United States Patent [19]

Stark

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[54] **ARTICULATED RAILWAY TILTING DUMP CAR**

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[73] Assignee: **Pullman, Incorporated,** Chicago, Ill.

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[52] **U.S. Cl.**..... **105/261 A,** 105/4 R, 105/358, 214/64, 298/17 R, 302/57

[51] **Int. Cl.**..... **B61d 5/02,** B61d 9/08, B61d 9/12

[58] **Field of Search**..... 105/3, 4 R, 196, 261 A, 105/358; 214/49, 64; 298/38, 17 R; 302/57

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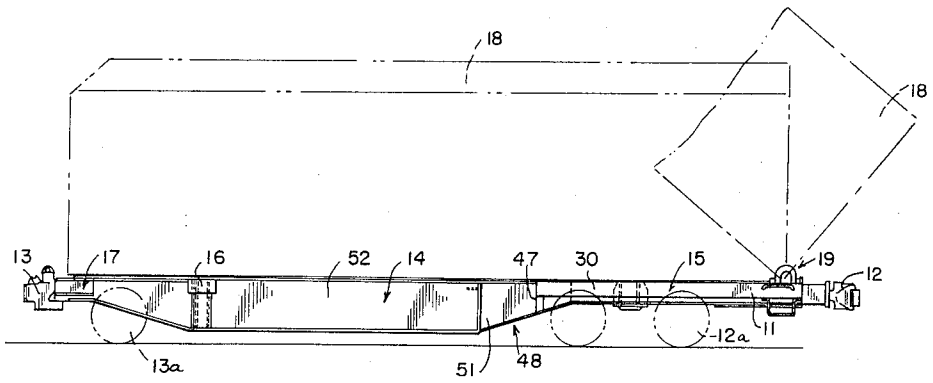
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Assistant Examiner—Howard Beltran
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[57] **ABSTRACT**

An articulated hopper car having a pivoted and tiltable container contained on each car unit of the articulated combination. Each container pivots about a trunnion attached pneumatic discharge outlet. A center sill member is the primary structural supporting member extending between the truck members. A stabilizing torque box arrangement including a pair of arms extending generally diagonally from the center sill form a side bearing stabilizing anti-sway connection when in contact with the common truck which supports two adjacent cars.

