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TANK VALVE CONTROL SYSTEM

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2 Sheets-Sheet 1

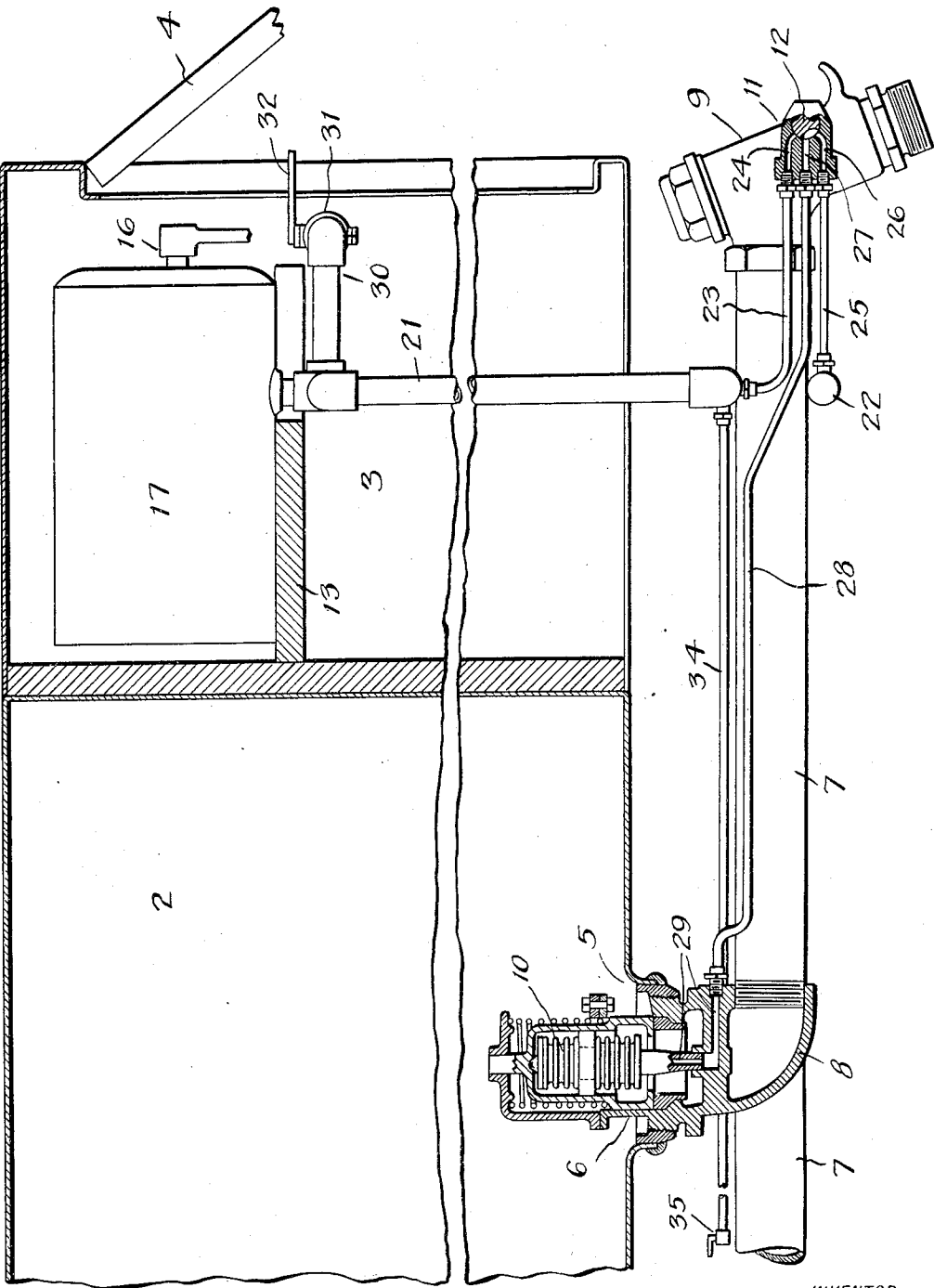


Fig. 1.

