J. A. ULLMAN.

STORAGE TANK.

APPLICATION FILED NOV. 16, 1909.

1,012,300. Patented Dec. 19, 1911.

2 SHEETS—SHEET 1

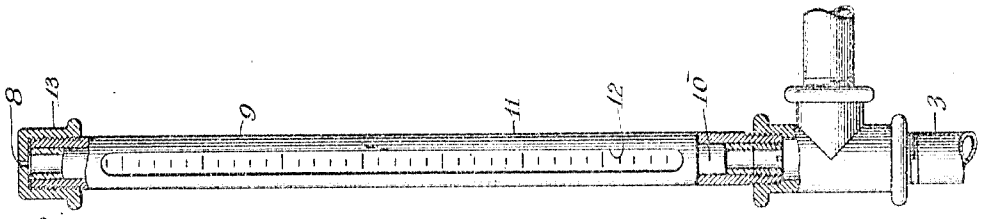

Fig. 2.

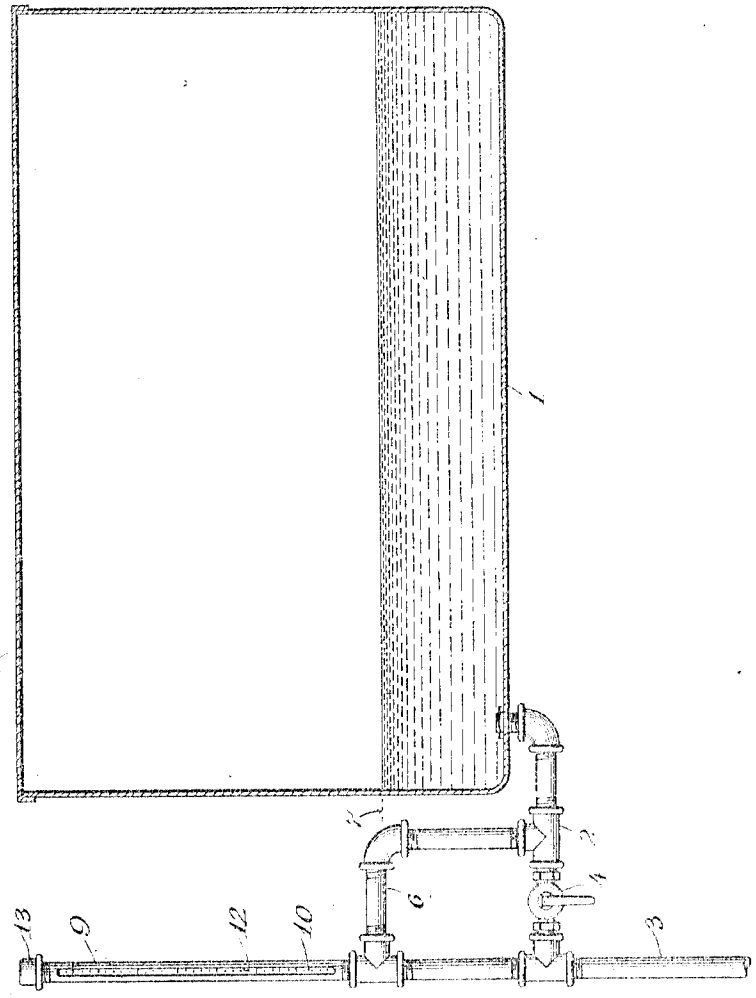

Fig. 1.

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2 SHEETS—SHEET 2.

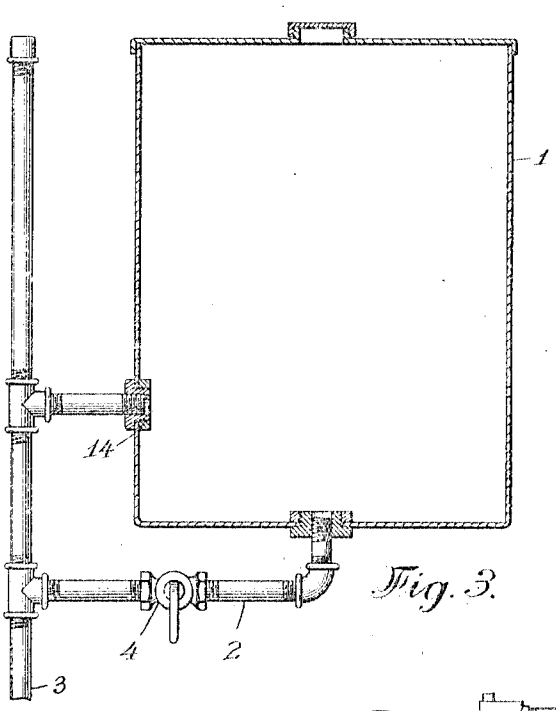


Fig. 3.

