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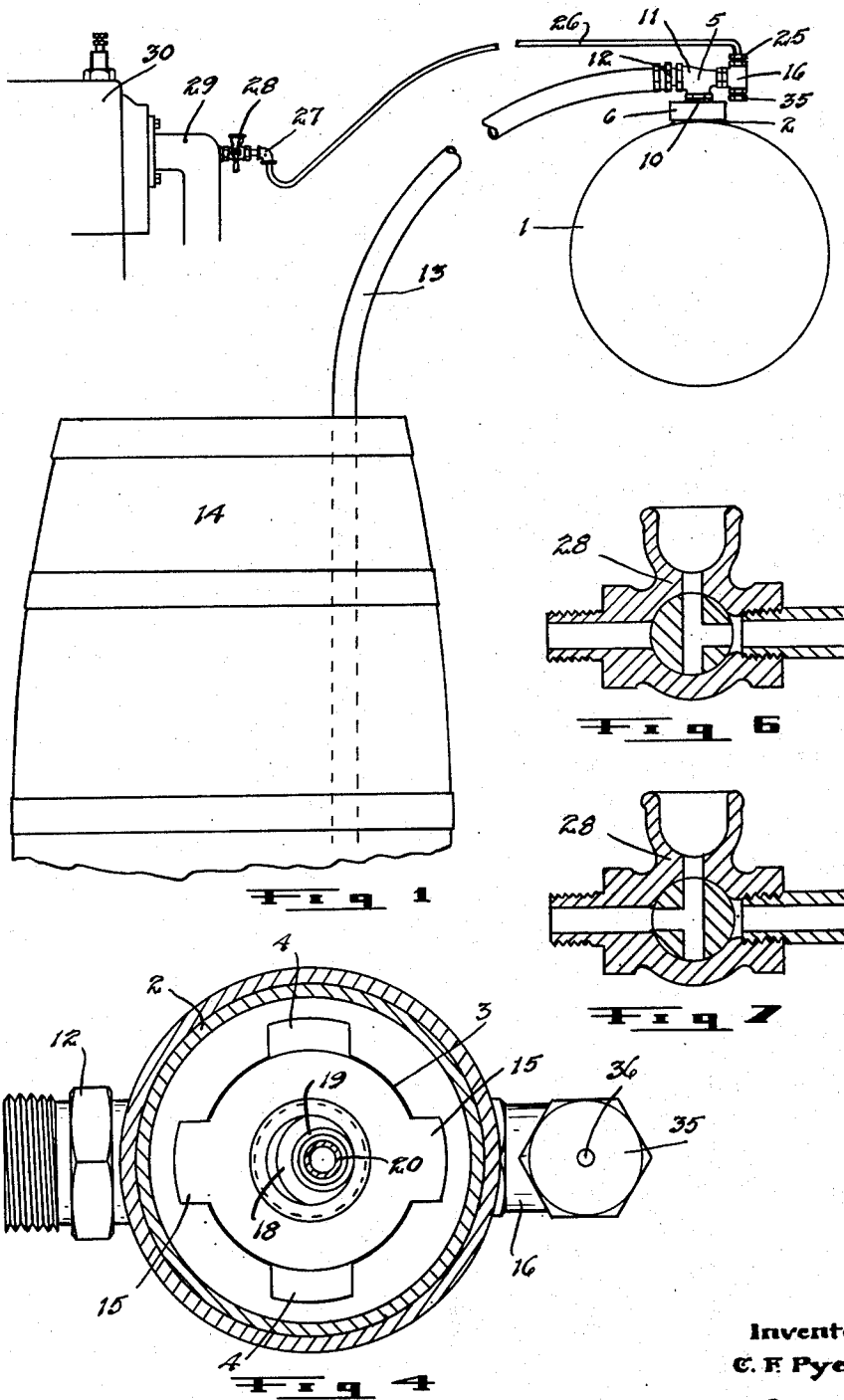
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2,225,844

