Nov. 29, 1960 K. M. SNIDER 2,962,042

LIQUID FEED TANK

Filed Feb. 24, 1959 2 Sheets-Sheet 1

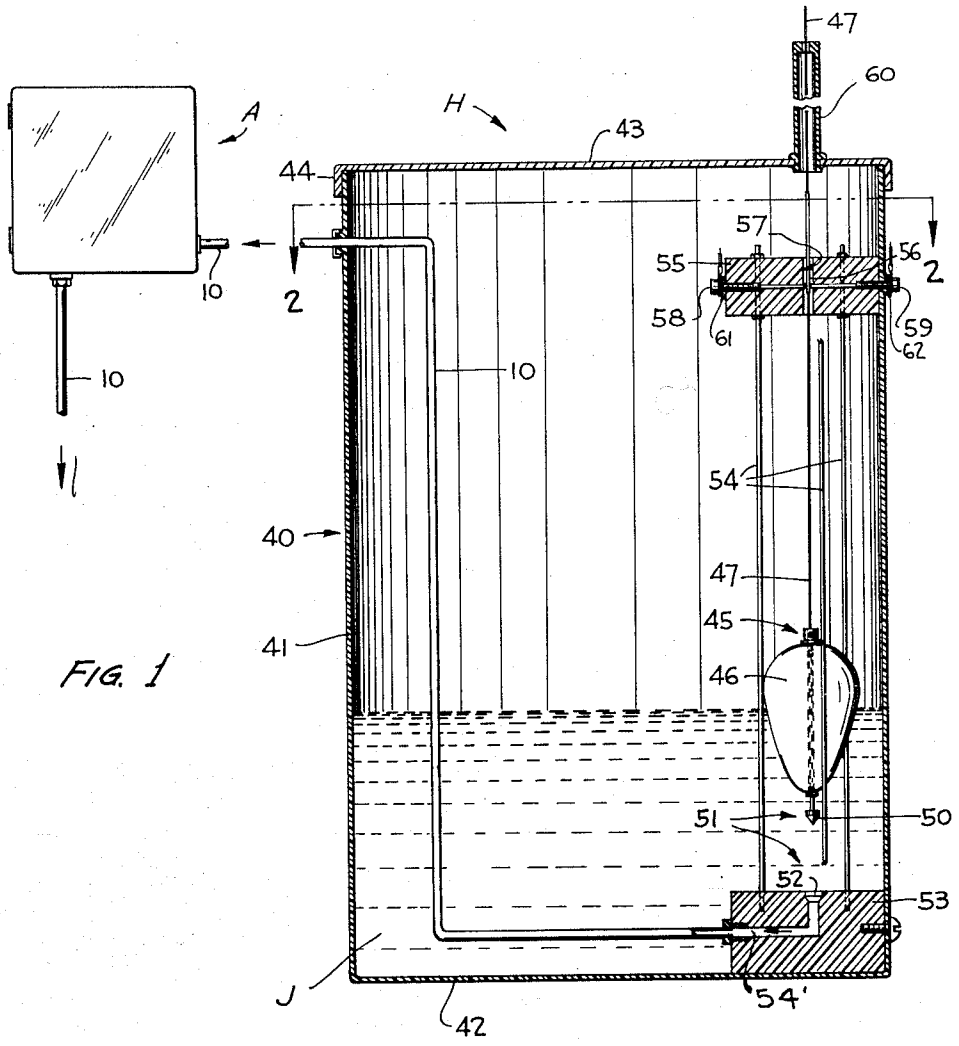

FIG. 1

INVENTOR

KENNETH M. SNIDER

BY Rommel, Allaire & Rommel

ATTORNEYS

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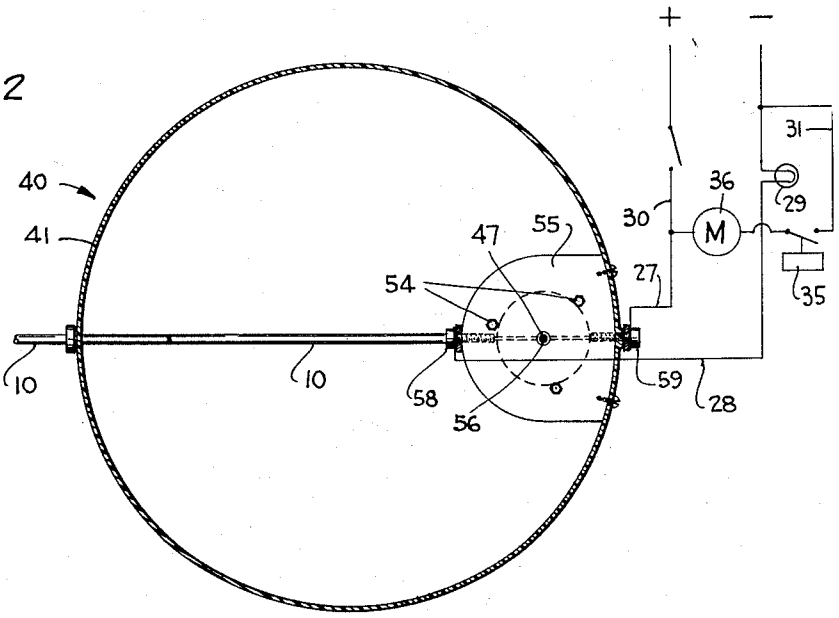
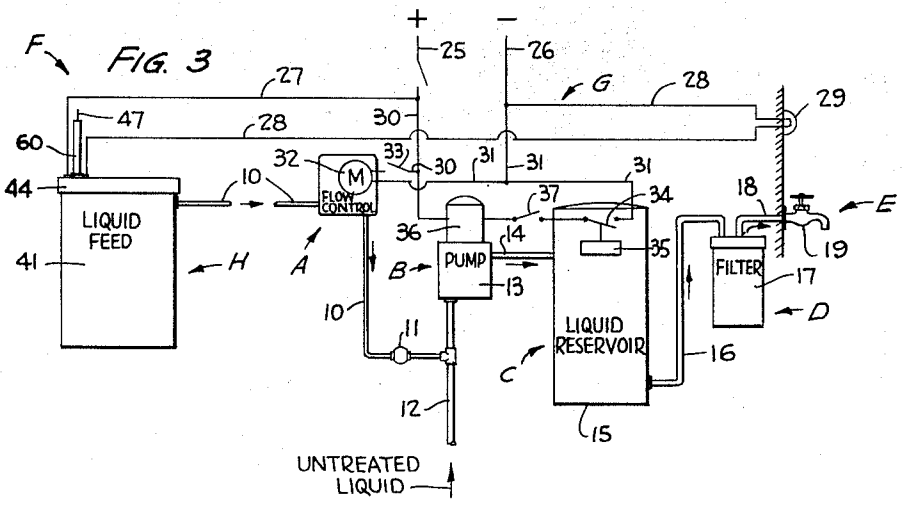
FIG. 2



F FIG. 3



INVENTOR

KENNETH M. SNIDER

BY Rommel, Allison & Rommel

ATTORNEYS

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2,962,042

LIQUID FEED TANK

Kenneth M. Snider, Mansfield, Ohio, assignor, by mesne assignments, to Water Purification, Inc., Mansfield, Ohio, a corporation of Ohio

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3 Claims. (Cl. 137—399)

This invention relates to liquid feed tanks. An example of such tanks is one in which control means closes a valve means when the liquid level of the tank drops to a predetermined level, and the control means also causes signal means to function so as to indicate the liquid level condition of the tank.

An important object of this invention is to provide liquid feed tank means in which float means selectively opens or closes a valve, depending upon predetermined levels of the liquid within the tank, and also opens or closes an electric circuit, depending upon those levels, so that the levels will be signalled exteriorly of the tank.

A further important object is to provide the tank means described in the preceding paragraph, which means includes few parts, is sturdy and positive in action, and may be manufactured at a low cost.

Another important object is to provide a tank as described above in which the electrical system of the tank means may be associated with other electrical equipment without interfering with the operation of the float means.

