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BOTTOM-FILL TRUCK TANK

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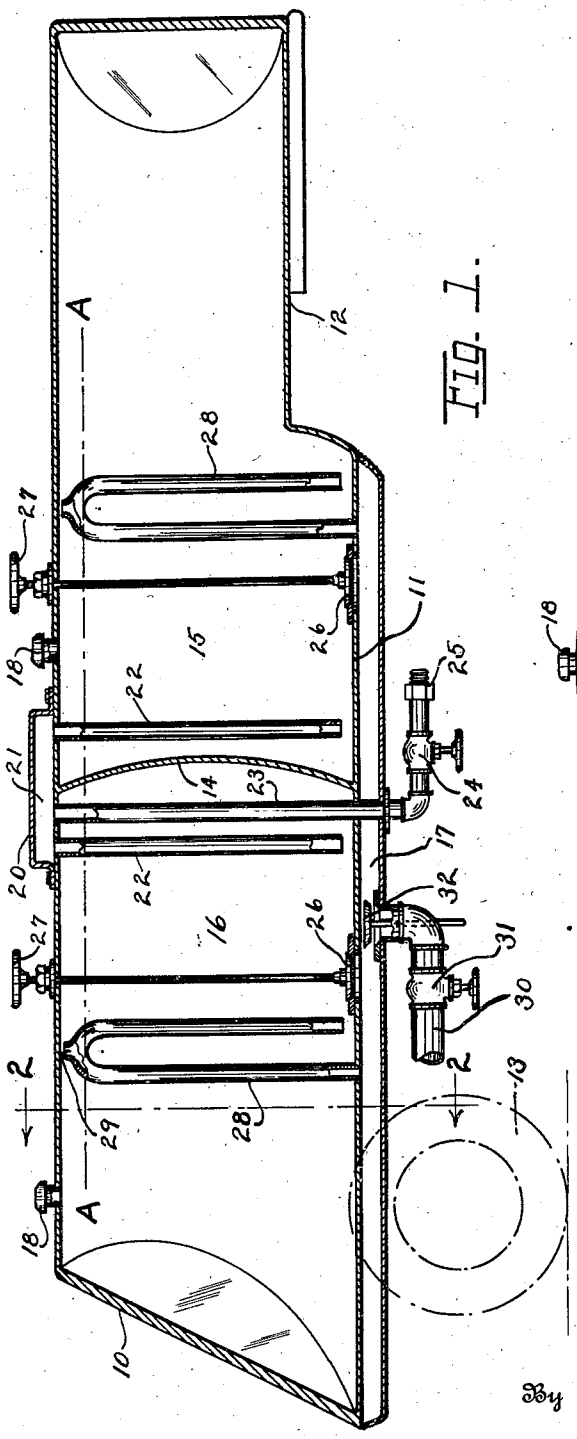


FIG. 1.

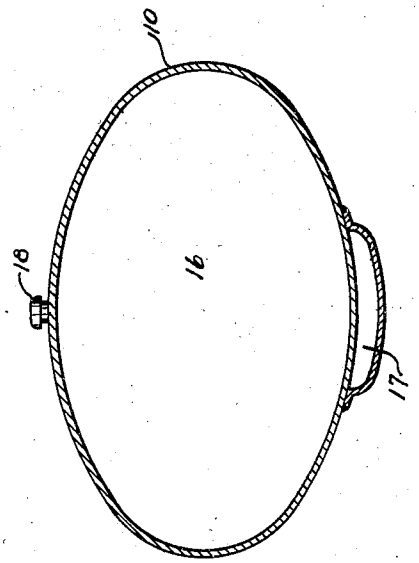


FIG. 2.

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BOTTOM-FILL TRUCK TANK

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4 Claims. (Cl. 137—21)

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This invention relates to tank trucks, such as are used for road transportation of any volatile liquids, such as gasoline, volatile solvents, or the like.

One object of the invention is to provide an improved tank adapted for bottom fill, thus safeguarding the tank and its load against waste of product due to excessive gassing and evaporation during loading, overrunning of the compartments, fire hazard, and inaccurate loading, as when necessary to fill to a marker or indicator.

Still another object is to provide an improved arrangement of this kind which avoids any necessity of moving the tank so that each compartment can be reached by the filling spout.