8 Claims, 11 Drawing Figures



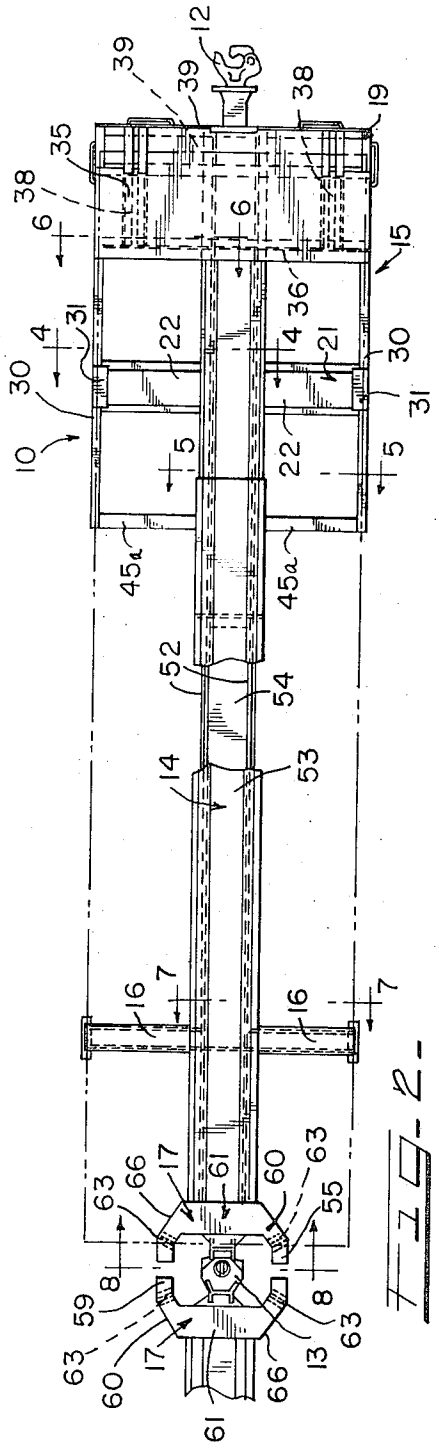


FIG. 2

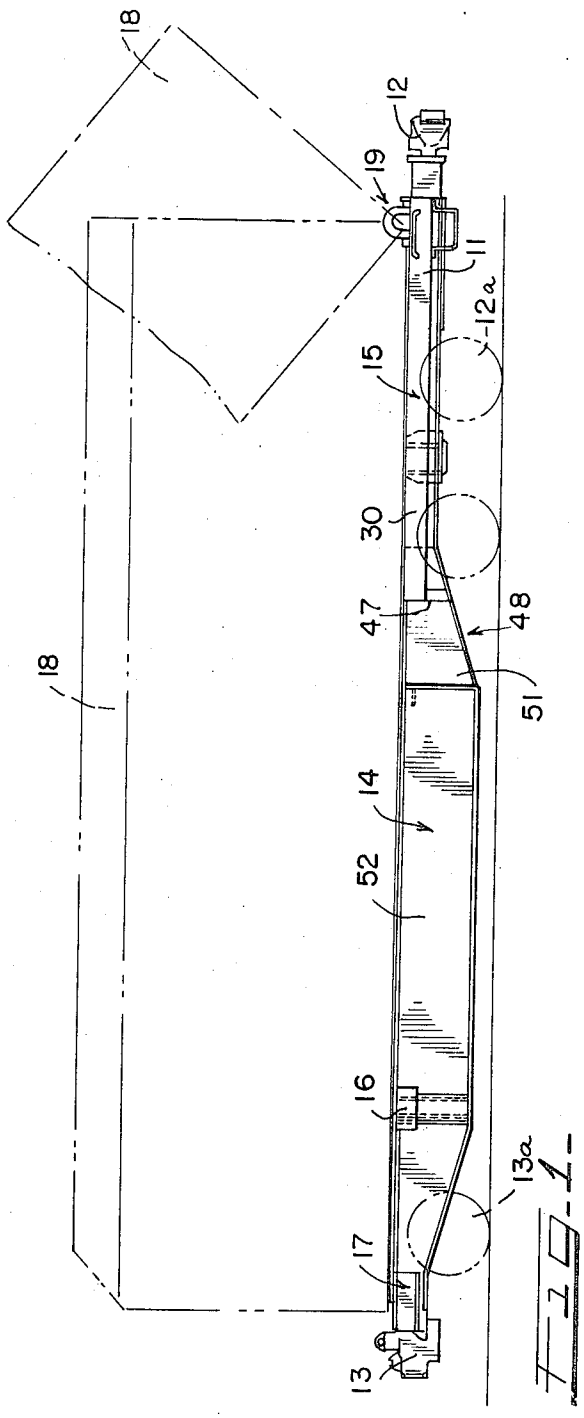