TANK FILLING DEVICE

Filed April 28, 1939

2 Sheets-Sheet 1



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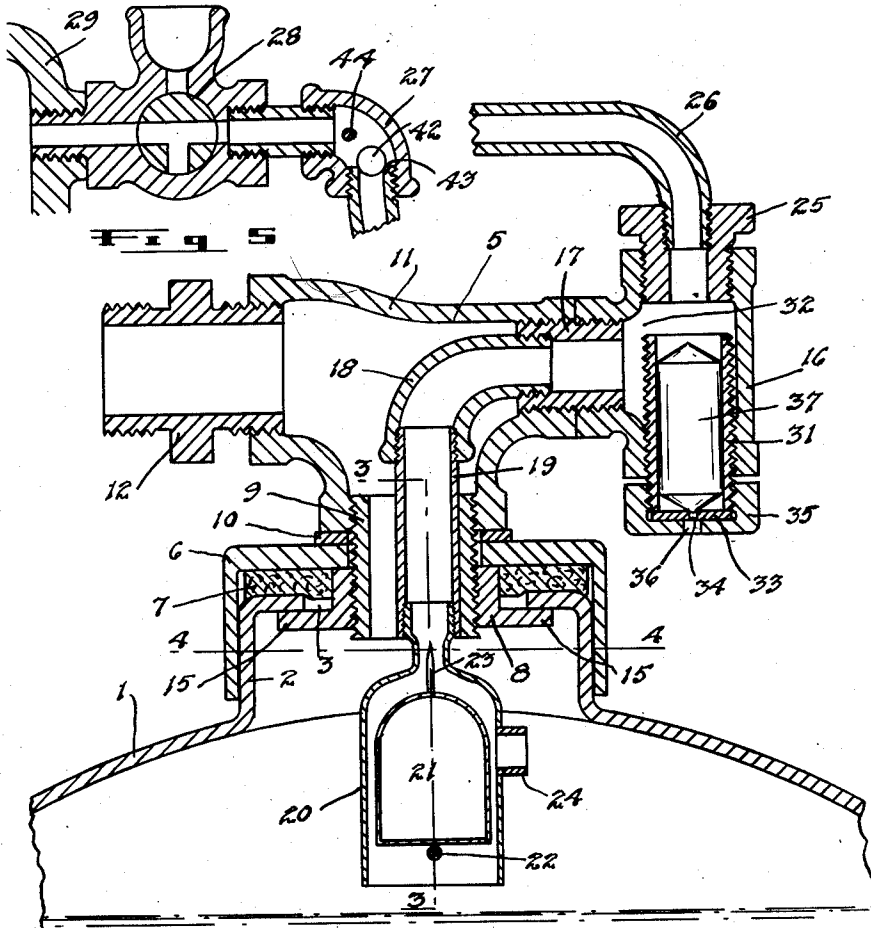
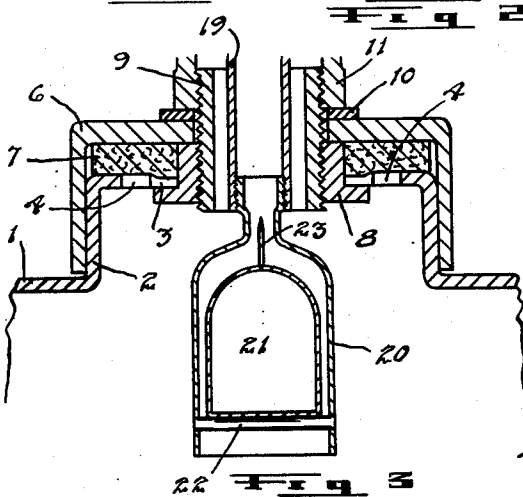
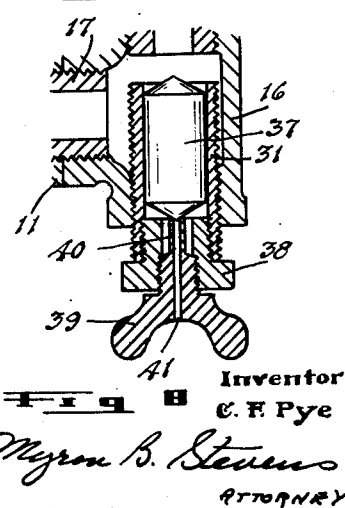
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TANK FILLING DEVICE