Another object is to provide an improved bottom-fill system or arrangement which is of relatively simple form and consequently of low cost, which reduces the cost of upkeep and repair, and which does away with operator attendance during the entire loading operation.

Further objects of the invention in part are obvious and in part will appear more in detail hereinafter.

In the drawings:

Fig. 1 is a longitudinal sectional elevation through one form of tank truck embodying the invention; and

Fig. 2 is a sectional elevation on the line 2—2, Fig. 1.

The truck shown in the drawings is illustrated somewhat conventionally, because capable of considerable modification with respect to size, shape, numbers of compartments and other features. It includes a sheet metal tank 10 of generally oval or elliptical form in cross section, as shown in Fig. 2. The tank may be of full size from end to end, but, as shown, the rear portion 11 is of full size and the front portion 12 is of reduced depth, over the fifth wheel or front running gear (not shown). The rear wheels are conventionally shown at 13.

The space within the tank may be subdivided into any number of compartments, even as many as ten or twelve, by the insertion of headers or dividing walls 14, but only one such wall is shown, forming two compartments 15, 16. Along its bottom, and extending into the zones of all compartments, the body is provided with a duct, trough or channel 17, which is closed or sealed against gas escape, except by way of connections to be described. Each compartment usually is provided with a suitable emergency vent device conventionally shown at 18 and permitting either inflow or outflow of air, in response to abnormal variations in pressure within the tank, as is usual.

In filling this tank, the liquid (gasoline or other volatile combustible material, or other liquid) is delivered from the source (the manufacturing

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plant or a large storage tank) to a manifold 20 which extends along the top of the tank, either inside or outside its wall, and which extends into the zones of all compartments. This manifold may be formed from a section of ordinary pipe, but is shown as made of a hollow sheet metal member welded or otherwise secured, by a leak-proof joint around its edges, to the outside of the tank wall. From the space or chamber 21 within said manifold pipes or conduits 22 (one for each compartment) extend down into the tank chamber, opening at their lower ends near the bottom thereof. Consequently, liquid supplied to said manifold is distributed and delivered to the several compartments at their bottoms, air escaping through the vent 18. The supply for the manifold comes by way of a pipe 23 provided with a valve 24 and a suitable fitting 25 to which may be connected the flexible hose (not shown) communicating with the source of supply. Pipe 23, as shown, extends down through the tank, although this is not essential.

By using pipes 22 of varying diameter, or orifices of varying size attached to the pipes, flow through each may be adjusted to the capacity of its particular compartment, so that when filling the tank, the level or liquid rises uniformly and simultaneously in all compartments.

Trough or channel 17 communicates with each of the several compartments by way of drain openings controlled by manually operatable valves 26 each operated by a valve handle 27. Communication also is provided by way of overflow or stand pipes 28, which may be plain upright pipes open-ended at the top, but are shown as of inverted U-form, each such U-pipe having a small opening 29 at the top of the bend, serving as a vent while filling, and also effective to prevent or break any tendency toward siphonic action. The bends in these pipes are at or near the tops of their several chambers or compartments. Channel 17 also is provided with an outlet by way of pipe 30 provided with a controlling gate valve 31 and an emergency valve 32.

The apparatus is operated or used as follows:

Let us assume that all compartments of the tank are empty and that it is desired to fill them with gasoline. Valves 26 are closed by operation of their handles 27 and valves 31 and 32 are opened, the end of pipe 30 being connected, as by a flexible hose (not shown), to a suitable emergency overflow reservoir adapted to receive spilled over liquid which later may be returned to the source of supply. Pipe 23 is connected, as by another flexible hose, to the source of supply. Thus, if the liquid from the source is permitted to flow from the supply, and the valve 24 is opened, liquid will flow into the manifold chamber 21 and then down through pipes 22 into the several compartments, filling them from the bot-

tom up, and with uniform rise of level in all compartments if the pipes 22 are properly sized relatively to their respective compartments or are provided with the proper orifices. Air or gas in the compartments escape by way of normal vent openings 29, and during emergencies by way of the vent openings 18. In this way, the level of liquid rises in all compartments until it reaches the level indicated by the dotted line A—A, Fig. 1, at the inside of the bend in the stand pipe. Beyond that point additional liquid permitted to flow into the tank spills over and is discharged by the stand pipes into the trough or channel 17 from which it flows by way of pipe 30 to the emergency overflow receptacle referred to. During the filling operation no attendance by the operator is necessary, so that he can attend to other work, nor is it necessary to move the truck from time to time to connect the several compartments successively to the filling hose.

