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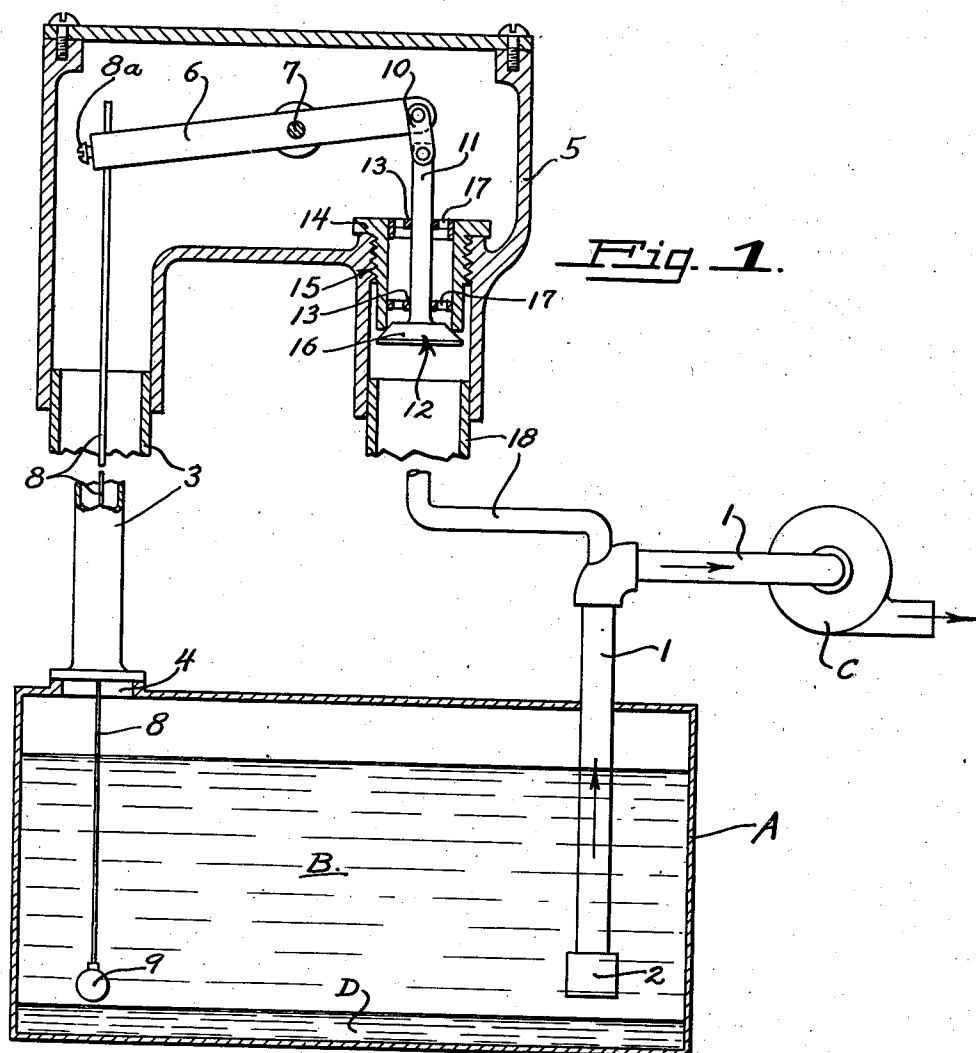
E. H. MARKWART