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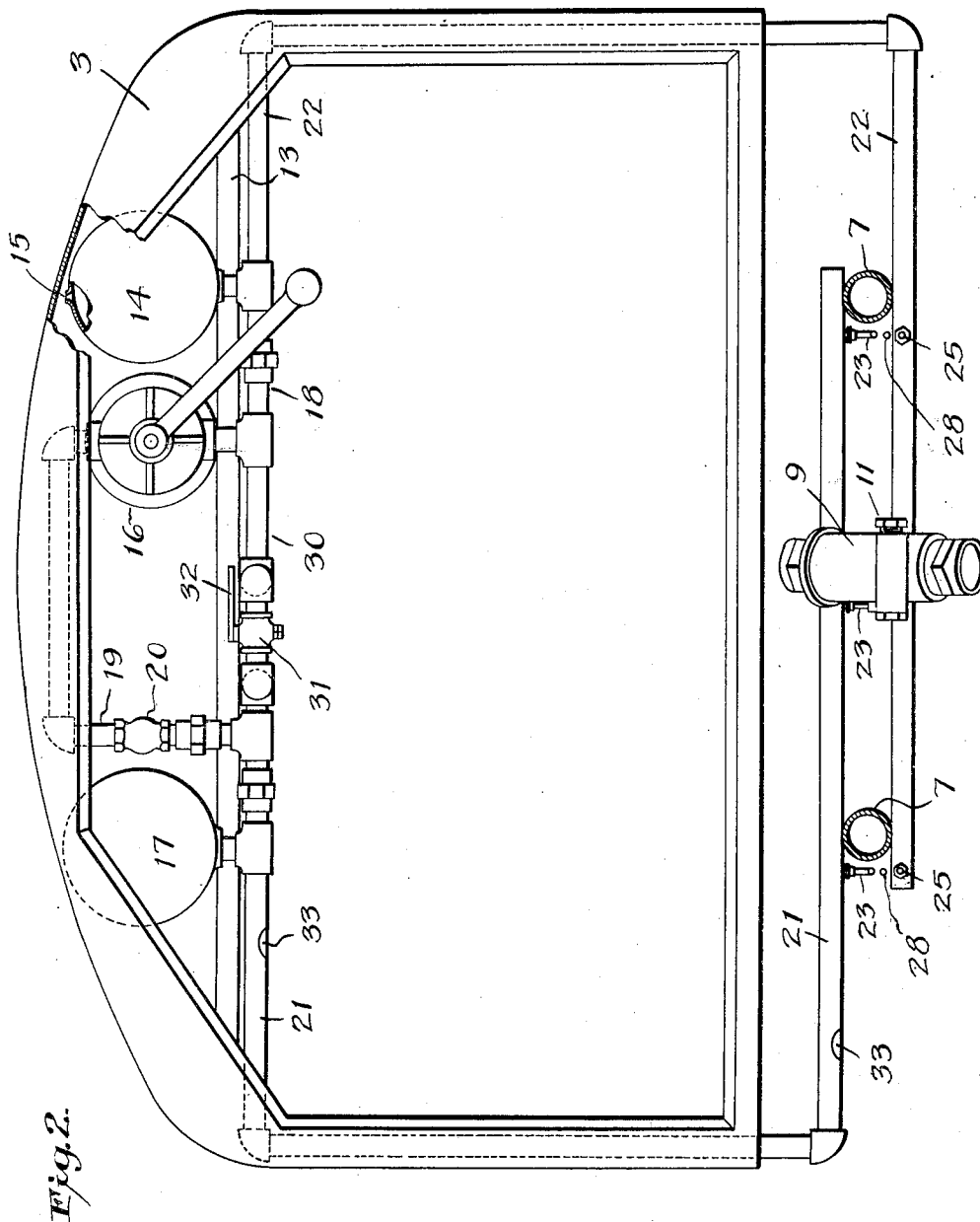
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2 Sheets-Sheet 2



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TANK-VALVE-CONTROL SYSTEM.

