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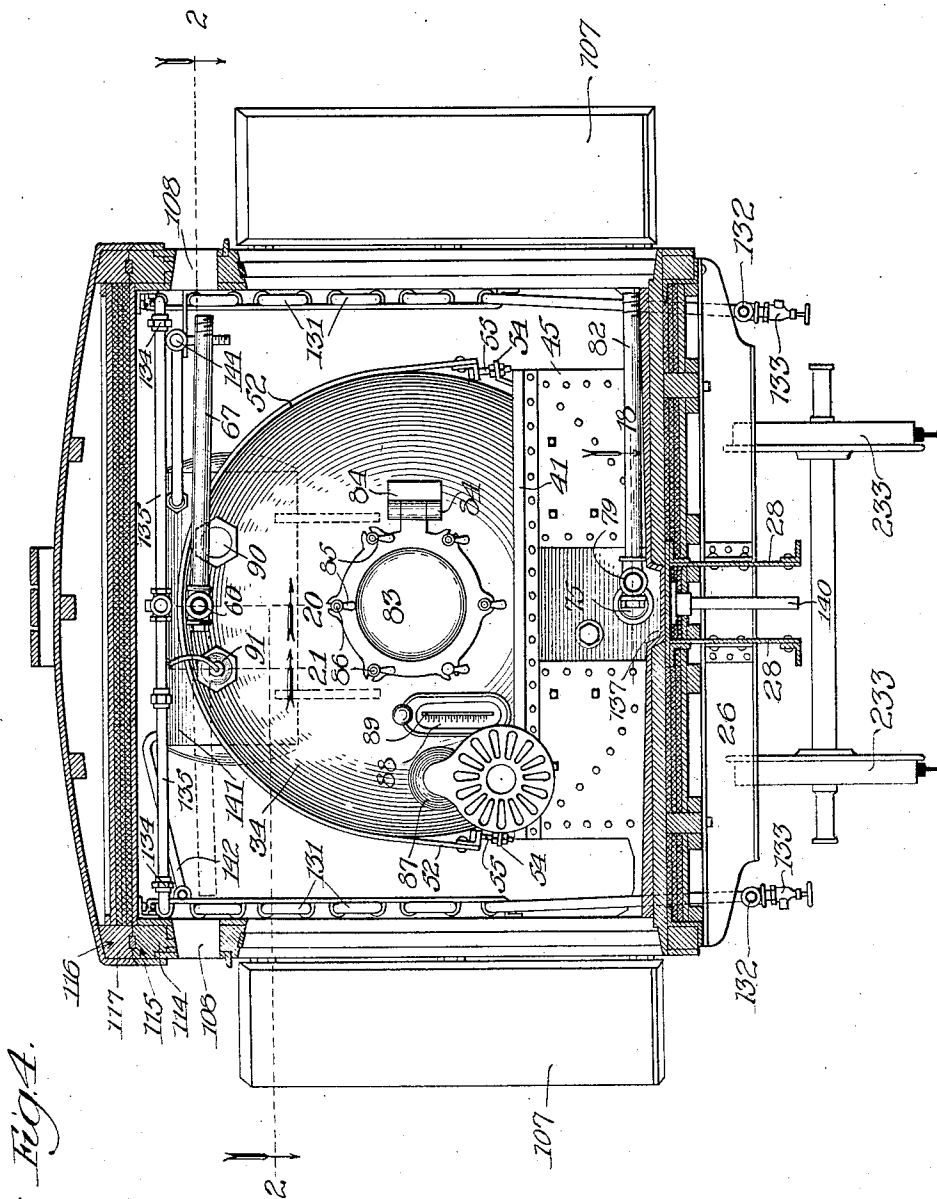
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R. R. WEAVER

RAILWAY CAR

Filed Nov. 21, 1924

9 Sheets-Sheet 3



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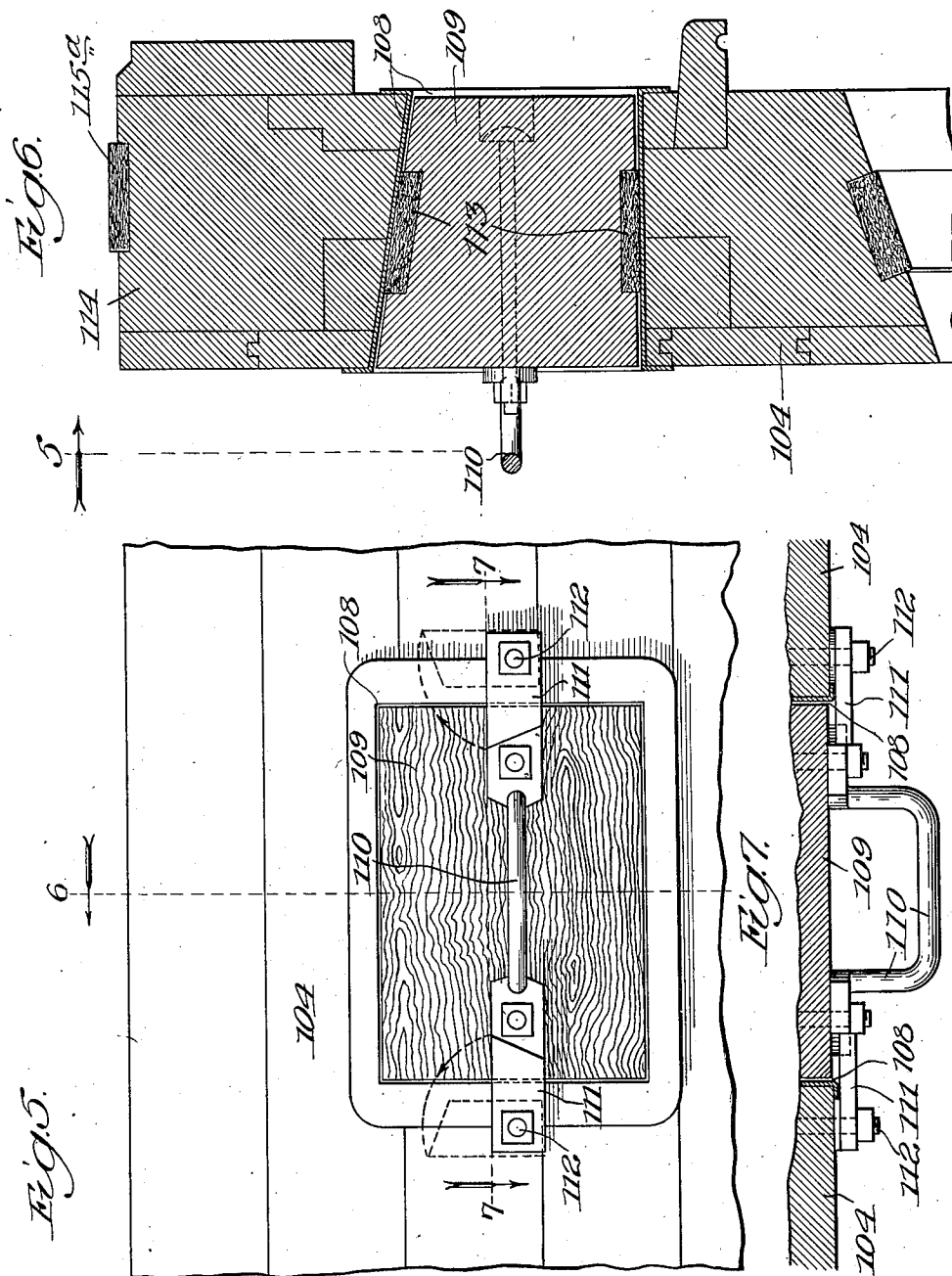
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RAILWAY CAR