FIG. 1

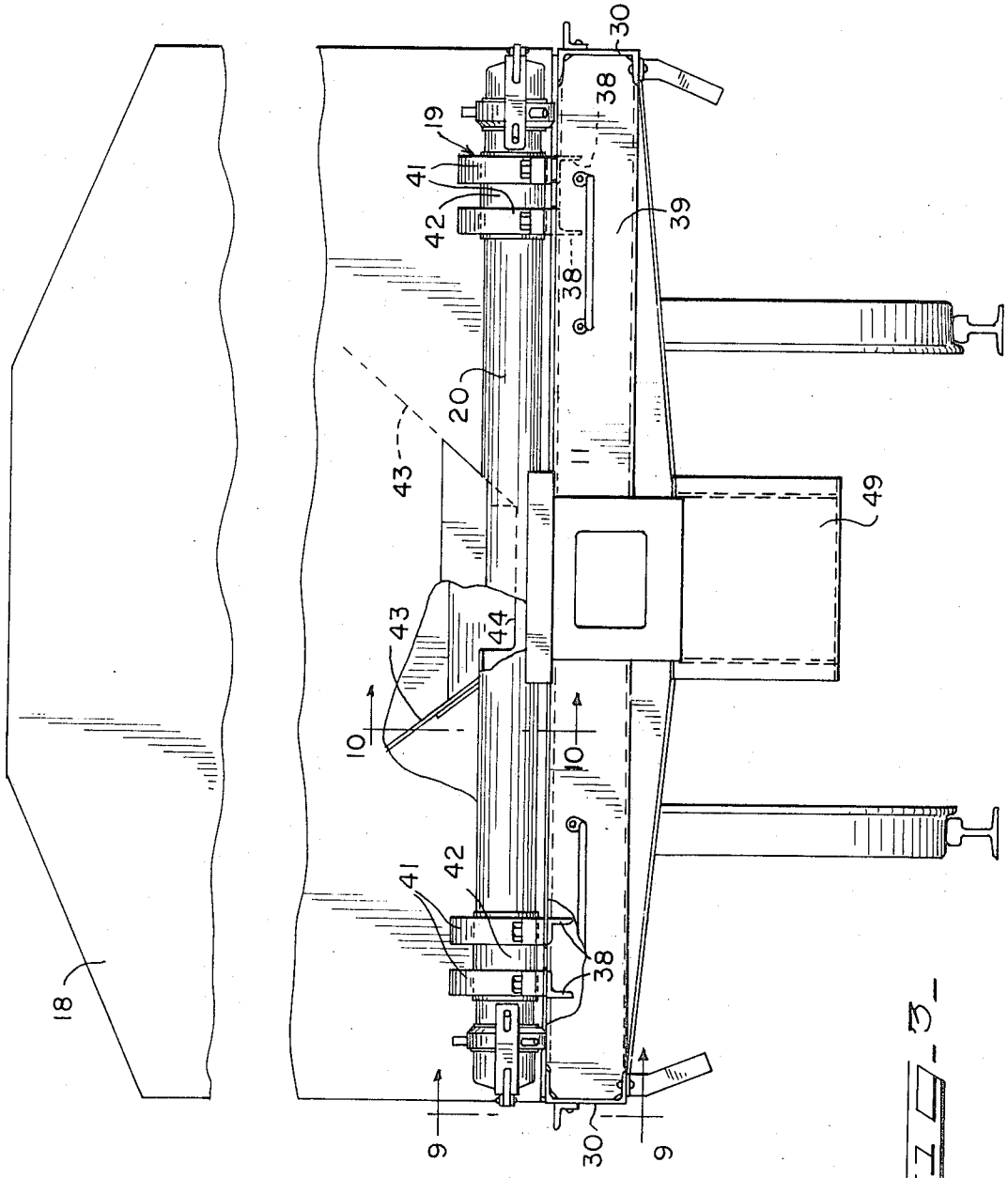
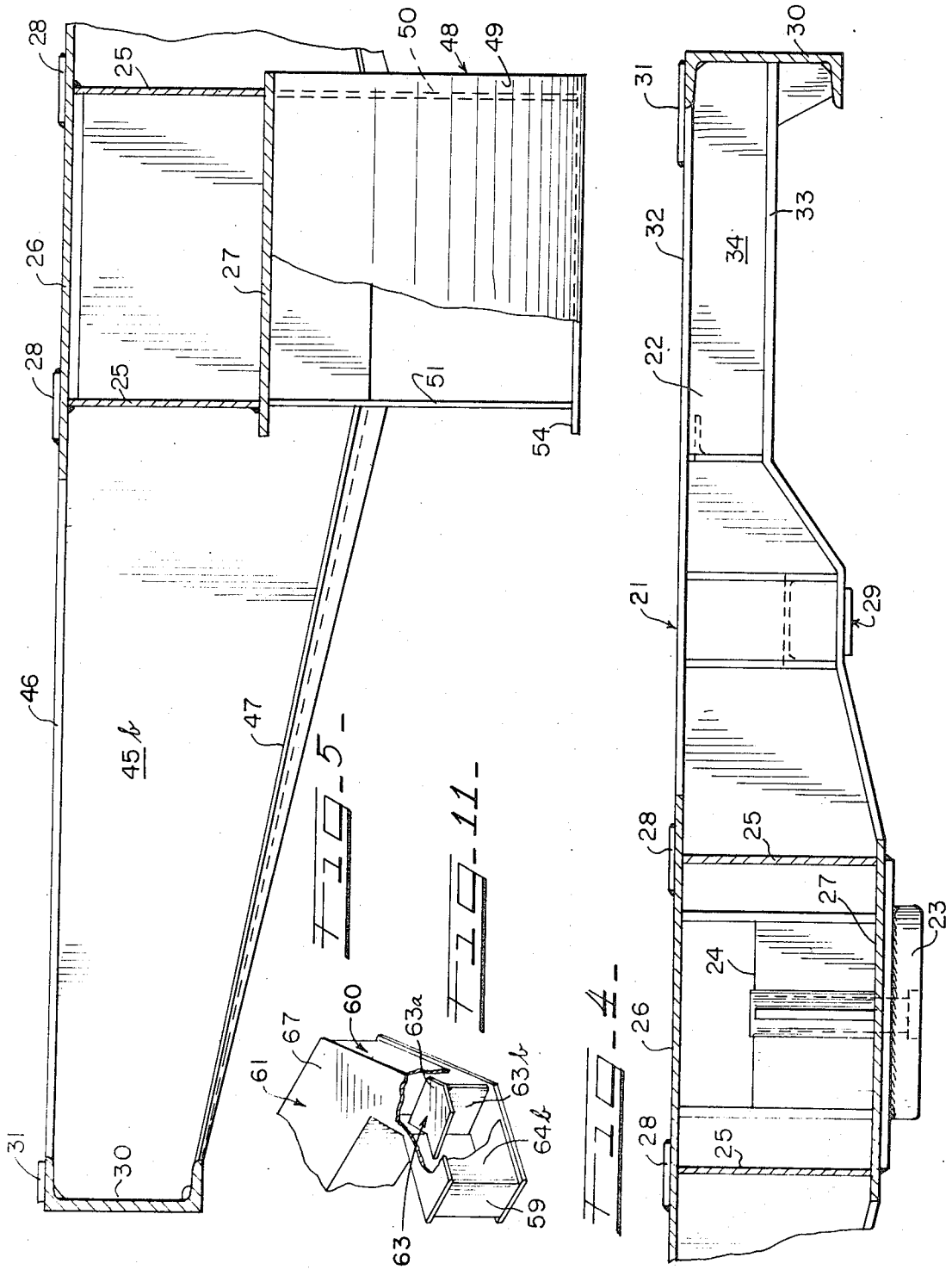


