Oct. 29, 1957 W. F. DIETRICHSON 2,811,115

BULK COMMODITY CAR

Filed Dec. 29, 1951 5 Sheets-Sheet 1

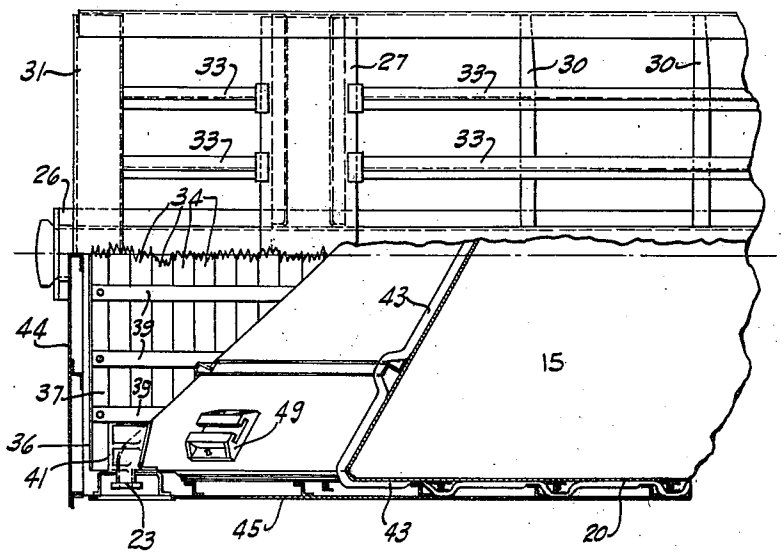


Fig. 1

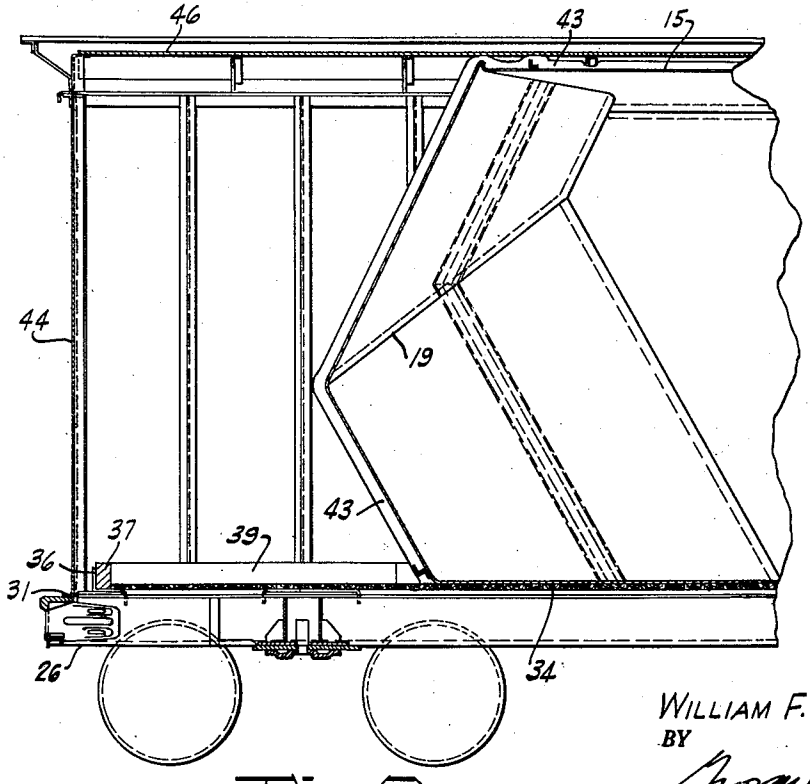


Fig. 2

INVENTOR.
WILLIAM F. DIETRICHSON
BY
George R. Gross
ATTORNEY

Oct. 29, 1957 W. F. DIETRICHSON 2,811,115

BULK COMMODITY CAR

Filed Dec. 29, 1951 5 Sheets-Sheet 2

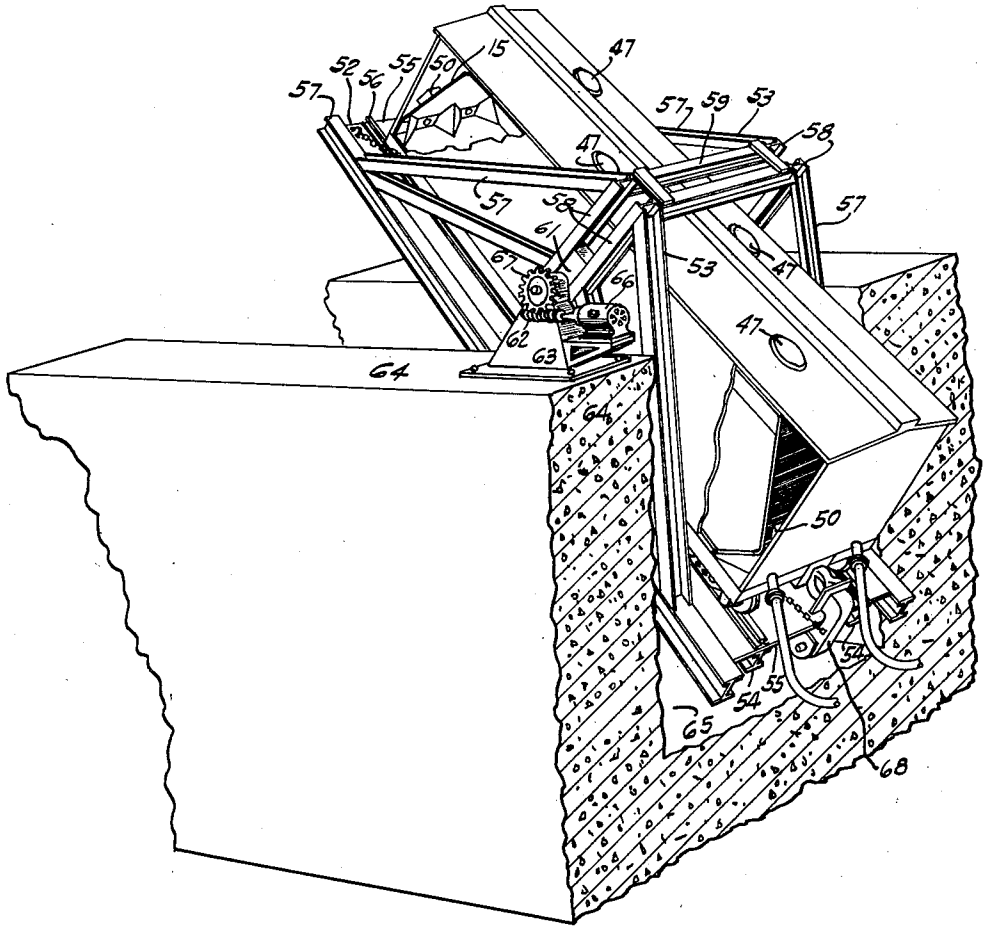


Fig. 3

INVENTOR
WILLIAM F. DIETRICHSON
BY
George R. Ericson
ATTORNEY

Oct. 29, 1957 W. F. DIETRICHSON 2,811,115

BULK COMMODITY CAR

Filed Dec. 29, 1951 5 Sheets-Sheet 3

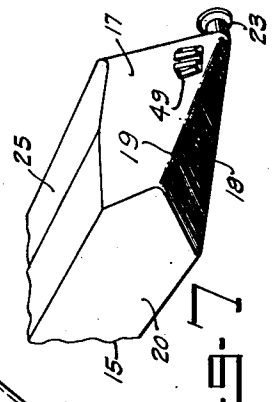


Fig. 7

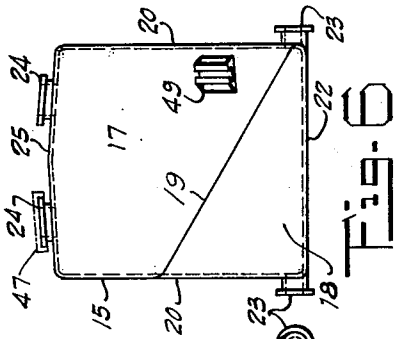


Fig. 6

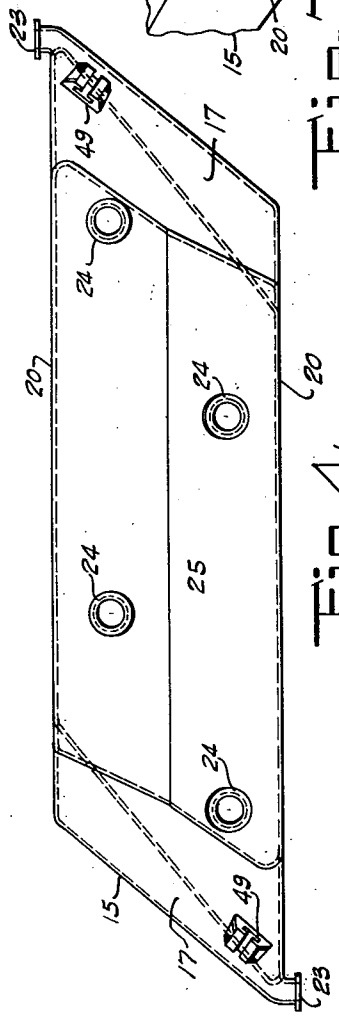


Fig. 4

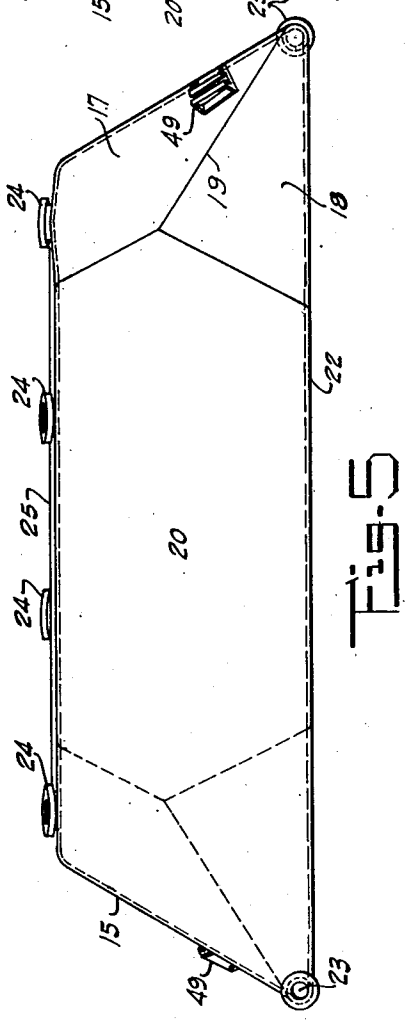


Fig. 5

INVENTOR
WILLIAM F. DIETRICHSON
BY George R. Ericson
ATTORNEY

Oct. 29, 1957 W. F. DIETRICHSON 2,811,115

BULK COMMODITY CAR

Filed Dec. 29, 1951 5 Sheets-Sheet 4

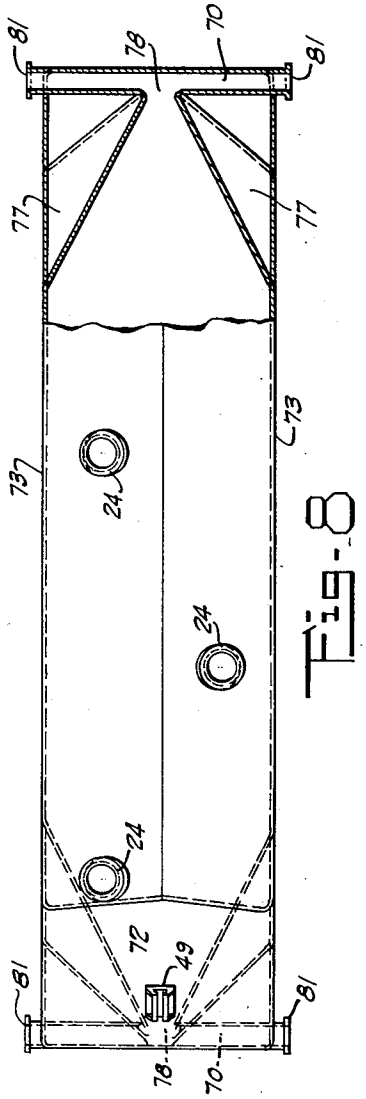