Filed Nov. 21, 1924

9 Sheets-Sheet 4



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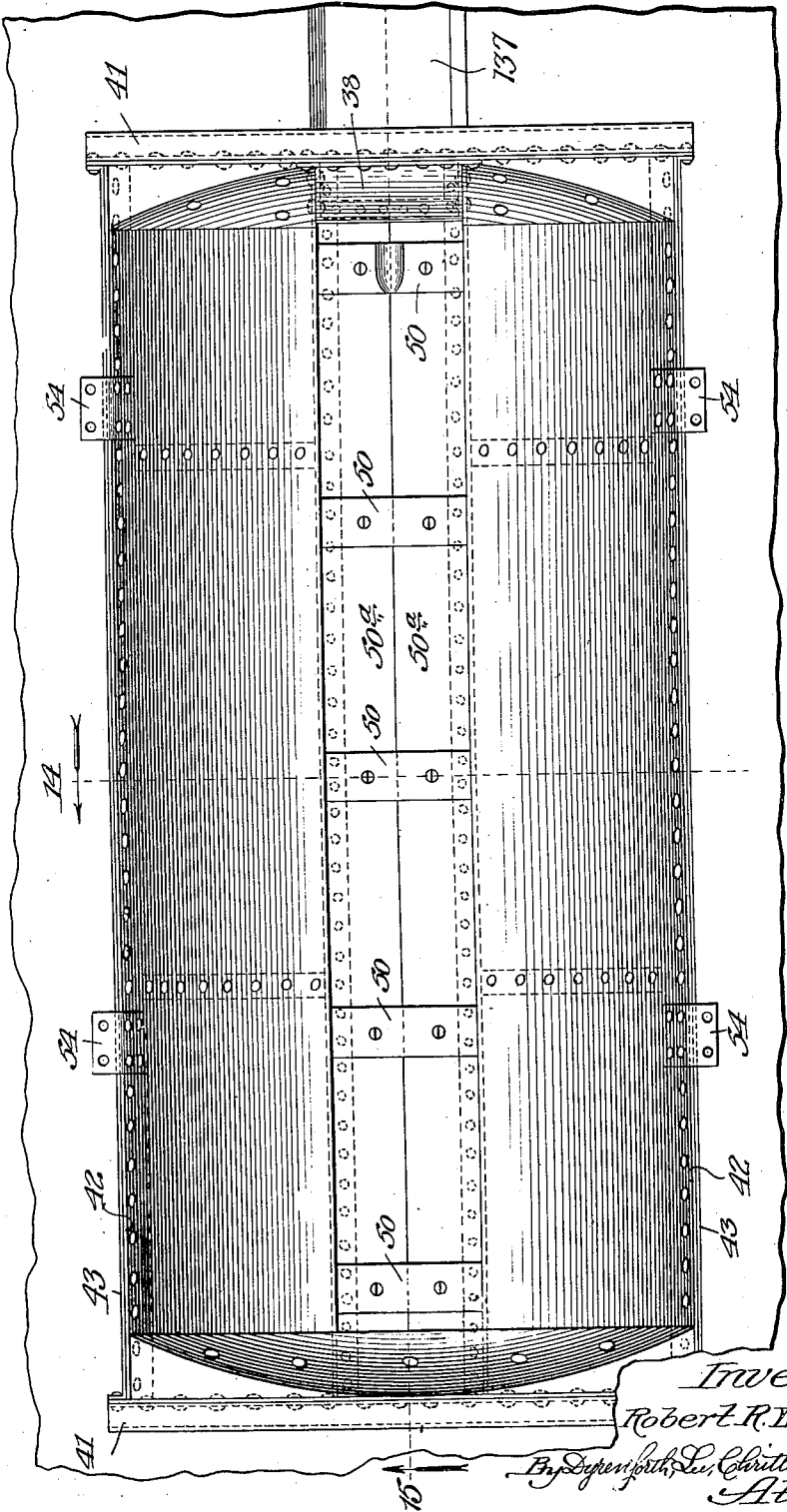
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9 Sheets-Sheet 6

Fig. 13.