2,371,339

WATER LOCK

Filed Jan. 24, 1944

2 Sheets-Sheet 1



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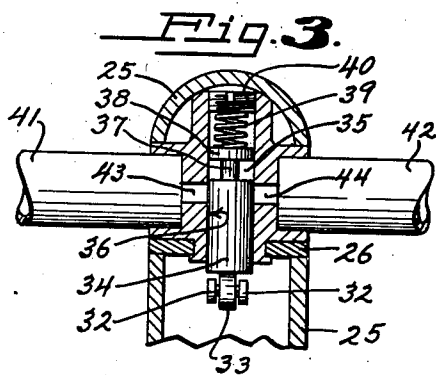
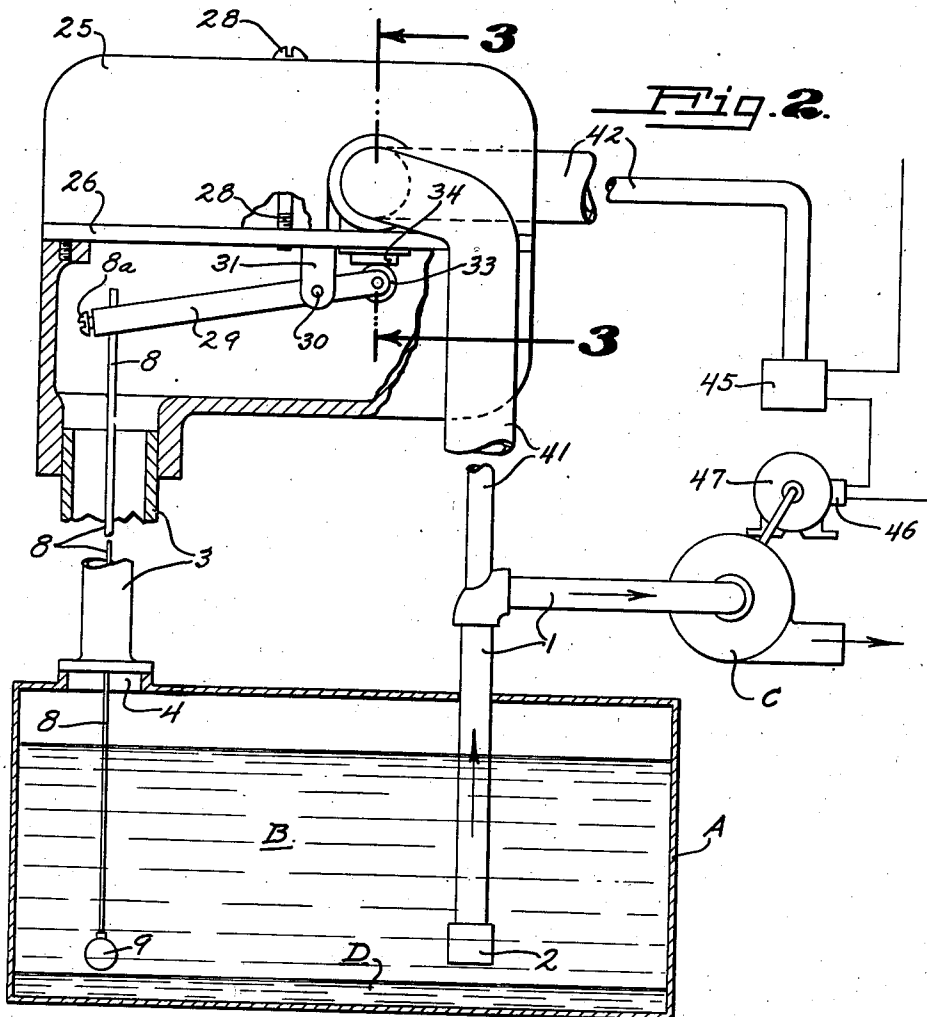
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WATER LOCK

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7 Claims. (Cl. 222-63)

This invention relates to water locks and more particularly to a water lock device adapted to be used in gasoline fuel dispensing stations to prevent water from being pumped from a storage tank into an automobile fuel tank, or the like.

An object of the invention is to provide a simple device for use with gasoline service station pumps and the like, which prevents water, which accumulates by means of condensation or in other manners, from being pumped from the said storage tank and delivered to the fuel tank of a motor vehicle or the like. Another object of this invention is to provide a water lock device which prevents the operation of a gasoline dispensing pump when water has accumulated to a determined amount in a storage tank. A further object of this invention is to provide a water lock device which may be easily attached to a conventional gasoline storage tank and pump without the necessity of rebuilding or modifying conventional equipment in order to accomplish installation thereof. A further object of the invention is to provide a water lock device adapted to shut off a pump motor when a predetermined amount of water has accumulated in the gasoline storage source. Other objects and advantages of the invention will become apparent upon referring to the accompanying specification attached hereto and made a part hereof.

Referring to the drawings in which similar characters of reference represent corresponding parts in the several views:

Fig. 1 is a diagrammatic view of a fuel storage tank and pumping apparatus with the preferred form of the invention connected thereto shown in enlarged longitudinal section.

Fig. 2 is a diagrammatic view of a fuel storage tank and pumping apparatus with a modified form of the invention connected thereto shown in enlarged side elevational view, partly broken away.

Fig. 3 is a transverse sectional view, taken on line 3-3 of Fig. 2.

Fig. 1 illustrates a preferred form of the invention, wherein a storage tank, generally indicated at A, provided with suitable vent holes (not shown) and adapted to contain gasoline B, is provided with a conventional, vertically disposed gasoline pump suction conduit 1, provided with a conventional foot valve 2 and leading to a gasoline pump C which, in turn, leads to a dispensing conduit (not shown) for dispensing gasoline into the fuel tanks of motor vehicles and the like.

The invention is adapted for easy connection to the storage tank A and comprises a housing

conduit 3, connected to an aperture 4 provided in the top of a gasoline storage tank and supporting a valve housing 5. It is noted that there is communication from the storage tank through the housing conduit 3 into the valve housing 5. A lever 6 is pivotally mounted on a wall of the valve housing, as at 7. A cable, wire or other suitable supporting means 8 is attached to one end of the lever 6, as by means of an adjustable set screw 8^a.