As soon as overflow to the emergency overflow tank is perceived, valve 24 is closed, shutting off the supply. Valves 31 and 32 are also closed, shutting off the drain outlet. Thereupon both the filling and discharging hose may be removed and by opening any valve 26 the liquid in its compartment is permitted to flow to the channel 17 and by opening valves 31 and 32 to a hose by which it may be delivered to any suitable place. That occurs, of course, when the truck has been moved on the road to the desired delivery point.

The vent openings 29 in the stand pipes prevent any siphonic effect, so that said pipes serve merely as overflow outlets taking their liquid from the bottom instead of from the top of the compartments.

The construction described is of very simple form, prevents undue loss by gassing, materially reduces the fire hazard, reduces the labor involved in the filling operation, and may be embodied in any tank truck at relatively low cost.

Further advantages of the invention will be apparent to those skilled in the art.

What I claim is:

1. A bottom-fill multiple compartment truck tank for transporting volatile liquids, comprising a hollow chambered tank adapted for support upon a vehicle chassis and provided with a plurality of compartments, said tank being provided near its top with a manifold having a filling chamber provided with a series of tank filling pipes each extending downwardly into one of the tank compartments and opening at a low level therein, valve controlled means for supplying liquid to the manifold filling chamber, and an overflow pipe within each tank compartment, each overflow pipe being of inverted U-form and having liquid receiving and discharge legs, the former opening into the compartment at a low level and the latter extending through the bottom wall of the tank and opening beneath the same, and a vent opening at the bend of each overflow pipe.

2. A bottom-fill multiple compartment truck tank for transporting volatile liquids, comprising a hollow chambered tank adapted for support upon a vehicle chassis and provided with a plurality of compartments, said tank being provided near its top with a manifold having a filling chamber provided with a series of tank filling pipes each extending downwardly into one of the tank compartments and opening at a low level therein, valve controlled means for supplying liquid to the manifold filling chamber, and an

overflow pipe within each tank compartment, each overflow pipe being of inverted U-form and having liquid receiving and discharge legs, the former opening into the compartment at a low level and the latter extending through the bottom wall of the tank and opening beneath the same, and a vent opening at the bend of each overflow pipe, said tank also having beneath its bottom wall a hollow trough forming a common discharge channel into which all of the discharge legs open.

3. A bottom-fill multiple compartment truck tank for transporting volatile liquids, comprising a hollow chambered tank adapted for support upon a vehicle chassis and provided with a plurality of compartments, said tank being provided near its top with a manifold having a filling chamber provided with a series of tank filling pipes each extending downwardly into one of the tank compartments and opening at a low level therein, valve controlled means for supplying liquid to the manifold filling chamber, and an overflow pipe within each tank compartment, each overflow pipe being of inverted U-form and having liquid receiving and discharge legs, the former opening into the compartment at a low level and the latter extending through the bottom wall of the tank and opening beneath the same, a vent opening at the bend of each overflow pipe, said tank also having beneath its bottom wall a hollow trough forming a common discharge channel into which all of the discharge legs open, and valve means controlling selective discharge from any tank compartment to said channel.

4. A bottom-fill multiple compartment truck tank for transporting volatile liquids, comprising a hollow chambered tank adapted for support upon a vehicle chassis and provided with a plurality of compartments, said tank being provided near its top with a manifold having a filling chamber provided with a series of tank filling pipes each extending downwardly into one of the tank compartments and opening at a low level therein, valve controlled means for supplying liquid to the manifold filling chamber, and an overflow pipe within each tank compartment, each overflow pipe being of inverted U-form and having liquid receiving and discharge legs, the former opening in the compartment at a low level and the latter extending through the bottom wall of the tank and opening beneath the same, a vent opening at the bend of each overflow pipe, said tank also having beneath its bottom wall a hollow trough forming a common discharge channel into which all of the discharge legs open, valve means controlling selective discharge from any tank compartment to said channel, and a valve controlled outlet for the discharge channel.

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