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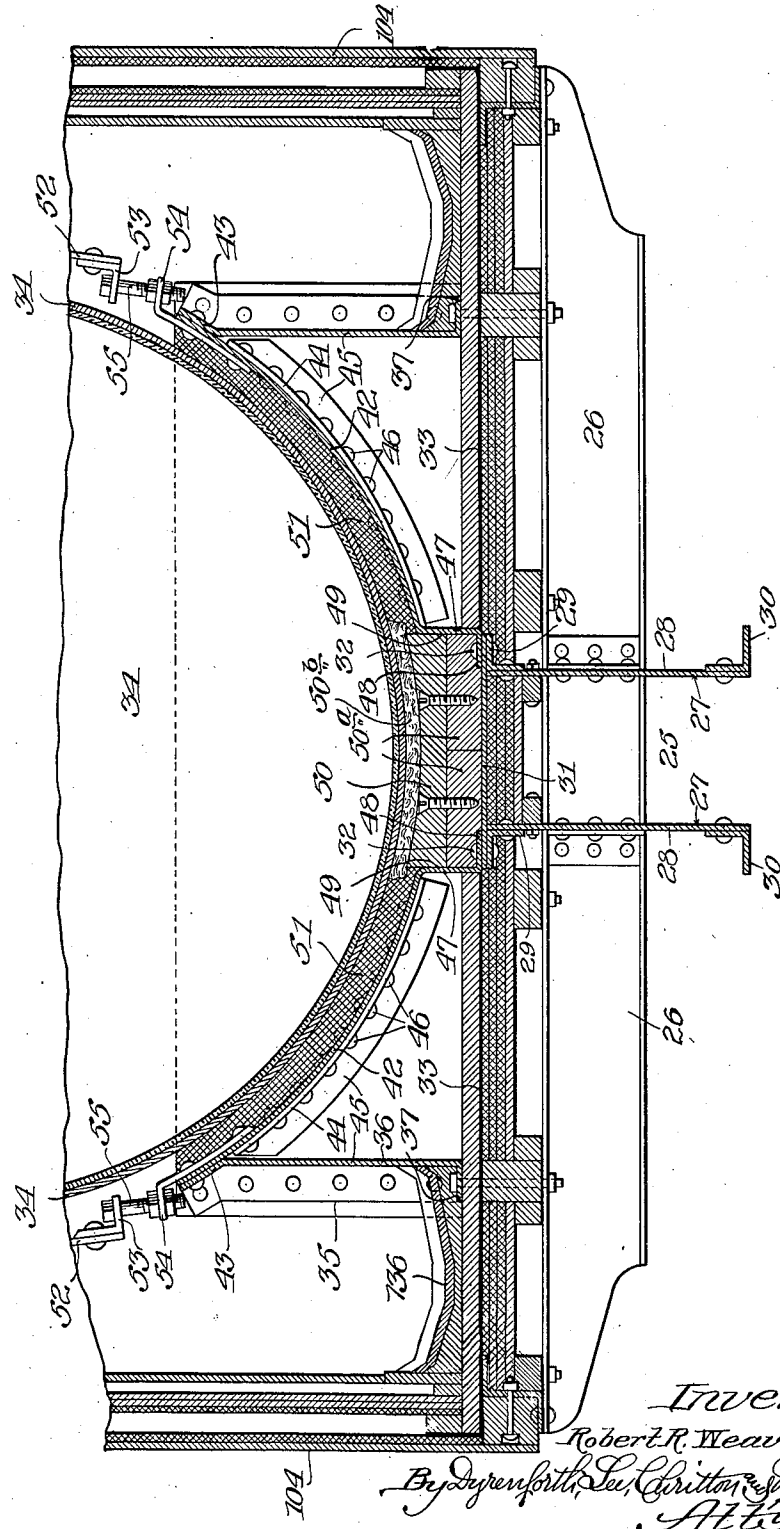
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Fig. 11.



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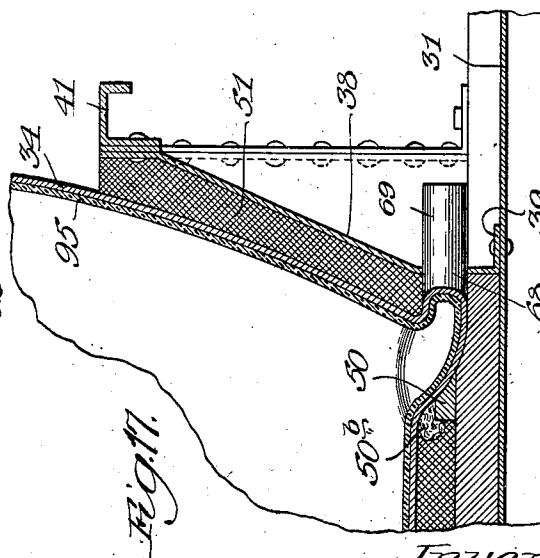
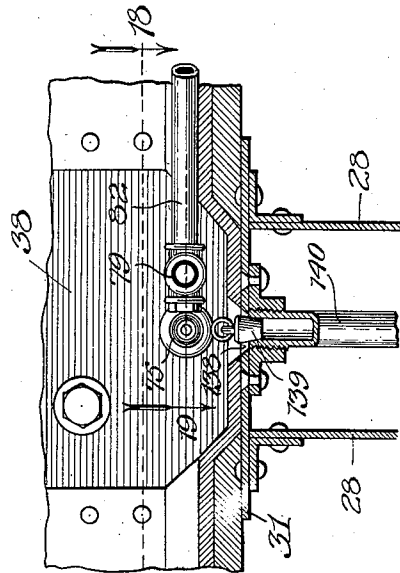
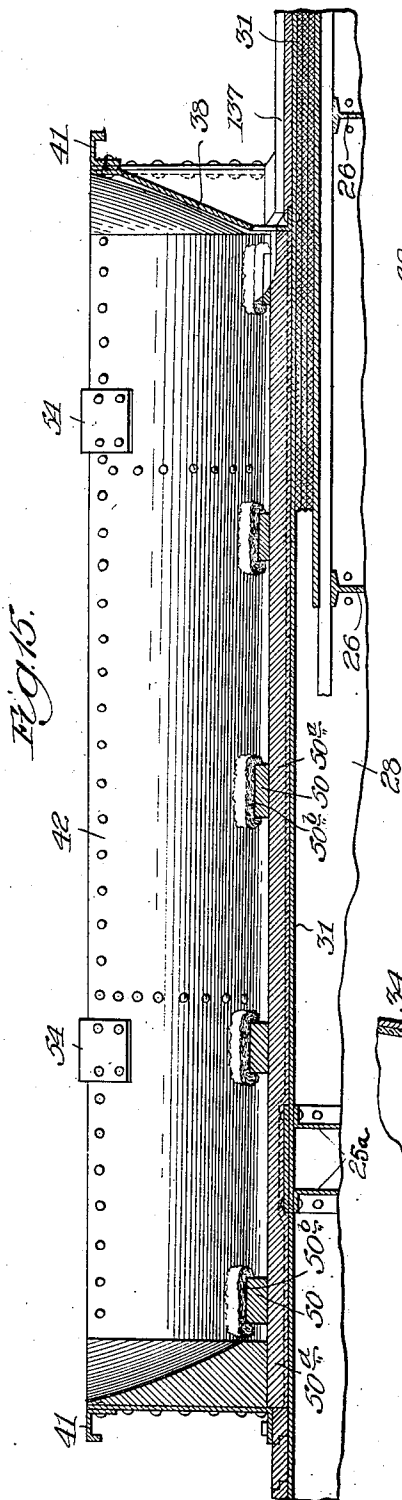
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RAILWAY CAR