FIG. 5


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FIG-5-
FIG-11-
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63a
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63b
64b
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FIG-4-
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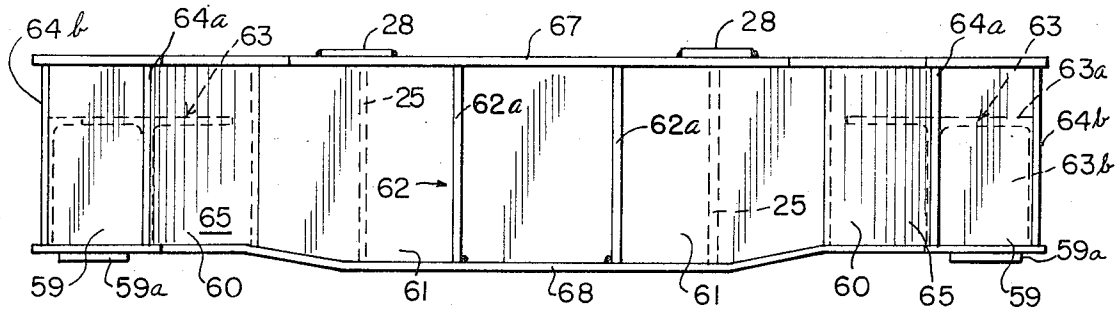