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10 Claims. (Cl. 226—116)

With the present wide use of internal combustion motors such as on automobiles, tractors, aeroplanes, motor boats, combines, etcetera, much valuable time is used up in filling the fuel tanks and considerable fuel is wasted by spilling. On farms, in the harvest time, the fuel forms a dangerous fire hazard if spilled as it could easily start a prairie or forest fire. Many farmers and others work at night and it is extremely hard to tell when the tank is full. On combines, it is necessary to carry the fuel up a distance of approximately ten feet to the tank which is not only a time consuming operation but also a tiring one. In some cases it is necessary to elevate water or other liquid a considerable distance.

The principal object of the present invention is to provide a specially designed valve which may be temporarily or permanently attached to the filler member of an elevated tank and by utilizing the low pressure in the intake manifold or cylinder of an internal combustion motor through a pipe to said valve, liquid may be drawn up into said elevated tank through a secondary pipe from a lower container.

A further object of the invention is to accomplish said first-mentioned object without waste, spilling or contamination of the liquid and so avoid the possibility of a fire, other disadvantages of such spilling or injury to the mechanical parts of the motor through foreign particles in the fuel.

A further object of the invention is to provide a float cut-out on said valve which will automatically stop the flow of liquid when the tank has been filled to a predetermined level.

A further object of the invention is to construct the device so that the operation of filling the elevated tank and shutting off the flow is entirely automatic to permit the operator to do other work while waiting.

A further object of the invention is to provide a device of the class mentioned which will also disconnect the motor suction from said elevated tank if the upward flow of liquid stops from any cause, thus preventing the collapse of said elevated tank.

A further object of the invention is to provide an indicator which will audibly register that the upward liquid flow has stopped, upon a valve being turned.

Still further objects of the invention are, 1st, to construct the device in a simple, cheap and durable manner; 2nd, by the use of well known pipe fittings; 3rd, to attach such device without altering the tank or motor; 4th, to operate same without interfering with the operation of said motor and 5th, to provide means for utilizing the suction directly from a cylinder of the motor.

With the above important objects in view,

which will become more apparent as the description proceeds, the invention consists essentially, in the arrangement and construction of parts, hereinafter more particularly described, reference being had to the accompanying drawings in which:

Figure 1 is a diagrammatic view showing an elevated tank with the invention installed, a pipe connection from said invention to a motor and a hose connection from said invention to a lower liquid container.

Figure 2 is an enlarged vertical section through the invention and partly showing the tank.

Figure 3 is a partial vertical section taken on the line 3—3, Figure 2.

Figure 4 is an inverted horizontal section taken on the line 4—4, Figure 2.

Figure 5 is an enlarged vertical section through the suction control valve and associated parts.

Figures 6 and 7 are views showing various positions of the suction control valve.

Figure 8 is a view showing a modified form of indicator shut-off.

In the drawings, like characters of reference indicate corresponding parts in the several figures.

An elevated tank, to receive liquid, is indicated by the numeral 1 and is provided with the usual filler member 2 which comprises an inverted cup shaped extension on the top of the tank having a circular opening 3 and with a cut-out 4 on either side of the opening for the locking members of the ordinary cap (not shown) to pass through.