Fig. 8

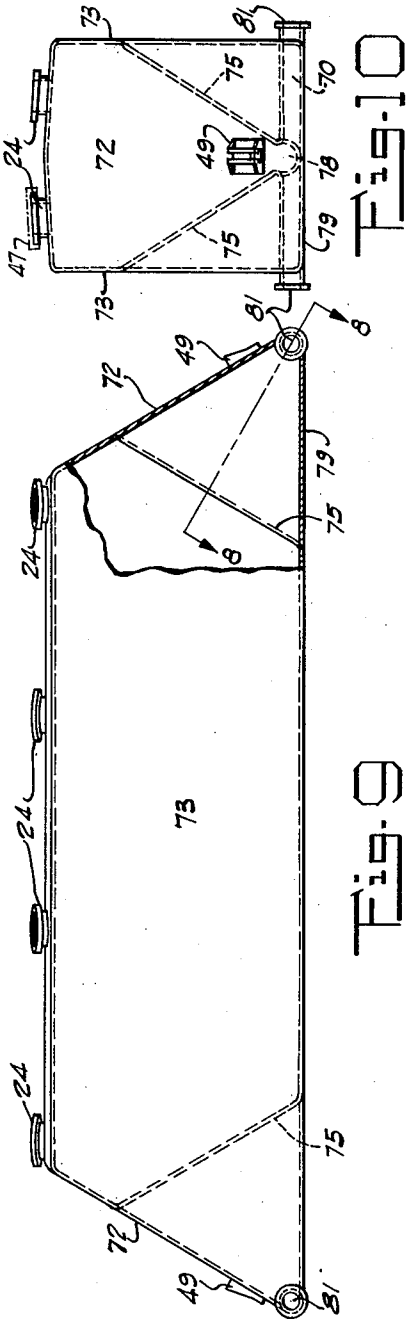


Fig. 9

Fig. 10

INVENTOR
WILLIAM F. DIETRICHSON
BY
ATTORNEY

Oct. 29, 1957 W. F. DIETRICHSON 2,811,115

BULK COMMODITY CAR

Filed Dec. 29, 1951 5 Sheets-Sheet 5

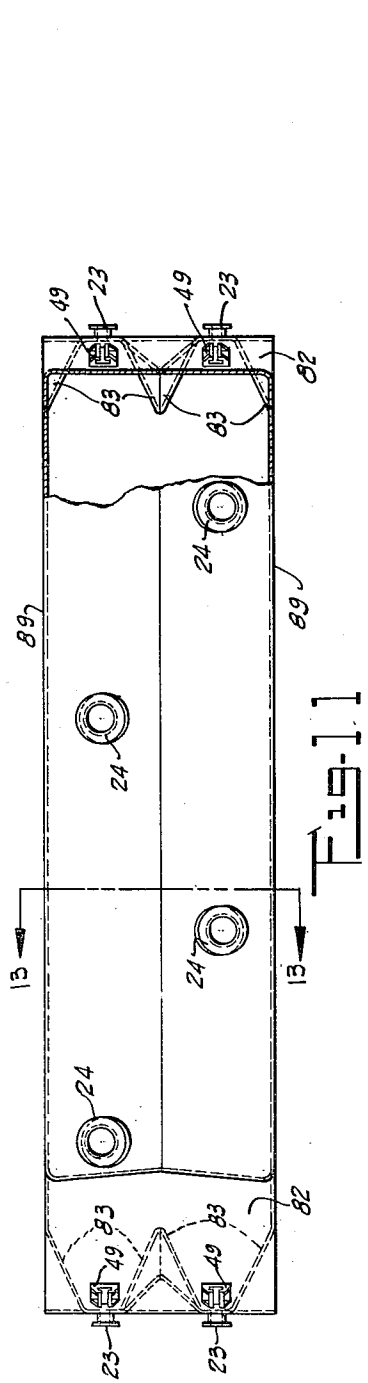


Fig. 11

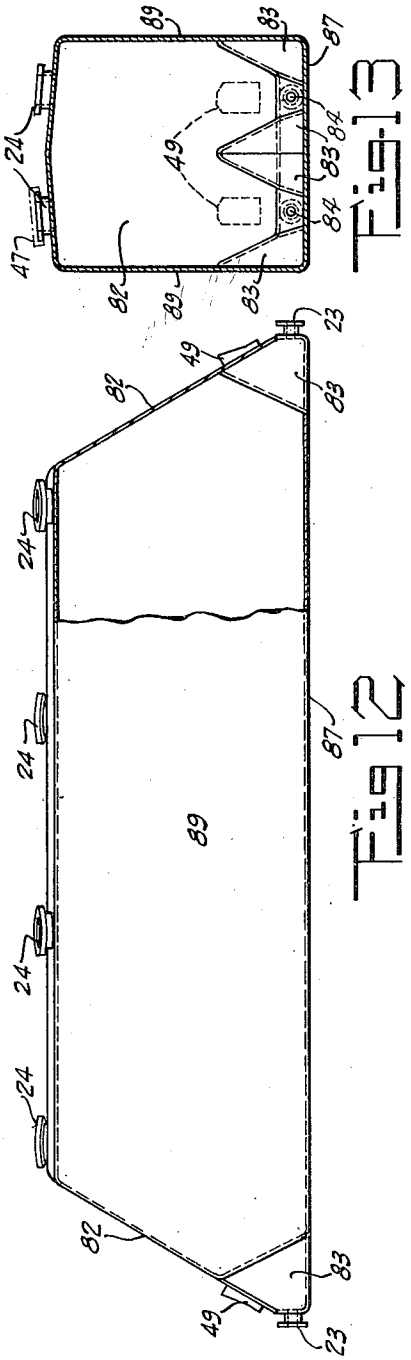


Fig. 12

Fig. 13

INVENTOR
WILLIAM F. DIETRICHSON
BY
George R. Ericson
ATTORNEY

United States Patent Office 2,811,115 Patented Oct. 29, 1957

2,811,115

BULK COMMODITY CAR

William F. Dietrichson, Garden City, N. Y., assignor to ACF Industries, Incorporated, a corporation of New Jersey

Application December 29, 1951, Serial No. 264,204

4 Claims. (Cl. 105—358)

This invention relates to railway freight cars and particularly to cars adapted to carry granulated or pulverized commodities such as flour and the like in bulk, a method of constructing cars of this type and a method and apparatus for unloading such cars.