FIG. 8

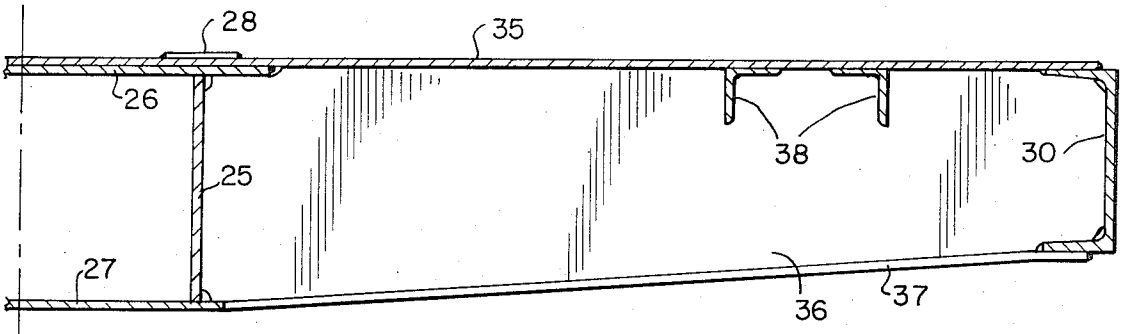


FIG. 6

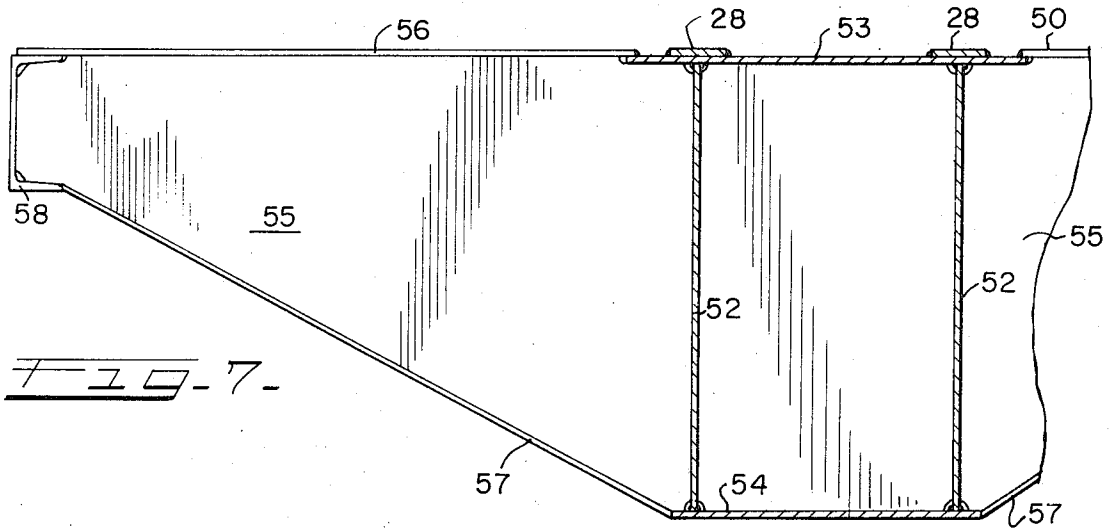
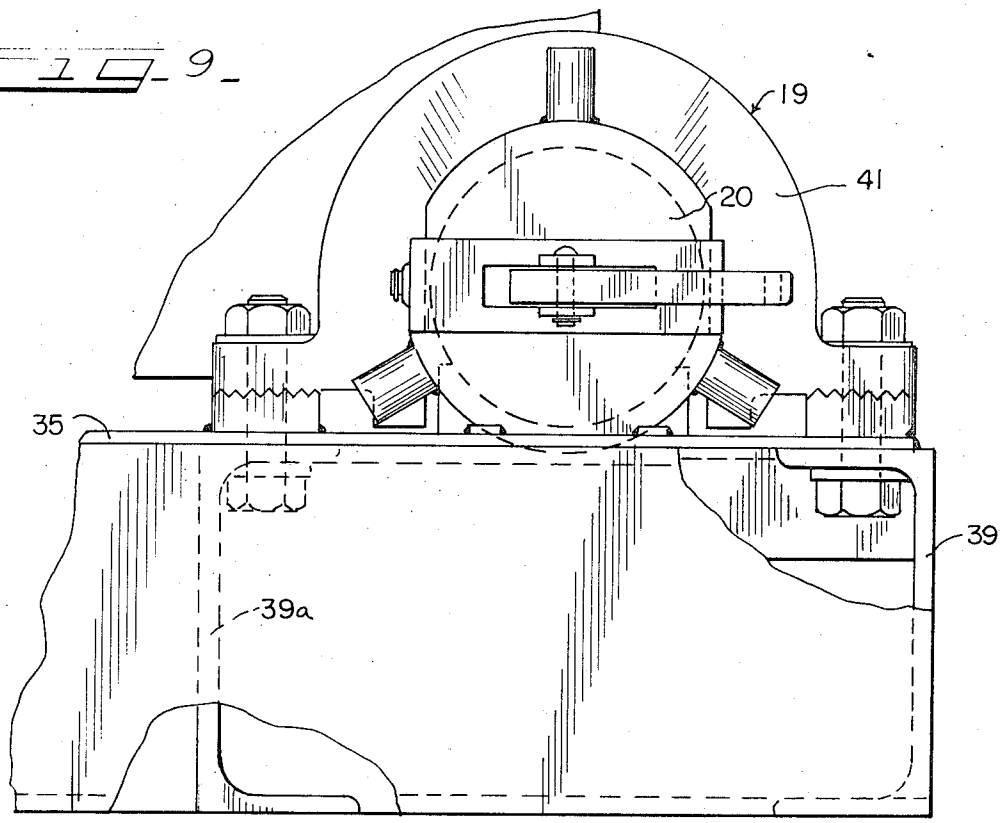