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9 Sheets-Sheet 8



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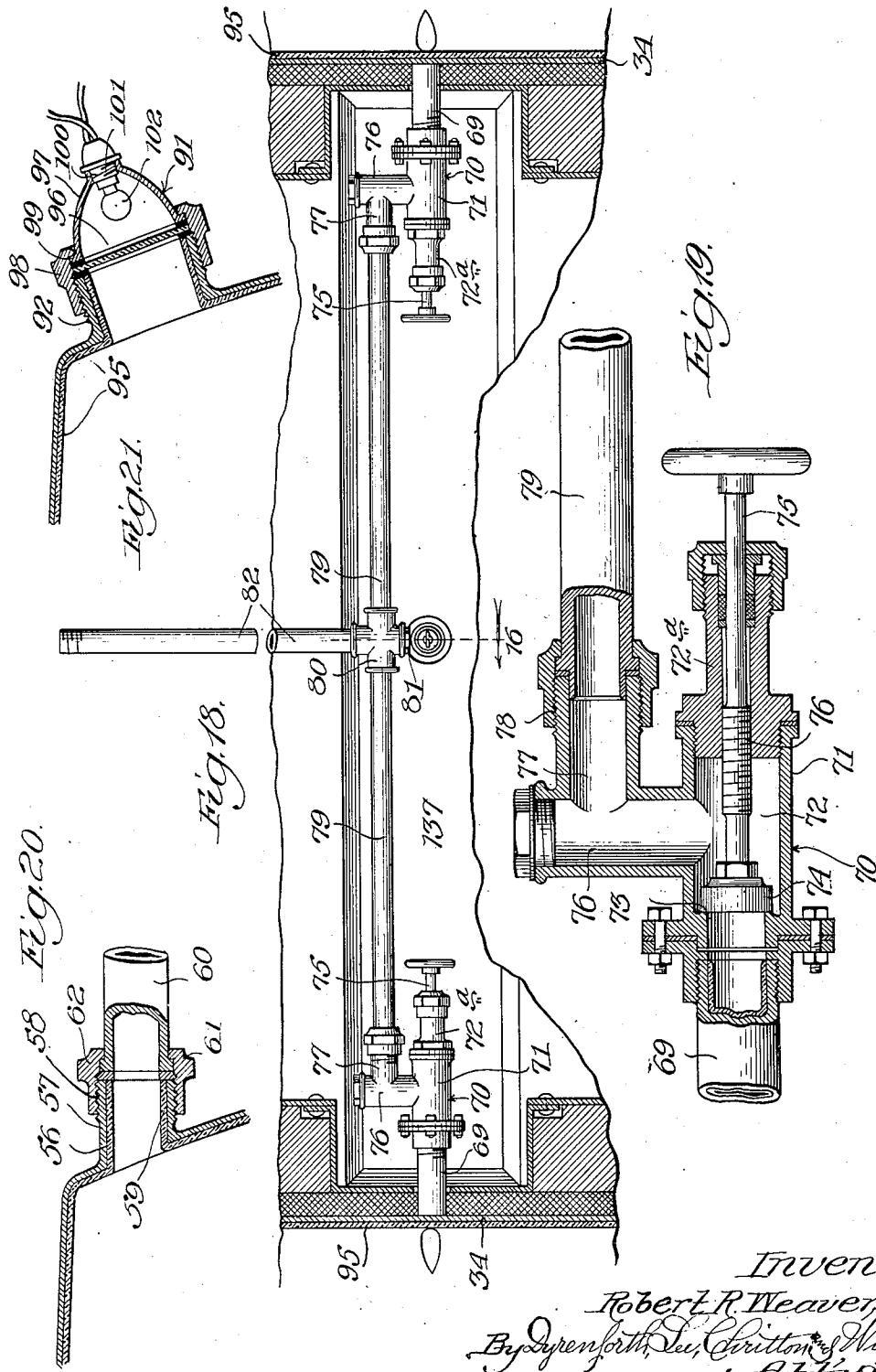
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R. R. WEAVER
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9 Sheets-Sheet 9



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UNITED STATES PATENT OFFICE.

ROBERT R. WEAVER, OF CHICAGO, ILLINOIS, ASSIGNOR TO GENERAL AMERICAN TANK CAR CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF WEST VIRGINIA.

RAILWAY CAR.

Application filed November 21, 1924. Serial No. 751,260.

My invention relates generally to improvements in railway tank cars.

My primary objects are as follows:

To provide in a tank car, the floor of which is liable to have fluid spilled thereon, for the proper draining of the floor as desired.