Some commodities such as flour are generally transported in bags rather than in bulk, due largely to the difficulty of thoroughly emptying containers of flour which has become tightly packed. The use of bags is satisfactory for transporting relatively small quantities but when large quantities are shipped, the use of bags is wasteful for several reasons: first, the cost of the bags is substantial; second, filling and emptying the bags is time-consuming and consequently expensive; and third, the transfer of the individual bags to and from cars is a costly operation.

Accordingly it is an object of this invention to provide means for the shipment of flour and like commodities in bulk.

It is a further object to provide relatively simple yet highly effective means for rapid and complete evacuation of railway cars in which pulverized or granulated commodities are shipped in bulk.

It is an additional object to provide a railway car particularly adapted to the bulk shipment of flour and like commodities.

It is an additional object to provide a novel method of constructing cars for the transportation of pulverized or granulated commodities in bulk.

It is a still further object to provide a novel method for the emptying of railway cars carrying granulated or pulverized commodities.

It is another object to provide a railway car of the above type, and apparatus for unloading it, whereby for the purpose of unloading, the entire mass of the lading may be directed by gravity toward the outlet.

Further objects and advantages will be apparent from the following description, reference being had to the accompanying drawings wherein forms of the present invention are clearly shown.

Referring to the drawings:

Fig. 1 is a horizontal sectional view of a portion of railway car incorporating my invention.

Fig. 2 is a vertical sectional view of a portion of a railway car incorporating my invention.

Fig. 3 is a perspective view, partially sectionalized, showing a mechanism for evacuating cars of the type shown in Figs. 1 and 2.

Figs. 4, 5 and 6 are, respectively, plan, elevation, and end views of one form of tank.

Fig. 7 is a fragmentary perspective view of the tank illustrated in Figs. 4, 5, and 6.

Fig. 8 is a plan view of a second form of tank, partially sectionalized along the line 8—8 of Fig. 9.

Figs. 9 and 10 are, respectively, elevation and end views of the tank of Fig. 8.

Figs. 11 and 12 are, respectively, plan and elevation views partially sectionalized of a third form of tank.

Fig. 13 is a vertical transverse sectional view along the line 13—13 of Fig. 11.

Referring particularly to Figs. 1–7, the reference character 15 generally indicates a tank, which may be fabricated of stainless steel or other corrosion resistant metal. The proportions of tank 15 are such that the tank may be fitted into a conventional railway house car superstructure, although it is evident that its dimensions might be varied to conform to any railway clearance limitations.