The filler valve, to be described, is generally indicated by the numeral 5 and is provided with an inverted cup shaped member 6 which, when the valve is applied to the tank, telescopes over the filler member. The inside of the member 6 is provided with a resilient washer 7 loosely retained therein by a lock nut 8 screwed onto a sleeve 9 which passes up through an opening in the member 6, through a washer 10 and terminates within a T reducer 11. The large end of the T reducer threadedly receives one end of a coupling 12 which is adapted to receive the fitting of a hose 13 which passes down into or connects with a lower liquid container such as a barrel 14. The nut 8 is provided with a pair of side lugs 15 which pass through the cut-outs 4 so the nut can be turned to lock the valve 5 to the filler member 2.

The opposite small end of the T reducer 11 is connected to a further T 16 through a nipple 17. The end of the nipple, within the T reducer 11, receives the small end of a reducer elbow 18. Both the inner and outer threads on the nipple are the same pitch so the nipple can thread into the T and the elbow at the same time. The lower end of the elbow 18 receives a

short pipe 19 which passes down through the hollow portion of the sleeve 9 and then receives the threaded end of a bottle shaped hollow member 20 which projects into the tank 1. A float 21, having a semi-spherical upper end, is positioned within the member 20 and is supported on a pin 22 passing thereacross. The upper end of said float is provided with an upwardly extending pin 23 which projects into the neck of the member 20 and acts as a guide for the float. A short pipe 24 projects from the side of the member 20 for a purpose later described.

A reducer 25 screws into the upper end of the T 16 and in turn receives a pipe 26. The other end of this pipe connects with an elbow 27 which in turn connects with a three-way valve 28 having a priming cup on the top. The other end of the valve is threaded into the intake manifold 29 of an internal combustion motor 30.

The lower part of the T 16 threadedly receives a sleeve 31, the upper end of which terminates near the reducer 25, thus providing a narrow passage 32 from the nipple 17 to said reducer 25. The lower end of the sleeve 31 is closed by a disc 33, having a small hole 34 in the centre thereof. The disc is held in place by a cap 35 threaded onto the end of the sleeve 31, and said cap is also provided with a central opening 36 larger than 34. A cylindrically shaped weight or indicator 37, having cone shaped ends, is slidably positioned within the sleeve 31 and the lower end projects into and closes the opening 34 in the disc 33.

The device as shown in the drawings is in working position. The low pressure in the intake manifold of the internal combustion motor acts through the valve 28, and the parts shown, to reduce the pressure in the elevated tank 1. This, in turn, acts through the hose 13 to draw liquid from the barrel 14 up into the elevated tank. If, for any reason, the connection between the elevated tank and the barrel becomes clogged or stopped, the pressure will reduce quickly in the elevated tank 1. To prevent the collapse of the tank, the weight or indicator 37 will rise under the atmospheric pressure on the small hole 34 and close the lower end of the reducer 25. In the normal operation however, with all pipes clear, the indicator 37 will remain in the position shown and the tank 1 will fill up. When the level of the liquid, in said tank, has reached a sufficient height, the float 21 will rise and the semi-spherical upper end will contact and close the neck of the bottle shaped member 20 and the filling operation stops. The pressure is then reduced along the vacuum passage above the member 20 and the weight or indicator 37 will rise and close the lower end of the reducer 25.

When the above operations have occurred, air leaks past the indicator 37 from the hole 34, through the passage 32 to the bottle shaped member 20 and out the pipe 24 to bring the tank 1 back to atmospheric pressure. At this time all surplus liquid in the hose 13 drains back into the barrel 14.

The operator can tell if the filling operation has stopped by turning the valve 28 to the position shown in Figure 6. If the indicator 37 is up, it will drop as the valve increases the air pressure and the operator will hear an audible click as the indicator strikes the disc 33. As the liquid is used up in the tank 1 the float 21 will descend until it rests again upon the pin 22. During this period, air is admitted into the tank

1 through the short pipe 24 from the three-way valve 28.