The supporting means 8, depending from lever 6, is in vertical alignment with, and is enclosed by, the housing conduit 3. A duo-gravity float 9, i. e. adapted to sink in gasoline and float on water, or other liquids having different specific densities, is connected to the bottom end of the supporting means 8 and is spaced above the floor of the gasoline tank at a predetermined point in order that a predetermined accumulation of water D will float the said duo-gravity float 9 and actuate the valve, as will hereinafter be described. The end of the lever 6 opposite to the supporting means 8 carries a pivotally mounted toggle link or the like 10 which is pivotally attached to a stem 11. The stem 11 forms a part of a valve 12 provided in the valve housing, which will now be described.

The stem 11 is slidably mounted in spiders or bearings 13 provided in a hollow plug 14, preferably removably connected in aperture 15 formed in the valve housing 5. The stem 11 extends through the plug 14 and carries a valve head 16 which is adapted to seat against the annular walls of hollow plug 14. Preferably the head 16 is tapered in order to make a line contact with the inner annular edge of the hollow plug 14 to prevent fluid communication through said plug.

It will be noted that passages 17 are provided adjacent to the bearings 13 to allow communication from the valve housing to the valve head 16. A pipe 18 communicates with aperture 15 below plug 14 and leads to and is tapped into the suction conduit 1 of the gasoline-dispensing circuit. Preferably, the pipe 18 is tapped into the suction conduit 1 at the top of the vertical lift of the said suction conduit in order to facilitate priming of the pump after the pump has been rendered inoperative, as will hereinafter appear.

In operation, when the duo-gravity float 9 is elevated, as caused by the accumulation of water D, weight is relieved from the one end of lever 6, thereby allowing the weight of the stem and valve head to tilt the lever downwardly toward

the plug 14, allowing the valve 12 to open, which, in turn, allows air to pass from the top of tank A, through housing conduit 3, through valve housing 5, and thence through apertures 17 in plug 14 to pipe 18 and conduit 1 which leads to the pump. Thus by induction of air into the suction line of the pump, the pump becomes inoperative to lift the liquid gasoline and is thereby rendered inoperative to discharge gasoline from the said storage tank. After the accumulated water D has been removed from the storage tank, float 9 seeks a lower level which, in turn, closes the head 16 and the gasoline pump then becomes operative to pump gasoline. An aperture may be provided in the valve housing 5 or conduit 3 to furnish a source of air to suction conduit 1 rather than taking air directly from the top portion of the tank A.

It is noted that, as described, the supporting means 8 is flexible so that by elevating float 9, the weight thereof on lever 6 is removed and functions to open valve 12. In this form of construction the weight of supporting means 8 and float 9 when immersed in gasoline is greater than the weight of stem 11 and cap 16. Obviously the weights can be shifted by moving the position of pivot 7 of lever 6 to change the leverage. The supporting means 8 may be a rigid member so that when the float 9 is elevated the valve 12 is opened by applied pressure rather than by the counterbalancing means above described.

Figs. 2 and 3 illustrate a modified form of the invention, wherein a vacuum switch is actuated to shut off a pump motor or the like. The modified form of water lock is connected to a conventional gasoline storage tank in the same manner as hereinabove described with reference to the preferred form of the invention.

The valve housing 25 is partitioned by partition member 26 which divides the housing into two portions, the top portion being held in position on the partition member by means of a screw or the like 28. A lever 29 is pivotally mounted, as at 30, on a stud 31 carried by partition 26. One end of the lever 29 carries a supporting means 8 attached to duo-gravity float in the same manner as hereinbefore described with reference to a preferred form of the invention. The opposite end of the lever 29 is formed with a clevis portion 32 mounting a roller 33 adapted to rest against the bottom of a piston 34 which forms a part of the valve 35 hereinafter described.

The piston 34, seated slidably in a passage or cylinder 36, is provided with a reduced diameter portion 37, having a cap or head portion 38 upon which is mounted a coil tension spring 39 adapted to be compressed adjustably against the cap 38 by means of a set screw 40. Pipes 41 and 42 communicate with passages 43 and 44, respectively. Communication between the pipes 41 and 42, through the passages 43 and 44, is normally shut off by means of the piston 34. However, when the piston is lowered from the position shown in Fig. 3, communication between the pipes is allowed through the reduced diameter portion 37. Pipe 41 leads to the pump suction pipe 1 and pipe 42 leads to a conventional pneumatic vacuum switch 45 or the like, connected in series to a stopping and starting relay switch 46 controlling the pump motor 47. The switch 45 may lead to any motor cut-out or controller mechanism of a suitable nature.