The preferred form of tank shown in Figs. 4, 5, 6 and 7 is of substantially rectangular cross-section, and is formed with wedge-shaped ends each having faces 17 and 18 intersecting at 19 to form an edge or tip therealong. Intersection line 19 lies in a vertical plane passing through a corner of the car and intersecting the opposite side of the tank a substantial distance inwardly from the car end. The line of intersection 19 passes through the lower corner of the car and is inclined upwardly intersecting the opposite side wall of the tank at a point intermediate the lower and upper edges. Faces 17 and 18, one of the side walls 20, and the bottom wall 22 thus converge at a lower corner and at the point of convergence an outlet opening 23 is formed. A plurality of inlet hatches 24 are formed in the top wall 25 of the tank. Tank 15 is supported on a conventional freight car underframe consisting of a center sill 26, body bolsters 27, cross ties 30, end sills 31, stringers 33 and wood flooring 34. Longitudinal shifting of the tank with respect to the car underframe is prevented by a system of braces including a transverse angle member 36 which is secured to the end sills and extends substantially across the entire length of the sill, a transverse beam 37 bolted to angle member 36, and a plurality of spaced longitudinally extending beams 39 abutting against beam 37 and angle member 36 at one end and against the lower edge of the tank at their other end. Spaced relation between the outlet corners of the tank 15 and transverse beam 37 is maintained by a spacer casting 41 having one surface conforming to the surface of the tank adjacent the outlet, and its opposite surface flat for abutting engagement with beam 37. All exposed surfaces of the tank are covered with insulating material 43 and a conventional housecar superstructure consisting of side and end walls 44 and 45, respectively, and roof 46, is erected on the underframe to completely enclose the tank. Openings are formed in the roof 46 to permit the projection therethrough of inlet hatches 24. Inlet hatches 24 are provided with suitable sealing closure members 47 and outlet openings 23 are similarly provided with a suitable closure member as well as with a fitting whereby a suction hose may be attached for evacuation of the tank. Mounting brackets 49 for vibrators 50 are secured to a wall of the tank adjacent the outlets for use in loosening the lading, as will be described further in the specification.

Cars of the type described above are adapted for gravity unloading, and for this purpose must be substantially up-ended. Fig. 3 shows a mechanism for up-ending railway cars. In Fig. 3 the reference character 52 generally denotes a rigid track-supporting structure consisting of a pair of rigid side frames 53, transverse floor supports (not shown), I-beam stringers 54, steel floor 55, and spaced track rails 56. Side framing 53 consists of longitudinal members 57, a pair of vertical members 58 welded or otherwise rigidly secured at their lower ends to members 57, and a plurality of diagonal brace members extending between vertical members 58 and longitudinal members 57. The upper ends of members 58 are connected by transverse members 59. Trunnion blocks 61 are secured to vertical members 58 at a point near the center of gravity of the structure and are provided with outwardly extending trunnions 62, which are rotatably journalled in posts 63. Posts 63 are mounted on a concrete or masonry structure 64 forming a well

65 of suitable dimensions to permit the rotation thereinto of track-supporting structure 52 to an angle of at least sixty degrees from the horizontal. One or both of the trunnions 62 is provided with means whereby it may be rotated, such as electric motor 66 and gearing 67. The downwardly rotatable end of the track-supporting structure 52 is provided with a buffer element 68 adapted to engage the coupler face of a car to prevent the car from rolling off the structure when tilted. One end of the structure is adapted to register with the end of a stub siding, so that cars may be pushed directly onto it. Operation of the mechanism will be described in detail later in the specification.

Figs. 8, 9 and 10 illustrate a second form of tank having a transverse outlet passage 70 adjacent the lower transverse edges of the tank. The major portions 72 of the end walls slope inwardly at an angle of approximately thirty degrees from the vertical. The side walls 73 are intersected at each end, along lines 75, which make an angle of approximately sixty degrees with the horizontal, by converging substantially triangular wall portions 77 which terminate in a central outlet opening 78. It is evident from the drawings and the above description that the end wall portions 72 and 77 and the bottom wall 79 of the tank converge at the central opening 78 so that when the car is tilted at an angle of approximately sixty degrees from the horizontal these wall portions form a rectangular funnel, the major axis of which is vertical. The embodiment of a tank shown in Figs. 8, 9 and 10 is, like the first embodiment illustrated in Figs. 4–7, provided with a plurality of inlet hatches 24, and may be similarly mounted in a conventional housecar structure, with suitable modifications in the longitudinal bracing means. Outlet openings 81 at either end of transverse outlet passages 70 are provided with suitable closure means as well as with a fitting for attachment of a suction hose. Vibrator mounting brackets 49 are secured to the tank wall adjacent the outlets.