To provide in a car, and more particularly in a tank car having a box-like housing in which the tank is located, for the removal and replacement of the roof portion by a simple and quickly performed operation and without risk of damaging the car, in which structures it is sometimes necessary to remove the tanks from the cars, as for example in the case of repairs to be made, in which case the tanks are lifted out of the housings, the roof portions of cars as at present constructed being intimately built into the side walls of the housings rendering the operation of removing the roof a tedious and expensive one and oftentimes resulting in impairment of the structure.

To provide for the so positioning of the refrigerating pipes in refrigerating cars, that the tanks may be removed from, and replaced in, the car housings through their upper ends, without obstruction from the pipes and without requiring the disturbing of the position of the latter.

To provide in a tank car of such character, and provided for such use, that the temperature in the car be maintained unaffected, to as great an extent as possible, by outside temperature conditions, as for example in the case of cars the tanks of which are provided for receiving milk, for reducing, to as great an extent as possible, the affecting of the temperature of the contents of the tanks by outside temperature conditions, while permitting of the ready charging of the tanks with the fluid to be transported.

To provide in a tank car, especially of the center-sill type, for the so securing of the tank bands which hold down the tanks that they will not be required to be carried down through the floor of the car, thereby economizing in the cost of construction, facilitating their installation and removal when desired, and producing a strong and highly resistant structure.

To provide a novel and highly efficient form of cradle structure for the tank of a tank car and its attachment to the under-frame thereof.

To provide in a tank car a novel and efficient tank-supporting structure, and espe-

cially of a character employing a receptacle forming portion containing a bed of cushioning material in which the lower portion of the tank is embedded; and generally to improve upon structures of the general character above stated as hitherto provided, and to the end that the cost of manufacture and operation will be reduced.

As a preface to the following description, it may be stated that I have devised my improvements for embodiment, more particularly in tank cars the tanks of which are provided with linings of glass or enamel for preventing injurious or contaminating effects upon the fluid carried in the tanks, as for example milk, the tanks being retained in the desired anchored condition, on the under-frame of the car, by embedment at their lower portions in a bed of material of such a character as to adhere to the tank and present cushioning qualities, such a material, by way of example being what is known in the trade as coal tar pitch, having a melting point of about 170° to 200° F., the tanks being located in housing structures comprising side walls and roofs; and I have, therefore, chosen to illustrate my invention in such a type of car, but without, however, intending to be understood as limiting my invention to embodiment in such a character of structure, as to those features which may be incorporated in cars of other types.

Referring to the accompanying drawings:

Figure 1 is a plan view of a car of the type above referred to. Figure 2 is a plan sectional view of the car, the section being taken immediately below the roof portion thereof, at the irregular line 2—2 on Fig. 4, the tanks being shown in plan. Figure 3 is an enlarged view in longitudinal sectional elevation of one end of the car, the section being taken at the line 3 on Fig. 2 and viewed in the direction of the arrow. Figure 4 is a section taken at the line 4 on Fig. 3 and viewed in the direction of the arrow; Figure 5 is an enlarged elevational view of a side-wall of the car, the roof portion being removed, viewing the side wall from the interior of the car, and showing one of the similar closure-equipped openings of the car, the view being taken at the line 5 on Figure 6, and viewed in the direction of the arrow. Figure 6 is a broken section taken at the line 6 on Fig. 5 and viewed in the direction of the arrow. Figure 7 is a broken sectional view taken at the line 7—7

on Fig. 5 and viewed in the direction of the arrows. Figure 8 is an enlarged fragmentary sectional view taken at the line 8 on Fig. 1 and viewed in the direction of the arrow; Figure 9 is a broken section taken at the irregular line 9—9 on Fig. 8 and viewed in the direction of the arrows; Figure 10 is a plan view of the structure shown in Fig. 8, with the roof-proper removed. Figure 11 is a broken, enlarged, fragmentary sectional view taken at the line 11 on Fig. 1, and viewed in the direction of the arrow. Figure 12 is a face view of one of the plurality of similar lifting lugs provided on the roof portion of the car. Figure 13 is a plan view of one of the two similar receptacle cradling structures on the car and in which the tanks, which are omitted in this figure, are supported. Figure 14 is an enlarged sectional view taken at the line 14 on Fig. 13, and viewed in the direction of the arrow, with the tank secured in place in the cradle structure. Figure 15 is a longitudinal, sectional, view of the structure shown in Fig. 13, the section being taken at the line 15 on Fig. 13 and viewed in the direction of the arrow. Figure 16 is an enlarged, sectional, view taken at the line 16 on Fig. 18 and viewed in the direction of the arrow. Figure 17 is a fragmentary, longitudinal, sectional view of the cradling structure and the tank therein and taken through the discharge outlet of the tank, the valve control for which is omitted. Figure 18 is a plan sectional view taken at the lines 18 on Figs. 4 and 16, and viewed in the direction of the arrows, this view showing a detail of the valved discharge outlet of the tank. Figure 19 is an enlarged, broken plan sectional view of the valve-equipped outlet of the tank. Figure 20 is a fragmentary view, in vertical sectional elevation, of the inlet opening of the tank, the section being taken at the line 20 on Fig. 4, and viewed in the direction of the arrow; and Figure 21, an enlarged, sectional view taken at the line 21 on Fig. 4, and viewed in the direction of the arrow, showing means for illuminating the interior of the tank.

The particular construction shown involves an under-frame illustrated more especially in Figs. 3, 4 and 14, and of the fish-belly center-sill type, the center-sill being represented at 25 and extending longitudinally of the under-frame from end to end thereof. This frame in addition to the center-sill 25 comprises cross-bearers 26 arranged at different points along the center-sill 25 and the body bolsters 25^a located towards opposite ends of the frame. The particular construction of center-sill shown which is of hollow form, comprises the side walls 27 spaced apart and formed of plates 28 provided at their upper and lower edges with angle bars 29 and 30, respectively, rigidly secured thereto, and a plate 31 extending across the upper ends of the side walls 27 and resting upon the angle bars 29 to which

they are secured, as by rivets represented at 32. The underframe shown is supported on wheel trucks the wheels of which are represented at 233, the form of under-frame shown being of well-known construction. The structure also comprises a platform or floor portion represented generally at 33 which, except for certain of its portions as hereinafter set forth, is of common construction, this floor portion 33 being superposed on the under-frame and secured thereto in any desired manner, as for example in the manner well known in the art.