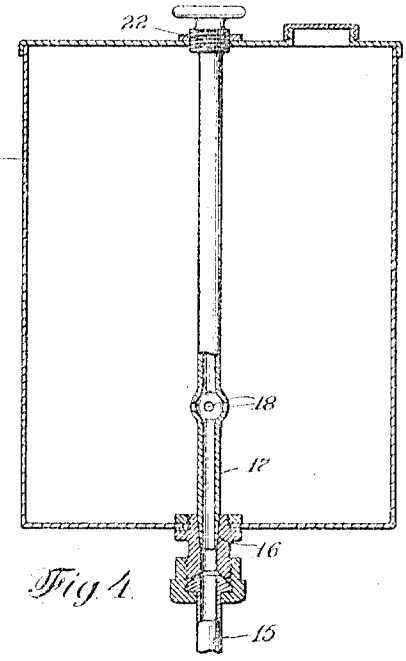
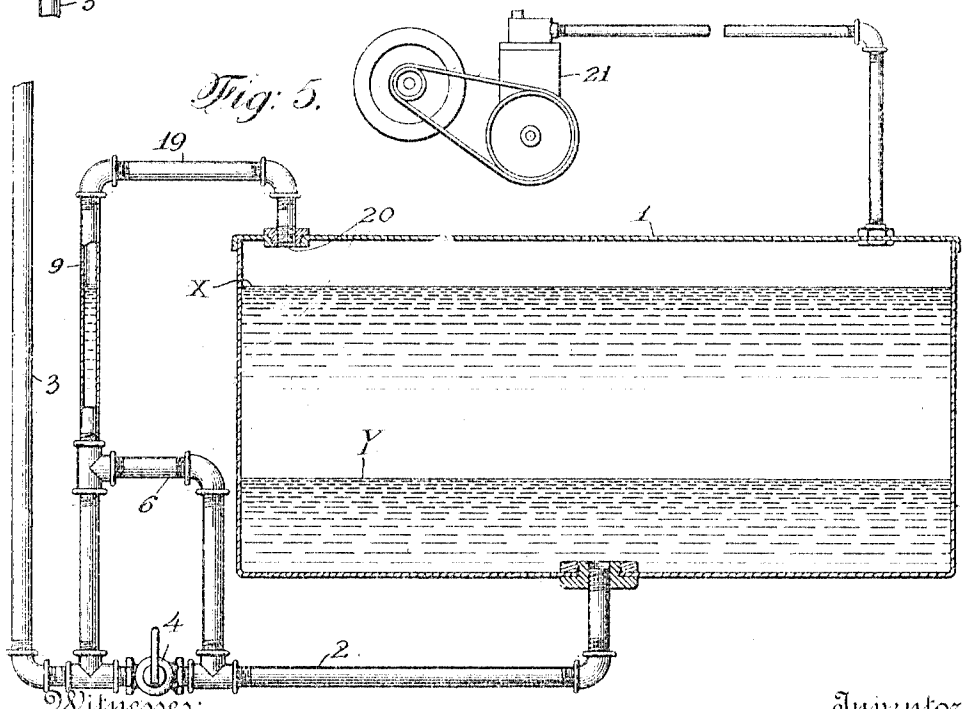


Fig. 4.

Fig. 5.



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STORAGE-TANK.

1,012,300. Specification of Letters Patent. Patented Dec. 19, 1911.

Application filed November 16, 1909. Serial No. 528,327.

To all whom it may concern:

Be it known that I, JAMES A. ULLMAN, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Storage-Tanks, of which the following is a specification.

My invention relates to improvements in storage tanks, and is designed particularly for use in connection with the fuel tanks of automobiles, motor boats, etc.

The invention will be described in its application to the gasolene tank of an automobile, but it will be understood that this is only one of its many uses and that it may be employed wherever found practicable or desirable.

The fuel storage tanks of automobiles are usually placed in a more or less inaccessible position. For that reason the driver is seldom aware of the amount of fuel in the tank and is therefore liable to run short of fuel at any moment, without warning.

My invention aims to give warning of any scarcity in the fuel supply, and further to provide a reserve supply of fuel, which is available for use after the main supply has become exhausted.