From the above, it will be apparent that liquid can be elevated from a lower tank to a higher one by this method without loss of time or waste. If fuel is being elevated the fire hazard is dropped to a minimum. The automatic operation of the float ensures that the elevating operation will be stopped when the tank is full. Overflow is accordingly avoided and the operator does not waste valuable time watching the tank level. This is extremely valuable at night. The operation of the weight 37 not only informs the operator when the tank is full but also acts as a safety to prevent collapse of the tank due to the intense outside pressure if anything goes wrong with the upward flow of the liquid. The device is very simple, being made mostly from pipe fittings, no alterations are required on the tank or the motor and it can be removed quickly or left on as a permanent fixture.

If it is desired to use the device on different tanks located at different heights, or if more or less pressure is required on the tank 1 to lift the fuel, the washer 33 may be removed and another, having a larger or smaller hole can be substituted. The larger the hole, the higher the pressure in the tank 1 before the indicator will lift and shut off the suction and conversely, the smaller the hole, the lower the pressure in the tank 1 before the indicator lifts.

In some cases when only two pressures are required for liquid lifting, the device shown in Figure 8 may be employed. A plug 38 is threaded into the end of the sleeve 31. This plug is hollow and threadedly receives a wing screw 39 having an upward extension 40 provided with a central hole 41. For low pressure in the tank 1, the weight 37 will close the hole in the extension 40 and if a high pressure is desired the wing screw can be removed or screwed down so that the weight closes the larger hole in the plug 38.

If a still lower pressure is required in the tank, the pipe 26 can be connected direct to one of the cylinders of the motor. In such cases, the elbow 27 is formed into a check valve, shown in Figure 5, to prevent back pressure or back fire into the valve 5 during the operation of the motor. A ball 42 rests on the end of the pipe 26 and is drawn up on the intake stroke by the reduced pressure in the cylinder. The end of the pipe 26 is provided with a slight groove 43 to permit air to leak past when the three way valve is in normal position. The slight leakage when the back pressure from the motor occurs is not serious. A pin 44 passes across the body of the elbow to prevent said ball from closing the opening in the nipple connecting the elbow to the valve 28. On the three strokes of the motor (compression, expansion and exhaust) the ball seats on the end of the pipe 26.

In Figure 5, the valve 28 is shown in position for operation of the valve 5. In Figure 6, the valve 28 is shown in the shut-off or normal position, permitting air to pass down into the tank 1. In Figure 7, the valve 28 is shown in the priming or cranking position for the motor when the pipe 26 is connected direct to the cylinder.

What I claim as my invention is:

1. In a tank filling device, a valve releasably fastened by an air tight joint to the filler member of an elevated tank, said valve fluidly connecting the interior of said elevated tank with a source of suction and with a lower liquid con-

5 taining tank to elevate the liquid in said lower tank to said elevated tank, primary means for disconnecting the interior of said elevated tank from said source of suction upon said elevated tank filling to a predetermined level, and secondary disconnecting means for later shutting off said suction and permit atmospheric air to enter said elevated tank.

10 2. In a tank filling device having a valve connecting the interior of an elevated tank with a source of suction and with the interior of a lower liquid filled tank to raise said liquid from said lower tank to said elevated tank, float means within said elevated tank to disconnect said source of suction therefrom when said elevated tank fills to a predetermined level, a weight slidably mounted and operable by atmospheric pressure, when said float means shuts off said suction, to shut off said suction from said float means, release same, and permit atmospheric air to enter said elevated tank and drain surplus liquid back to said lower tank from said elevated tank connection.

25 3. In a tank filling device having a valve connecting the interior of an elevated tank with a source of suction and with the interior of a lower liquid filled tank to raise said liquid from said lower tank to said elevated tank, float means within said elevated tank to disconnect said source of suction therefrom when said elevated tank fills to a predetermined level, a weight slidably mounted and operable by atmospheric air pressure, when said float means shuts off said suction, to shut off said suction from said float means, release same, and permit atmospheric air to enter said elevated tank and drain surplus liquid back to said lower tank from said elevated tank connection, and manual control means in said suction connection to disconnect said suction therefrom, admit air to said connection and cause said weight to drop and form an audible indicator.