The operation of the invention is as follows: When the duo-gravity float 9 is elevated by the accumulated water D, the weight is relieved from

the end of lever 29 and spring 39 pushes piston 34 downwardly to afford communication between pipes 41 and 42. The suction conduit 1, pumping gasoline in the direction of the arrows, creates a partial vacuum in pipes 41 and 42 to actuate the pneumatic vacuum switch 45, which, in turn, breaks the circuit to relay 46 and thereby stops motor 47.

After the accumulated water D has been removed from the tank A, float 9 seeks a lower level and the combined weight of said float, when immersed in gasoline, and the supporting means 8 is sufficient to force the piston 34 upwardly in passage or cylinder 36, thereby shutting off communication between the pipes 41 and 42. The motor may then be started and the pump will operate until such time as the water accumulated in the tank reaches a predetermined height.

The air exhausted from pipes 41 and 42 and inducted into suction pipe 2 will render the pump inoperative to pump gasoline until the vacuum switch is actuated to shut off the motor.

While I have referred to gasoline and water in the specification and claims, it is understood that other liquids of different specific densities and characteristics are equivalent liquids within the intended spirit of this invention.

While I have described the invention in more or less specific detail, it is understood that variations and modifications may be made within the spirit of the invention and within the scope of the appended claims.

I claim:

1. In a water lock device in combination, a storage tank for gasoline, a suction pipe in said tank and communicating with a pump, a float adapted to sink in gasoline and float on water disposed in said tank below the inlet to said suction pipe, a valve positioned remote from said float, means to link said float to said valve and actuate said valve upon elevation of said float, and a pipe connecting said valve to said suction pipe, said valve operative upon actuation to admit air to said pipe and thereby render said pump inoperative to pump gasoline.

2. The combination with a liquid storage tank and a suction pump connected therewith to withdraw liquid from the tank, of a float and connected valve mechanism, said float having a specific gravity greater than gasoline and less than water and being disposed in said tank adjacent the bottom thereof, said valve operative on the movement of the float to admit air to the suction side of the pump, and means actuated by said float and valve mechanism to cause the pump to cease pumping operations substantially simultaneously with the admission of the air to the suction side of the pump.

3. In a liquid storage tank and pumping system, the combination comprising a liquid storage tank, a suction pipe leading from said storage tank to a suction pump in flow communication therewith, a float adapted to sink in gasoline and float on water disposed in said storage tank below the level of the intake of said suction pipe, an air conduit in flow communication with said suction pipe, a valve in said air conduit and mechanical linkage means between said valve and said float whereby said valve is closed while said float is in gasoline and said valve is open when said float is in water.

4. In a liquid storage tank and pumping system, the combination comprising a liquid storage tank, a suction pipe leading from said storage tank to a suction pump in flow communica-

tion therewith, a float adapted to sink in gasoline and float on water disposed in said storage tank below the level of the intake outlet of said suction pipe, an air conduit in flow communication with said suction pipe, a valve in flow communication with said air conduit, means normally urging said valve to closed position and mechanical linkage connecting said float to said valve whereby said valve is opened when said float is floated on water in the bottom of said storage tank.

5. In a liquid storage and pumping system, the combination comprising a liquid storage tank, a suction pipe leading from said storage tank to a suction pump in flow communication therewith, a housing supported on said storage tank in flow communication with the interior of said storage tank above the liquid level therein, an air port leading from said housing in flow communication therewith, a pivot link mounted in said housing, a valve in said air port and attached to said pivot link at one end thereof, a float depending from the other end of said pivot link and disposed in said storage tank below the level of the intake outlet of said suction pump, said float having a specific gravity greater than gasoline and less than water, said valve being urged to closed position when said float is in gasoline and to open position when said float is in water and an air conduit in flow communication between said suction pipe and said air port in said housing.

6. In a liquid storage tank and pumping system, the combination comprising a liquid storage tank, a suction pipe leading from said storage tank to a suction pump in flow communication therewith, driving means for said pump, a vacuum switch controlling said driving means, an air conduit in flow communication with said pipe and said vacuum switch, a valve normally closing said air conduit, a float in said storage tank disposed below the level of the intake outlet of said suction pipe, said float having a specific gravity greater than gasoline and less than water and mechanical linkage means between said float and said valve operation to open said valve when said float is in water.

7. In a liquid storage and pumping system, the combination comprising a storage tank, a suction pipe leading from said storage tank to a suction pump in flow communication therewith, driving means for said pump, a vacuum switch controlling said driving means, an air conduit in flow communication with said vacuum switch and said suction pipe, a spring loaded valve normally closing said air conduit, a valve actuating mechanism attached to said valve and to a float disposed in said storage tank below the level of the intake outlet of said suction pipe, said float having a specific gravity greater than gasoline and less than water whereby said valve is urged to open position when said float is in water.

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