The third form of tank is shown in Figs. 11, 12 and 13, in which the tank is provided with outlets 23 projecting from the end of the tank. As in the tank of Figs. 8–10, the major portion 82 of the end wall is inclined inwardly at an angle of approximately sixty degrees from the horizontal. The end wall structure is intersected by small, substantially triangular wall portions 83 which converge in pairs toward outlet openings 84 to form, along with major end wall portion 82 and bottom wall 87, a plurality of funnels terminating in outlets 23. The lines of intersection between wall portions 83 and side walls 89 are at an angle of sixty degrees from the horizontal, so that the resultant funnels are of rectangular cross section, and their major axes are directed vertically when the tank is tilted longitudinally at an angle of sixty degrees with the horizontal. Outlets 23 are provided with suitable closure members and with fittings for the attachment of suction hoses. This form of tank, like the first and second forms described, may be similarly mounted in a conventional housecar structure provided with suitably modified longitudinal bracing means to conform to the shape of the tank. Vibrator mounting brackets 49 are similarly secured to the wall structure adjacent the outlets for use in loosening caked lading in unloading the tank.

The method of utilizing the car described and illustrated herein is as follows: Flour or a like commodity is poured into the tank through inlet hatches 24. Upon reaching its destination the tank is fitted with a vibrator and the car is switched onto the track portion of the tilting mechanism where it is tilted longitudinally to an angle of approximately sixty degrees from the horizontal. Since the car is provided at both ends with outlet openings, it may be tilted in either direction. The outlet closures are then removed. Hoses communicating with a source of vacuum are attached to the outlet openings. The vibrator is attached and energized to loosen the tightly packed flour in the vicinity of the outlet opening. One or more of the inlet hatches is opened to place the lading under atmospheric pressure, and a vacuum is applied to the outlet openings via the hoses, thereby cooperating with gravity to evacuate the lading of the car. To prevent the admission of foreign substances and dirt through the inlet hatches, they are preferably provided with a suitable filter.

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

I claim:

1. A vehicle including a longitudinally extending tank of substantially rectangular cross-section having a wedge-shaped end portion, the tip of said wedge-shaped portion passing through a lower corner of one side wall and making an acute angle with said side wall and intersecting the opposite wall mediate the lower and upper edges thereof, and an outlet opening in said lower corner.

2. A vehicle including a longitudinally extending tank of rectangular cross-section having a wedge-shaped end portion, the edge of said wedge-shaped portion lying in a vertical plane passing through a lower corner of the vehicle and intersecting the opposite side of the vehicle a substantial distance from the vehicle end, said edge being inclined upwardly from said lower corner so as to intersect the opposite side mediate its upper and lower edges, and an outlet opening in said lower corner.

3. A vehicle including an underframe, wall structure, and roof, and a longitudinally extending tank of substantially rectangular cross-section substantially enclosed within said underframe, wall structure and roof, said tank having a wedge-shaped end portion passing through a lower corner of one side wall and making an acute angle with said side wall and intersecting the opposite wall mediate the lower and upper edges thereof, and an outlet opening in said lower corner.

4. A vehicle including an underframe, wall structure, and roof, and a longitudinally extending tank of substantially rectangular cross-section substantially enclosed within said underframe, wall structure and roof, said tank having a wedge-shaped end portion, the edge of said wedge-shaped portion lying in a vertical plane passing through a lower corner of the vehicle and intersecting the opposite side of the vehicle a substantial distance from the vehicle end, said edge being inclined upwardly from said lower corner so as to intersect the opposite side mediate its upper and lower edges, and an outlet opening in said lower corner.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 22,876	Gray et al.	Feb. 12, 1946
830,444	Little	Sept. 4, 1906
1,193,630	Taylor	Aug. 16, 1916
1,465,665	Grindle	Aug. 21, 1923
1,595,152	Grindle	Aug. 10, 1926
1,875,609	Isaacson	Sept. 6, 1932
2,229,037	Boldman	Jan. 21, 1941
2,405,793	Lohse	Aug. 13, 1946
2,412,146	Hansen	Dec. 3, 1946
2,524,887	Curtis et al.	Oct. 10, 1950
2,563,470	Kane	Aug. 7, 1951

FOREIGN PATENTS

433,417	Germany	Aug. 31, 1926