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The invention relates more specifically to vehicle tanks such as are used for making deliveries of gasoline, and the object is to provide an improved hydraulic or fluid-pressure control system for the safety or "emergency" valves of such tanks. To this end the invention may be said to comprise the parts, improvements and combinations hereinafter described, and which will be more particularly pointed out in the claims.

In the drawings forming part hereof:

Fig. 1 is a vertical longitudinal section through the rear part of a multiple-compartment truck tank and its bucket-box, the depth of the view being reduced by breaking out, and a part of the door being broken away; and

Fig. 2 is a rear elevation, the door being omitted, a portion of the box wall being broken out, one of the faucets being shown in elevation, and two of the faucet pipes and the adjacent control conduits being shown in cross-section.

Fig. 1 shows part of the rear compartment or chamber 2 of a multiple compartment vehicle tank. Multiple tank chambers on truck tanks are so well known that it has been thought unnecessary to show more than the one chamber.

At the rear end of the tank, united or supported therewith, is the customary bucket-box 3, having a rear door 4.

In the bottom of each of the tank chambers is an outlet 5, commanded by a suitable automatic or spring-closing safety valve 6, to retain the contents of the chamber in event of injury to the delivery pipe or faucets.

Delivery pipes 7 extend from the several outlet fittings 8 below the safety valves rearward beneath the tank and bucket-box, and terminate in faucets 9. These faucets represent delivery valves, that is to say valves which must be opened by the attendant in order to make deliveries from the tank compartments.

Each valve 6 is provided with a sylphon 10, or fluid-pressure actuated bellows, for opening it. Each corresponding faucet 9 has control valve means 11 operatively interconnected with it. A simple and advantageous form of this means consists of a two-way plug on one end of the rock-shaft 12 of the faucet, this plug turning in a

ported casing formed integral with, or united to, the body of the faucet.

Supported on a shelf 13 in the upper part of the bucket-box are a reservoir 14, open to the atmosphere at 15, an oscillatory hand pump 16, and an air-tight pressure-accumulating chamber 17. Piping 18 connects the reservoir 14 with the intake of the pump, and piping 19 containing a check or non-return valve 20 connects the discharge of the pump with an opening in the bottom of the chamber 17.

A pressure manifold 21 extends from the bottom of the chamber 17 to one side of the interior of the box, thence downward through the bottom of the box and across over the rear portions of the tank outlet pipes 7. An exhaust or return manifold 22 extends across below said pipes, up through the bottom of the bucket-box at the other side of the box, and connects with the reservoir 14.

Small pressure pipes 23 connect the lower limb of the pressure manifold with port passages 24 of the control valve casings 11 associated with the several faucet valves. Other small pipes 25 connect port passages 26 of said casings with the return manifold. A third port passage 27 in each of said casings is connected by a line 28 and ducts 29 with the sylphon 10 of the corresponding safety valve 6. The relation of the control valve member 12 to the faucet is such that when the faucet is closed, as it normally is, the line 28, and therefore the sylphon, is connected with the exhaust, that is to say with the pipe 25 and return manifold 22, and is cut off from the pressure. When the faucet is opened the cock is turned to cut off the pipe 28 from the exhaust and connect it with the pressure pipe 23, so that pressure is admitted to the sylphon.

A by-pass 30 is interposed between the pressure-accumulating chamber and the reservoir 14. A shut-off valve 31 in this by-pass is operated by or through a lever or operating connection 32. The relations are such that there is an interference or interlock between this valve and the door 4. In the particular construction shown, when the valve is closed, the lever 32 must project outwardly of the door opening, where it will be in the way of the closing of the door, as is seen in Fig. 1. Consequently, the lever

must be turned manually or by the door itself, opening the valve, in order that the door may be closed. This insures that the pressure in the system will be relieved before the truck tank is driven away after making a delivery.