FIG. 7

FIG. 9



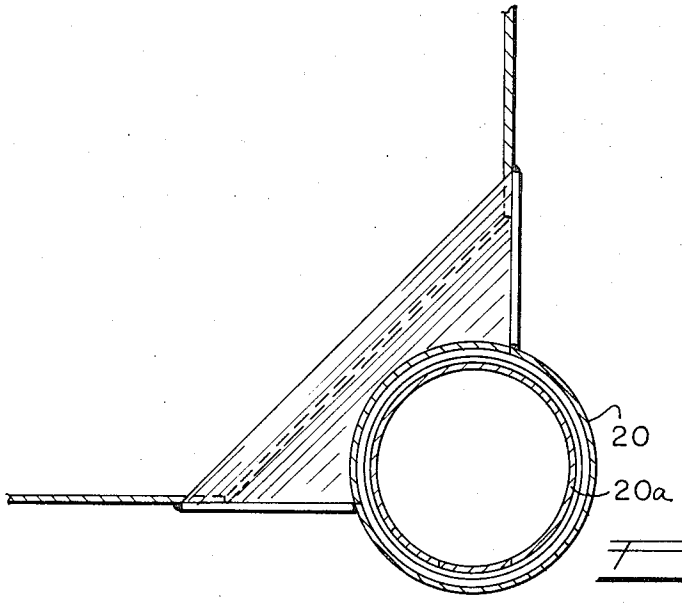


FIG. 10

ARTICULATED RAILWAY TILTING DUMP CAR

BACKGROUND OF THE INVENTION

1. Field of the Invention: This invention pertains to container carrying vehicles and in particular articulated vehicles having a generally skeletonized structural supporting underframe and having pivotally movable hoppers contained thereon.

2. Description of the Prior Art: Prior art articulated container carrying vehicles generally include a solid flat deck extending between the ends of the vehicle in combination with a center sill to form a reinforced container supporting structure. Stabilizing arrangements in the area of the articulated connection have generally included bolster type of transversely extending support members which are provided to support the end portions of the articulated car and the container and also form side bearing members to prevent excessive sway between the vehicle body and the articulated truck. Laterally extending bolster type of side bearings increase the length of the vehicle because of additional spacing required between the bolster type of side bearings and the articulated connection when rounding curves.

SUMMARY

The present invention relates to articulated container carrying vehicle arrangements including a transporting vehicle having reinforced end portions and a unitary center sill connecting the end portions and having a deep beam cross section forming a reinforced structural bending and torsion member extending between the car end portions. The reinforced end of the vehicle adjacent the articulated connection includes a torque box anti-sway side bearing member extending diagonally from the center sill and engageable with the articulated truck to prevent undesirable sway of the vehicle body during transport. The side bearing arrangement does not require additional spacing from the articulated connection to provide clearance in rounding sharp curves and usual parameters such as truck design and spacing between the pivotal hoppers will dictate the smallest radius curve which could be rounded. The vehicle also includes a reinforced end portion adjacent a conventional coupler to provide support and mounting structure for a pivotal connection between the vehicle body and a tiltable container or hopper. The pivotal connection is formed about the pneumatic discharge tube of the pivotal container.

It is an object of the present invention to provide a container carrying vehicle having a pivotal bearing arrangement for tilting of a container and said vehicle including a substantially skeletonized underframe.

It is another object of the present invention to provide a reinforced underframe including a pair of spaced end portions to provide support for the tilting container and one end including a torque box stabilizing arrangement engageable with the central truck to prevent excessive sway of the vehicle body when unloading and during transport.

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

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the container carrying vehicle of the present invention with an associated tiltable container shown in phantom;

FIG. 2 is a top plan view with portions cut away for clarity of the device illustrated in FIG. 1;

FIG. 3 is an end view of the container carrying vehicle with portions removed;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 2;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 2;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 2;

FIG. 7 is a sectional view taken along line 7—7 of FIG. 2;

FIG. 8 is a sectional view taken generally along line 8—8 of FIG. 2 and with parts removed for clarity;

FIG. 9 is a view taken along line 9—9 of FIG. 3;

FIG. 10 is a sectional view taken along line 10—10 of FIG. 3; and

FIG. 11 is a perspective view of a portion of the torque box side bearing arrangement with portions removed.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 depicts the general arrangement of the articulated container car **10** and shows a draft sill **11** which may receive the conventional type of coupler **12.** The opposite end of the car includes an articulation type of coupler and center plate assembly **13** wherein the coupled connection also forms a center plate for riding on the articulated truck, a portion of which is designated schematically at **13***a*. The center sill **14** extends between the spaced truck members.