40 4. In a tank filling device, a valve, comprising a T having a connection to the interior of an elevated tank to a lower liquid filled tank, and having a source of suction connected through said T to the interior of said elevated tank, a float suspended in said elevated tank from said valve and adapted to shut off said source of suction therefrom when said elevated tank fills to a predetermined level, a slidably mounted weight, operated by atmospheric air pressure when said float shuts off said suction, to disconnect said suction from said float and provide a passage for atmospheric air to said elevated tank upon the lowering of said float, and manual valve means in said suction connection to disconnect said suction therefrom, admit air to said connection and cause said weight to drop and form an audible indicator.

50 5. In a tank filling device, a valve comprising a T having a fluid connection to the interior of an elevated tank, a fluid connection to a lower liquid filled tank, and having a fluid connection from the interior of said elevated tank through said T to the intake manifold of an internal combustion motor to raise said liquid into said elevated tank, a bottle shaped container suspended in said elevated tank from said valve and forming the end of said connection to said intake manifold, a float supported in said bottle shaped container and adapted to close the upper end thereof when said elevated tank is filled to a predetermined level, a slidably mounted weight carried by said valve and positioned in said in-

take manifold connection and operable by atmospheric air pressure, upon a predetermined reduced pressure obtaining in said connection, to disconnect said intake manifold from said elevated tank and admit atmospheric air to said elevated tank, and manual valve means in said intake manifold connection to disconnect same from said intake manifold, admit air to said connection and cause said weight to drop and form an audible indicator.

6. In a tank filling device having a source of suction connected through an elevated tank to a lower liquid filled tank to elevate said liquid to said elevated tank; means for disconnecting the interior of said elevated tank from said source of suction upon a predetermined reduced pressure obtaining in said elevated tank; said means admitting air to said elevated tank at atmospheric pressure upon disconnecting said suction; and means for varying the pressure required to operate said disconnecting means.

7. In a tank filling device having a source of suction connected through an elevated tank to a lower liquid filled tank to elevate said liquid to said elevated tank: a slidably mounted weight, operable by atmospheric air pressure upon a predetermined reduced pressure obtaining in said elevated tank, to disconnect said source of suction from the interior of said elevated tank; and means for admitting air at atmospheric pressure to said elevated tank upon said weight acting to disconnect said suction.

8. In a tank filling device having a source of suction connected through an elevated tank to a lower liquid filled tank to elevate said liquid to said elevated tank: a slidably mounted weight located in a chamber fluidly connected to said elevated tank; said weight normally closing an opening to atmospheric air; said weight operable by atmospheric air pressure, upon a predetermined reduced pressure obtaining in said elevated tank, to disconnect said suction from said elevated tank and admit air at atmospheric pressure to said elevated tank.

9. In a tank filling device having a source of suction connected through an elevated tank to a lower liquid filled tank to elevate said liquid to said elevated tank: a slidably mounted weight located in a chamber fluidly connected to said elevated tank; said weight normally closing an opening to atmospheric air; said weight operable by atmospheric air pressure, upon a predetermined reduced pressure obtaining in said elevated tank, to disconnect said suction from said elevated tank; said opening positioned within a replaceable annular member and adapted to permit atmospheric air to enter said elevated tank upon the operation of said weight.

10. In a device of the character described, a tubular body member adapted to be mounted on a closed tank, a passageway in said body member communicating with the tank, and a chamber of reduced pressure, a fuel delivery tube communicating with the tank, a suitable liquid fuel supply line extending through said body member, a shut-off valve operable when a predetermined liquid level is obtained in the tank to close the passageway in said body member, a safety valve adapted to be moved by the differential of pressures inside and outside said passageway to close said passageway beyond said shut-off valve and to admit atmospheric pressure to said passageway to release said shut-off valve.