To this end the invention consists broadly in providing means for holding in check a certain quantity of the liquid in the tank, together with means adapted to be actuated to render this so-called "reserve supply" available for use. By such means as these, when the main supply is exhausted or nearly so, warning of this scarcity is given by means of the stoppage of the flow of the liquid. The reserve supply then becomes available until a further supply can be secured. Devices aiming to accomplish these results have been used heretofore, but, in so far as I am aware, each of these prior devices depends for their operation upon certain additional compartments or reservoirs adapted to contain the reserve supply.

Another one of the objects of my invention is to accomplish the results intended, without the use of any additional reservoirs or compartments other than the storage tank itself.

The means for carrying out the invention may vary widely and may be combined with the storage tank in various different relations. Also the invention is adapted to either a "gravity system" where the flow is due to the force of gravity, or to a "pressure system" wherein a certain pressure is maintained to cause the flow.

In a preferred form of the invention, I provide certain outlet connections from the tank so arranged that the liquid will flow freely until a certain level of the liquid in the tank is reached, and will thereafter automatically cease to flow, whereby a certain quantity in the bottom of the tank is held in reserve, and I further provide means, such as a valve or valves, which when operated will permit the use of the reserve supply thus created. The amount of fuel held in reserve would of course be varied to suit different conditions and requirements.

In one of its preferred forms, the invention consists specifically of a direct outlet leading from the storage tank, a normally closed valve located in this direct outlet and a bypass extending around said valve and rising to a point higher than the bottom of the tank. This bypass permits the fuel to flow around the valve until the liquid in the tank is on a level with the top of the bypass. The stoppage of the flow gives warning to the operator of the scarcity of fuel and the valve is then opened to permit the liquid constituting the reserve supply to flow through the direct outlet. The operator then knowing just how far the reserve supply will last, can proceed to the nearest point of supply. In order that this so-called bypass shall not act in the capacity of a siphon to drain the tank, I preferably provide the bypass with a vent. In the case of the pressure system, the vent may open into the top of the tank, whereas in the gravity system, the vent may open direct to the atmosphere. In this latter case, in order to prevent any loss of fuel through the vent, I may elevate the same to a point on a level or above the highest level of the liquid in the tank or reservoir.

To this end, another feature of my invention, when embodied in a gravity system, consists in providing a riser or stand pipe which is connected to the bypass and has a vent in its upper end, substantially on a level with the top of the tank.

Still another feature of my invention consists in utilizing this riser or stand pipe as a gage to indicate the level of liquid in the tank. This would preferably be accomplished by making the stand pipe in the form of a gage glass. This feature could

be applied to either the gravity or pressure systems.

Other features of the invention will appear as the specification proceeds.

In the accompanying drawings there is illustrated a preferred embodiment of the invention, but various modifications and changes may be made therein without departing from the spirit and scope of the invention.

In the drawings: Figure 1 is a partly sectional view of a preferred form of the invention. Fig. 2 is an enlarged broken detail view showing the manner in which the stand pipe may be utilized as a gage. Fig. 3 is a similar view of a slightly modified form of the invention. Fig. 4 is a sectional view illustrating another form of the invention. Fig. 5 is a view illustrating the adaptation of the invention to a pressure system.

Like reference characters denote like parts throughout the several views.

Referring first to Fig. 1: the fuel tank 1 is of any desired size and shape, and connected to the lower portion thereof, preferably the bottom as shown, there is provided a direct outlet 2, which by means of an extension or feed pipe 3, leads to the engine or other source of consumption. This direct outlet is adapted to be closed, as by means of the valve 4, and connected to the outlet pipe at a point between said valve and the point of connection with the tank, there is provided a bypass 6, which rises to a point 7, above or higher than the level of the bottom of the tank. The valve in the outlet pipe is normally closed so that the liquid will first flow around the valve, through the bypass and the extension 3, to the engine or other device. When the liquid in the tank reaches the level of the top of the bypass, then the flow ceases, thereby giving warning to the operator that the liquid in the storage tank has been lowered to the "reserve level". To enable the use of the reserve supply, it then becomes necessary to open the valve. When said valve is opened, the fuel flows uninterruptedly through the direct outlet and extension to the engine. In order to prevent the bypass from acting as a siphon, it is provided with a vent 8, which in the case of a gravity system is conveniently in the form of an opening in the top of the stand pipe 9. This stand pipe extends approximately to a point as high as the top of the tank so that the vent shall be higher than the highest level of the liquid in the tank, thereby preventing any leakage of the fuel through the vent. I prefer also to utilize the stand pipe as a gage or indicator for the level of the liquid in the tank, and for this reason I prefer to make the stand pipe in the form of a glass tube 10, which for protective purposes may be inclosed in a metallic sleeve 11, as shown in Fig. 2, and visible through a slot 12, in the wall of said sleeve. In this form, the vent would be formed in a cap 13, closing the end of the tube. This gage glass is of particular value, for if the engine should stop for any unaccountable reason, a glance at the gage glass will indicate whether the fuel has been lowered to the reserve level, and the operator will therefore be informed at once of the necessity for opening the valve to permit the use of the reserve store of fuel.