Adjacent the conventional car end portion is a reinforced vehicle end section designated by the numeral **15** and longitudinally spaced therefrom at the other end of the vehicle are a pair of transversely extending container support arms **16** and the antisway stabilizing assembly **17.** A container indicated in phantom and designated by the numeral **18** may be rotated about a pivot **19** by on board hydraulic equipment or by use of a trackside lifting device which permits tilting of the container for facilitating rapid discharging. The preferred embodiment of the present invention contemplates a pivot **19** which rotates the container **18** about its pneumatic discharge tube **20.** The pneumatic discharge assembly **20** includes the usual internal rotatable valve unit which is designated at **20***a* in FIG. **10.**

Reinforced end **15** also includes the transversely extending bolster unit **21** which includes a pair of laterally extending arm members **22** rigidly attached to the center sill **14.** As illustrated in FIG. **4,** positioned between the arms **22** of the bolster unit **21** is the center plate **23** and its associated reinforcing spider or center filler assembly **24** which forms a rigid connection between the arms **22** of the bolster unit and also transmits center plate forces effectively through the bolster arms **22.** Laterally spaced on each side of the reinforcing spider assembly are a pair of side plates **25** which extend between a top cover plate **26** and a lower or bottom cover plate **27** to form a box shaped reinforcing beam member about the reinforcing spider **24.** Leveling and support plates **28** may be attached on top of the top cover plate **26.**

Spaced laterally outwardly of the reinforcing spider are the symmetrically positioned side bearing plates **29** which prevent undesirable excessive sway of the car in the area adjacent the conventional truck **12a**. Further outwardly of the reinforcing spider **24** are the side frame members **30** which form cap plate portions for the bolster beam **21** and also provide sides for the box shaped reinforcing end portions **15**. A container support plate **31** is positioned atop the side frame member **30** and in a level plane with the associated leveling strips **28** to provide a generally flat plane for the container **18** to rest on. A flat continuous plate member **32** forms the top of the bolster arm **22** and a second or bottom plate **33** is spaced from the top plate **32**. Side plates **34** combine with the top and bottom plates **32, 33**, respectively, to form a box shaped bending bolster beam assembly **21**. This bolster beam has sufficient strength and is tapered so as to provide adequate beam depth to support the applied shear and bending loads which are applied by the supported container during transport and during unloading.

As best illustrated in FIG. **2**, the extreme right end portion of the container carrying vehicle includes a top shear plate or cover plate **35**. An L-shaped shear plate support member **36** includes a vertical web portion extending between the bottom of the shear plate **35** and the side frame member **30** and the side plate **25**. This support member **36** also has a bottom horizontally extending flange portion **37** as is best illustrated in FIG. **6**.

As indicated in FIG. **6**, the spaced longitudinally extending reinforcing angle members **38** extend between the web portion **36** and the end sill plate **39** which is shown in FIG. **3**. The end sill member **39** is a C-shaped structural support extending between the draft sill **11** and each side frame member **30**. Inwardly of the end sill member **39** is an internal laterally extending support **39*a*** which further rigidifies the extreme end portion of the vehicle where concentrated loads are present when the container is tilted for discharging.

Spaced trunnion assemblies **41** are positioned adjacent the end sill **39** and securely attach the pivoted container to the railway vehicle. A bearing sleeve **42** extends between each trunnion **41**. The bearing sleeve **42** is rotatably positioned about the pneumatic discharge tube **20** and connected to the container **18** by suitable hinge means. As indicated in FIG. **3** slope sheets **43** are used to direct lading within the hopper to a discharge opening **44** which is cut in the discharge tube **20**.

Spaced from the end sill **39** at the same end of the car are a pair of cross members **45*a*** which extend laterally outwardly of the center sill **14** and are best illustrated in detail in FIG. **5**. As noticed, these cross members are vertically tapered units including a vertically extending reinforcing web **45*b*** positioned between upper and lower reinforcing plates **46, 47**, respectively.

Progressing from right to left of the illustration in FIG. **1**, following the cross members **45*a*** is a center sill to draft sill transition portion **48** which is illustrated in detail in FIG. **5**. As noticed in FIG. **5**, a lower plate **49** extends diagonally downwardly from the reinforced vehicle end portion **15** and connects the spaced side plates **50, 51**.

The center sill **14** is a deep beam section having a box shaped configuration and including side plate members **52** and top and bottom reinforcing plates **53, 54**, respectively.