The particular construction of car shown involves the incorporation therein of two of the tanks of the general type above referred to, these tanks represented at 34 and which are of elongated form and circular in cross section being shown as located at opposite ends of the car and at the same distance from the center thereof.

The particular construction of means shown for anchoring these tanks in position comprises, for each tank, a bed of material located in a receptacle and in which the lower portion of the tank is embedded in spaced relation, at its ends and underside, to the receptacle, the material referred to thus opposing the ends and underside of the tank and forming anchoring means cushioning the tank against lengthwise movement thereof in the receptacle. The material employed is preferably of such character that upon positioning this bed material and the tank relative to each other the material sets sufficiently to present the cushioning anchorage referred to, as for example, that hereinbefore referred to. The receptacles referred to are represented generally at 35 each comprising a metal, preferably steel, box-like rectangular frame 36, shown as formed of sheet metal with its lower edges outwardly flanged, as represented at 37. The end wall of each receptacle adjacent the center of the car is formed with a downwardly and inwardly extending portion 38 which extends, as shown, to a point below the upper portion of the platform 33 and is secured at a flange 39 to the underlying steel plate-portion 31 of the center-sill, both ends of each frame 36 being reinforced with angles 41 at their upper edges. Each receptacle 35 also comprises a sectional curved bottom-forming portion, the curvature being cross-wise of the receptacle and the sections, which are represented at 42, lying at their upper edges against the upper curved portions 43 of the sides of the frame 35 and upon the flanges 44 of curved angle-bars 45 secured to the end walls of the frame 35 to which angle-bars they are secured by rivets 46. The sections 42 are spaced apart as represented in the drawings (Fig. 14) and at their inner edges are provided with depending portions 47 terminating in inwardly-extending flanges 48 which fit flatwise against

the plate 31 at the edges of the latter and to which they are secured by the rivets 32. Thus assembling the sections 42 with the center-sill causes the structure to present a channel 5 49 in each cradling receptacle in which blocks 50, as of wood, are arranged in spaced apart relation to form supports for the tanks 34 positioned in the cradling structures preliminary to the introduction of the cushioning, 10 embedding, material hereinbefore referred to, in accordance with the preferred embodiment of the invention, the blocks 50 which are preferably supported on, and secured to, planks 50^a located in the channels 49 being 15 preferably provided on their upper surfaces with cushioning insulating material 50^b, as for example, wool-felt, and upon which the tanks directly rest, and in order that the tanks may incline downwardly toward the center 20 of the car, the blocks 50 are of progressively less thickness from the ends of the car toward the center thereof, as shown (Fig. 15).

It may be here stated that in accordance with the preferred embodiment of my invention, the cushioning material above referred to in which the tanks 34 are embedded, and represented at 51, is poured in heated condition into the spaces provided between the 25 ends and undersides of the tanks and the opposed surfaces of the cradling-receptacles, and upon cooling becomes adhered to the tanks and forms a cushioning anchorage therefor.

Preferably tank-bands, represented at 52, 35 are provided, these bands partially encircling the tanks at their upper portions, and anchored at their lower, lug-equipped, ends 53 preferably to lugs 54 on the receptacle-frames 35, as by bolts 55 engaging the lugs 53 and 54 40 as shown.

Each tank 34 is provided at the upper portion of the end-wall thereof nearest the center of the car with an inlet 56 from which leads a short pipe-section 57, secured to the tank 45 34 and terminating in a threaded portion 58, the pipe 57 being also lined with glass, or enamel, as represented at 59. The threaded portion 58 of the pipe 57 forms means for securing to this pipe, a closure-cap (not shown) or a pipe for directing the fluid into the tank. In the arrangement shown the inlet-pipes 57 for the two tanks 34 are shown as 50 connected together by a filling pipe-section 60 the ends of which, flanged as shown at 61, are rotatably connected with the pipes 57 by means of coupling devices 62 engaging the flanges 61 and screwed upon the threaded portions 58 of the pipes 57. The pipe 60 60 midway between its ends, contains a four-way coupling 63, opposed outlet portions 64 and 65 of which are internally threaded to receive closure-plugs, one of which is shown at 66, or pipes, one of which is shown at 67, the inlets 64 and 65 being in line with relatively small openings, hereinafter referred 65

to, in the sides of the car. Where the pipe 60 is rotatably mounted, as described, a pipe 67 at one only, of the openings 64 and 65, need be employed, as by rotating the pipe 60, the pipe 67 may be caused to extend toward 70 either side of the car, as desired.

Each tank 34 is provided at its lower portion near the end thereof adjacent the center of the car, with an outlet 68 communicating with a pipe 69 equipped with a valve 70, which 75 may be of any desirable construction, that shown comprising a casing 71 secured to the pipe 69 and presenting an inlet-passage 72 containing a seat 73 co-operating with a valve-proper 74 the stem of which, represented at 80 75, is threaded at 76 at which it engages internal threads on a hollow plug 72^a screwed into the outer end of the passage 72, the valve being opened or closed by turning the stem 75. as by the handwheel thereon. The passage 72 85 communicates with a passage 76 extending at an angle thereto and opening into a passage 77 shown as extending parallel with the passage 72 the outer end of the portion 77 terminating in threads 78. The passages 77 of the 90 valves for each tank are directly opposed and are connected together by a pipe 79 which is shown as rotatably connected with the valve-passages 77 of the two opposed valve-structures, in the same manner as explained for the 95 connections between the pipe 60 and the pipe-sections 57, the pipe 79 containing a coupling 80 like the coupling 63 with a plug 81 and pipe-extension 82 as explained of the coupling 63, the outer end of the pipe 82 being threaded 100 for attachment thereto of a pipe, or hose-line, (not shown) for conducting away from the tanks 34 the contents of the tank or tanks, to a storage-tank, or other receptacle (not shown), as desired. 105

Each tank 34 also contains at one end a manhole, equipped with a removable closure represented at 83, and shown as hinged at 84 to an end-wall of the tank and releasably held in closed position by clamping nuts 85 on 110 studs 86 secured to the said wall.