The invention is capable of many modifications, one of which is shown in Fig. 3. Here the direct outlet leads from the bottom of the tank, but in this case the bypass connects directly with the tank at a point 14, above the bottom of the tank. This form of the device is similar in action to that shown in Fig. 1 and it is somewhat simpler than the first form.

Still another form of the invention is illustrated in Fig. 4. In this case the outlet pipe 15 is provided with a socket 16, in which is removably seated the lower end of a gage tube 17. At a point above the bottom of the tank this tube is provided with a number of openings 18. The flow of the liquid is normally through said openings 18, down through the tube and out the feed pipe. When the liquid reaches the level of these outlet openings, the flow ceases, thereby giving warning of the exhaustion of the main supply of fuel. The tube is then lifted from its seat in the mouth of the outlet pipe, thereby permitting the use of the reserve supply of fluid. The gage tube may be either wholly removed, as by way of a hand-hole opening in the top of the tank, or there may be provided a screw thread connection 22 between the tube and the top of the tank, whereby a simple turning movement of the tube will cause it to be lifted from its seat. The openings in the tube may be utilized as a strainer, and for this purpose the tube may be enlarged or swelled at this point, substantially as shown.

In Fig. 5 is shown one method by which the invention may be used with a pressure system. The form shown differs from that of Fig. 1, only in that instead of being open to the air, the vent opens into the top of the tank. This may be done by providing the stand pipe with an extension 19, opening into the top of the tank, at the point 20. The air pressure may be supplied by an air pump 21. When the liquid in the tank is at a higher level than the top of the bypass, for instance at the level X, then the liquid will stand at a corresponding level in the stand pipe, at the same time that the air pressure on the top of the liquid is creating a flow around the bypass and through the feed pipe. The pressure up

through the top of the stand pipe is equalized by the pressure on the main body of liquid and the liquid will stand in the stand pipe approximately on a level with that in the tank. As soon, however, as the liquid in the tank falls to a level below the top of the bypass, as to the level Y, the pressure in the stand pipe forces all the liquid out of the stand pipe and an escape is therefore open to the air pressure by way of the stand pipe and feed pipe, and the flow by way of the bypass ceases. The valve is then opened and as the liquid fills the pipes, the escape by way of the stand pipe is cut off and the pressure becomes effective to force the remainder of the liquid out through the feed pipe. It will be obvious that the stand pipe may be utilized as a gage, also with this form of the invention.

What is claimed, is:

1. The combination of a tank and a feed pipe leading therefrom, a valve in the feed pipe, a bypass connected with the feed pipe, leading around the valve in the feed pipe and located wholly on the outside of the tank, said bypass rising to a point above the bottom of the tank, the valve aforesaid controlling the passage of liquid through the feed pipe, and a transparent stand pipe connected with the bypass serving as a gage for the liquid in the tank.

2. The combination of a tank and a feed pipe leading therefrom, a valve in the feed pipe, a bypass connected with the feed pipe, leading around the valve in the feed pipe and located wholly on the outside of the tank, said bypass rising to a point above the bottom of the tank, the valve aforesaid controlling passage through the feed pipe, and a transparent stand pipe connected with the bypass serving as a gage for the liquid in the tank, said stand pipe extending substantially to the level of the top of the tank and provided with a vent in its upper end.

3. In combination, a storage tank, a feed pipe connected with the lower portion of the tank, a valve in the feed pipe, and a bypass connected with said feed pipe leading around the valve in the feed pipe, the said bypass being located wholly without the tank and rising on the outside of the tank to a point above the level of the bottom of the tank.

Signed at New York in the county of New York and State of New York this eighth day of November A. D. 1909.

JAMES A. ULLMAN.

Witnesses:
L. H. Freund,
Otto Peters.