The container support arms **16** which are positioned near the end of the car adjacent the articulated connection, and best illustrated in FIGS. **2** and **7**, include a vertically extending pair of spaced webs **55**. The webs **55** are positioned between upper and lower plate portions **56, 57**, respectively, to thereby form hollow generally box shaped supporting beam portions extending outwardly from the center sill **14** and having adequate beam depth to support one end of the pivotable container **18**. Cap plates **58** seal off the outer margins of the support arms **16**.

The stabilizing arrangement associated with the articulated connection and the articulated truck **13*a*** is indicated by the numeral **17** and shown in detail in FIGS. **8** and **11**. More specifically, however, the torque arm arrangement includes the bearing pad arm portion **59** which is at the extreme end portion of the torque arm unit and forms a supporting member for mounting of a bearing pad plate **59*a***. The plate **59*a*** is a wear surface which contacts an associated part of the articulated truck to limit side sway of the body unit relative to the supporting truck members. A generally diagonally extending transition portion **60** connects the bearing pad arm portion **59** and the reinforced transversely extending section **61**. As illustrated in FIG. **8**, the central portion of this torque arm arrangement **17** includes a box shaped section **62** having side plate members **62*a*** contained internally.

The transition portion **60** absorbs a combination of bending and twisting type of stresses and requires a specially reinforced section to adequately absorb these forces. Therefore, the section between the bearing pad arm **59** and the transition portion **60** is reinforced by a T-shaped plate member **63** having a horizontally extending top portion **63*a*** and a vertically extending web portion **63*b***. This reinforcement section **63** combines with the side plates of bearing arms **64*a***, **64*b*** to form an essentially box shaped reinforcement section in this area.

The transition section **60** is also essentially box shaped and has a front plate **65** and a longitudinally spaced back plate associated therewith to combine with the top plate of the entire unit **67** and the bottom plate of the entire unit **68** to complete the rectangularly shaped cross section of the beam **68** to complete the rectangularly

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.

What is claimed is:

1. A railway vehicle having a tiltable container and supporting body carried on a pair of truck units including a connecting truck and:

a skeletonized supporting vehicle underframe having a rigid center sill with a deep beam center section and having shallow beam end portions and a reinforced end portion and a longitudinally spaced modified end portion having a stabilizing torsion box anti-sway means;

said center sill also including transition beam portions connecting the deep beam section with said shallow beam end portions;

container support arms being attached to said center sill at the connection of the center sill deep beam section and the shallow beam end portion adjacent said modified end portion;

said reinforced end portion including bolster means, side frame means and an end sill member all rigidly interconnected to form the reinforced end portion;

said tiltable container having a first end portion with pivot means fixedly attached to said reinforced end portion to permit rotational vertical movement of the container;

said stabilizing torsion box anti-sway means of the modified end portion including arm means extending from one of said shallow beam end portions of the center sill and engageable with said connecting truck to stabilize the tiltable container on said connecting truck.

2. The invention according to claim **1**, and:

said reinforced end portion having a top cover shear plate means positioned atop said center sill;

support means for said shear plate means positioned inwardly of the end sill member and having portions extending from said center sill to said side frame means and said shear plate means and said associated support means combining with the side frame means and with the end sill member to thereby provide a rigid mounting platform for the tiltable container.

3. The invention according to claim **2**, and:

said reinforced end portion including a pair of laterally extending cross members having a tapered contour and extending from the side frame members to said center sill to thereby combine with the end sill member to provide a closed reinforced end portion.

4. The invention according to claim **1**, and:

said stabilizing torsion box anti-sway means including a transversely extending section in direct connection with the vehicle center sill and a diagonally extending section connected to the transverse section, and a generally longitudinally extending section completing the torsion box and in communication with the diagonally extending section;

said torsion box having top and bottom plates and side plates to thereby form a box shaped cross section and said torsion box also including internally positioned reinforcing plate members.

5. The invention according to claim **4**, and:

said reinforcing plate members including a reinforcing plate combination comprising a horizontally extending and a vertically extending plate portion connecting the diagonally extending torsion box section with the longitudinally extending torsion box section.

6. The invention according to claim **1**, and:

said container including pneumatic discharge means comprising a tube element and bearing sleeve member surrounding the tube element and hold down trunnions for positioning the bearing sleeve on the tube element to provide for the rotational movement of said container about said pneumatic discharge means.

7. The invention according to claim **1**, and:

said center sill including a centrally disposed deep beam box section and having a top plate portion containing a pair of spaced container support strips mounted thereon.

8. The invention according to claim **1**, and:

said container support arms having a tapered web portion extending outwardly of the vehicle center sill to provide vertical support and stabilization to the container.

* * * * *