Each tank is also equipped with means for agitating the contents thereof which comprises a motor 87 mounted on the outside of the tank and having driving connection with 115 a propeller-device (not shown) located in the interior of the tank; and also with a thermometer device, represented at 88, for indicating the temperature of the contents of the tank and comprising a thermometer tube 89 120 such as commonly provided, mounted to extend exteriorly of the tank and co-operating with means (not shown) extending into the contents of the tank, whereby the temperature of such contents is communicated to the 125 thermometer tube 89.

Provision is also made for viewing the contents of the tank, as desired, these means comprising a peep-sight 90 in one end of the tank and located near its top surface and to one 130

side of the longitudinal center line of the tank, and an illuminating device 91 in the same end of the tank and at about the same level as the peep-sight 90 but at the other side of the center line of the tank. The device 91 is shown as comprising a threaded tubular member 92 extending outwardly from the tank and opening into the interior of the tank, with the glass, or enamel, lining 95 of the tank covering the inner surface of the member 92. A transparent plate 96, as of glass, extends across the outer end of the member 92 and is held in place between the latter and a reflector-member 97 by a sleeve 98 interlocked with an annular flange 99 on the reflector-member 97 and screwed on the outer end of the member 92. The reflector-member 97 contains an opening 100 in which an electric lamp socket 101 is secured, the lamp located in the socket 101 and represented at 102 being located in the reflector-member 91 and on the outside of the transparent plate 96.

By disposing the illuminating device as described and shown, those portions of the tank which are within the range of vision of one looking through the peep-sight 90, are so illuminated, as to permit such portions, as also the tank-contents, to be readily seen and visually inspected.

The housing structure for the tanks 34 comprise end and side-walls 103 and 104, respectively, and a roof-portion 105, the wall-portions 103 and 104 being built into each other and into the platform portion 33 of the car as is common in refrigerating cars, these wall-portions being of plural-wall construction with spaces therebetween containing any suitable thermal insulating material. The side-walls 104 at the central portion of the car contain the usual large door-openings 106 equipped with doors 107 and above these door-openings, with smaller openings 108 equipped with removable closures 109 shown as in the form of tapered plugs having hand-grips 110 on their outer surfaces and retainers for holding them in place shown as in the form of bars 111 pivoted at 112 on the body of the side-wall adjacent each opening 108 at opposite sides thereof and adapted to be swung into and out of a position in which they overlap the marginal edges of the plugs 109, rings 113 of thermal insulating material being provided about these plugs.

The side and end walls 104 and 103 are provided along their upper edges with side and end plates 114 which together form a rectangular frame 115 built into the spaced wall-forming portions of these walls. The roof-portion 105 of the housing is likewise formed of a rectangular frame 116 of substantially the same size and shape as the frame 115 and comprising side plates 117 suitably connected together at their ends, the frame 116 resting upon the frame 115, pref-

erably with thermal insulating material represented at 115^a, interposed therebetween. The frame 116 is provided at intervals along its inner surfaces, at its sides and ends, with cleats 118, those at the sides of the car being located between adjacent carlins 119, as shown in Fig. 10, the cleats 118 which extend inwardly beyond the side plates 114 and 117 being rigidly secured to the frame 116 by bolts 120 extending through the side plates 117 and the cleats 118. The frame structure thus presented has secured to it the roof-proper represented at 121 and the ceiling 122 spaced from the roof-proper 121 to provide air-spaces with thermal insulation interposed therein, the ceiling 122 being secured in place as by nailing it to the carlins 119. The roof portion 105 at its cleated portion is provided at intervals with vertically-disposed bolts 123 having square upper ends 124 at which they extend into square openings 125 in the cleats 118, these bolts passing downwardly through the cleats 118, the ceiling 122 and through the horizontal flanges of angle-clips 126, the nuts 123^a of these bolts bearing against the undersides of the angle-clips 126. Plates 128 resting on the upper surfaces of the cleats 118 and secured thereto by bolts 129 and extending across the upper ends of the bolts 123 prevent upward displacement of the latter in the application of the roof-portion 105 to the side and end-wall portion of the car. The angle-clips 126 which as positioned at intervals in the angular spaces between the end and side-walls 103 and 104 of the car and the ceiling 122 are connected with the side plates 114, the inner surfaces of which they overlap, by means of bolts 130 which extend through the side plates 114 and the depending flanges of the angle-clips 126.

Provision is made for refrigerating the car, these means comprising refrigerating coils 131 for any suitable refrigerating medium, as for example ammonia, arranged along the inner surfaces of the side-walls 104. The coils 131 at each side of the car are connected together at their lower ends by pipes 132 extending below the platform 33 and provided with filling and draw-off valves 133 and at their upper ends, through couplings 134, by cross-over pipes 135.

The platform 33 of the car is built-up, as shown in Fig. 14 at 136, throughout its area, except for those portions thereof which are covered by the receptacle-structures 35, to cause the upper surface of the platform to slope from all directions toward a sump 137 formed in the platform 33 adjacent the deflected portions 38 of the end walls of the receptacles 35 the edges of the built-up portions of the platform, inclining upwardly as shown for the purpose of draining to this sump such fluid as may become spilled upon the platform. The bottom of the sump 137 con-

tains an opening 138, which is provided with a plug-valve 139, and communicates with a drain pipe 140.

The car is also shown as equipped with
 5 flushing-water supplying means, comprising a tank 141 having an inlet for compressed air supplied to the tank 141, through a pipe 142, from any suitable source, the tank 141 containing a pipe 143 opening at its lower end
 10 into the lower portion of the tank and leading at its opposite outlet end, at which it is equipped with a valve 144, to a position central of the car.