The system is more particularly a hydraulic system. It will therefore be understood that the reservoir 14 contains an ample supply of a suitable liquid, and that the siphons 10 and the connected piping are filled with the liquid. The chamber 17 contains a trapped body of air.

In order to make a delivery, the attendant first opens the door 4 and turns the lever 32 so that it extends outwardly of the door opening. This closes the by-pass valve 31. Then the operator operates the handle of the pump 16 for a brief period, drawing liquid from the reservoir 14 and forcing it into the chamber 17 against the air therein. The air in the chamber is then compressed as the liquid rises in the chamber, until a sufficient body of liquid under sufficient air pressure has been accumulated, the check valve 20 preventing return flow.

The operator next takes a wrench handle and opens one of the faucets 9 connected with one of the tank chambers. This connects the siphon 10 of the corresponding emergency valve 6 with the pressure thus accumulated, opening this valve, permitting liquid from the interior of the tank compartment to flow through the pipe 7 and the open faucet. When the faucet is closed, the pressure is exhausted from the siphon, and consequently the valve 6 also closes. The pressure-accumulating chamber 17 is designed to store enough pressure for repeated faucet and safety-valve operations.

When the delivery has been completed, the handle 32 is turned to open the valve 31, thereby releasing all pressure in the system, before the door is closed.

Fusible plugs 33 in the lower walls of both the upper and the lower limbs of the pressure manifold 31 also provide for automatic relief of all pressure in the event of fire.

A line 34 leading forward from the pressure manifold and provided with a manually operatable valve 35 enables all pressure in the system to be released from the front end of the tank in case of emergency.

It will be understood that the invention is not limited to the precise form and embodiment illustrated, and that various changes may be made without departing from essentials within the scope of the appended claims.

I claim:

1. The combination with a vehicle tank, of

an outlet pipe, a normally closed safety valve for preventing outflow through said pipe, a delivery valve connected with said pipe, a fluid-actuated device for opening said safety valve, a liquid reservoir, a pump, a pressure-accumulating chamber into which liquid from the reservoir is forced by the pump against a confined body of air, and control valve means operatively interconnected with said delivery valve, with conduits between said control valve means and said pressure-actuated device, and between said control valve means and said pressure accumulating chamber on the one hand and between said control valve means and said reservoir on the other hand.

2. The combination with a vehicle tank, of an outlet pipe, a normally closed safety valve for preventing outflow through said pipe, a delivery valve connected with said pipe, a fluid-actuated device for opening said safety valve, a liquid reservoir, a pump, a pressure-accumulating chamber into which liquid from the reservoir is forced by the pump against a confined body of air, control valve means operatively interconnected with said delivery valve, with conduits between said control valve means and said pressure-actuated device, and between said control valve means and said pressure-accumulating chamber on the one hand and between said control valve means and said reservoir on the other hand, a by-pass between said pressure-accumulating chamber and said reservoir, and a valve for opening and closing said by-pass.

3. In a tank, an outlet pipe, a normally closed safety valve for preventing outflow through said pipe, a delivery valve connected with said pipe, a fluid-actuated device for opening said safety valve, a liquid reservoir, a pump, a pressure-accumulating chamber into which liquid from the reservoir is forced by the pump against a confined body of air, control valve means operatively interconnected with said delivery valve, with conduits between said control valve means and said pressure-actuated device, and between said control valve means and said pressure-accumulating chamber on the one hand and between said control valve means and said reservoir on the other hand, a by-pass between said pressure-accumulating chamber and said reservoir, a valve for opening and closing said by-pass, a box associated with the tank and having a door, and an interlock between said door and said by-pass valve, whereby said valve must be open when the door is closed.

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