As regards the use of the car for conveying
 15 fluids which it is desired be maintained at a given temperature, as for example, a relatively low temperature, as in the case of milk, the provision of the relatively small openings 108 in the sides of the car, is of great advantage, inasmuch as it avoids the necessity
 20 of maintaining the large side doors of the car in open condition during the filling of the tank or tanks 34, thereby reducing to the minimum, the heating of the contents of the car by access thereto of the atmosphere, it being understood that the provision of the small
 25 openings at opposite sides of the car enables the tanks to be filled from either side of the car, the pipe 60 being rotated to cause the pipe 67 to extend at its outer end adjacent either one of the small openings as desired, as represented by the full and dotted lines in Fig. 4.

Another feature of advantage is that of providing the roof portion of the car as a section readily removable and replaceable on
 35 the side wall-forming portions of the car, it being understood that the roof portion may be quickly released for removal by unscrewing the nuts on the lower ends of the bolts 123. By such an arrangement of parts, the
 40 roof portion may be readily removed and replaced without dismantling any of the parts of the wall-forming portions of the car, to permit the tanks 34 to be bodily lifted, as by cranes, out of the car-housings, and replaced therein as desired, it being understood that the piping located directly above the tanks would be first removed. To provide for the
 45 ready attachment of the lifting device to the roof-portion 105, as for example, the lifting element of a crane, the roof-portion 105 is provided at intervals with upwardly-extending apertured plates 145 secured thereto as by bolts 146.

Furthermore, a car embodying my improvements is exceedingly strong in construction, sanitary, readily repairable, when necessary, is particularly adaptable for the most efficient anchoring of the tanks without
 50 danger of impairment thereof, and generally is suitable to a high degree to fluid transportation, especially for the transportation of milk.

While I have illustrated and described a
 55 particular construction embodying my im-

provements, I do not wish to be understood as intending to limit my invention thereto, as the same may be variously modified and altered, without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is:

1. In a tank car, the combination of an underframe comprising a center-sill structure, a unitary cradling structure having a centrally-disposed depending portion superposed on, and connected with, said center sill, a platform carried by said underframe and extending beneath the side portions of said cradling structure substantially to said depending
 75 portion, a tank mounted on said cradling structure, and a tank band engaging said tank and connected at its ends to said cradling structure.

2. In a tank-car, the combination of an
 85 underframe, a cradling receptacle structure carried by said underframe, a tank mounted in said cradling-structure, a bed of cushioning material interposed between said tank and said cradling-structure and adhering to said tank, and a tank-band engaging said tank and connected at its ends, to said cradling-structure.

3. In a tank car, the combination of an under-frame, a housing structure mounted on
 95 said under-frame, a cradling-structure connected with said under-frame and extending in said housing, a tank mounted on said cradling structure and located in said housing and receiving support by sides of said housing, and a tank band engaging said tank and connected at its ends to said cradling structure.

4. In a tank-car, the combination of its underframe, a receptacle mounted on the underframe, a tank extending at its lower portion
 105 into said receptacle, a rest for the tank, cushioning material interposed between said tank and said rest, and a bed of cushioning material in said receptacle and in which the lower portion of said tank is embedded.

5. In a tank-car, the combination of its underframe, a receptacle mounted on the underframe, a tank extending at its lower portion into said receptacle, a rest for the tank, cushioning insulating material interposed
 115 between said tank and said rest, and a bed of cushioning material in said receptacle and in which the lower portion of said tank is embedded and to which said tank is adhered.

6. In a tank car, the combination of an underframe formed of a center-sill structure, a cradling-structure mounted on said underframe and superposing, and connected with, said center-sill structure, a tank extending at its lower portion into said cradling-structure, and a floor carried by said underframe and located below and under said tank, said floor comprising supporting members connected with said center sill and extending wholly below the upper surface of said center sill.

7. In a tank-car, the combination of its underframe, a separate receptacle cradling-structure mounted thereon and comprising a rest which is supported on said underframe 5 directly above the median line of the underframe, and a tank extending at its lower portion into said receptacle and mounted on said rest.

8. In a tank-car, the combination of its 10 underframe, a separate receptacle cradling-structure mounted thereon and comprising a rest which is supported on said underframe directly above the median line of the underframe, a tank extending at its lower portion 15 into said receptacle and mounted on said rest, and a bed of cushioning material in said receptacle and interposed between the walls of the latter and said tank.

9. In a tank-car, the combination of its 20 underframe comprising a center-sill structure, a separate receptacle cradling-structure mounted on said underframe with a portion thereof superposed on, and connected with, said center-sill structure and comprising a 25 rest which is supported on, and located directly above, said center-sill structure, and a tank extending at its lower portion into said receptacle and mounted on said rest.

10. In a tank-car, the combination of its 30 underframe comprising a center-sill structure, a separate receptacle cradling-structure mounted on said underframe with a portion thereof superposed on, and connected with, said center-sill structure and comprising a 35 rest which is supported on, and located directly above, said center-sill structure, a tank

extending at its lower portion into said receptacle and mounted on said rest and a bed of cushioning material in said receptacle and interposed between the walls of the latter and 40 said tank.

11. In a tank-car, the combination of an underframe, a separate receptacle-forming structure thereon, said structure being depressed, at its lower portion, a rest in said depression, and a tank extending at its lower 45 portion into said receptacle and mounted on said rest.

12. In a tank-car, the combination of an underframe comprising a center-sill structure, a receptacle-forming structure on said underframe, the bottom wall of which is formed of sections having downwardly-extending spaced-apart portions which superpose said center-sill structure and are connected therewith, a rest superposing said center-sill structure and located between said 50 depending portions, and a tank extending into said receptacle and mounted on said rest.

13. In a tank car, the combination of an under-frame formed of a center-sill structure, a cradling structure mounted on said under-frame and superposing, and connected with, said center sill structure, a tank extending at its lower portion into said cradling structure, 60 and a floor carried by said under-frame and located below and under said tank, said floor comprising supporting members connected with the sides of said center-sill and extending wholly below the surface of said center 65 sill. 70

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