Other objects and advantages of the invention will be apparent during the course of the following detailed description of the invention, taken in connection with the accompanying drawings, forming parts of this disclosure and in which drawings:

Figure 1 is a vertical sectional view of the tank means in operation.

Figure 2 is a horizontal sectional view substantially on the line 2—2 of Figure 1 and diagrammatically showing electrical means associated therewith.

Figure 3 is a diagrammatic view of the tank means associated with a water-treating system with which it may be associated.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views, the letters A to E inclusive designate mechanical components of a water treating system F; G, the electrical components thereof; H, the liquid treating tank, and J, a treating liquid.

By way of example, the tank H is shown associated with liquid flow control means A, pump means B, liquid reservoir or tank means C, liquid filter means D, and liquid tap means E, included in the water treating system F. The tank means H, liquid flow control means A and pump means B are also electrically connected with the electrical components G.

The liquid flow control means A is more fully disclosed in my application for United States Letters Patents, Serial No. 794,956, filed concurrently herewith and includes the liquid flow conduit **10** opening into the tank of the means H and extending to, through and outwardly of the flow control means A, with a liquid flow conventional check valve **11** interposed in the conduit **10**, and the conduit **10** opening into a liquid supply conduit **12** extending to the suction chamber of the conventional pump **13** of

the pump means B, which pump **13** has a liquid flow conduit **14** opening into its discharge chamber and extending to the upper portion of a reservoir of a conventional tank **15** for the liquid from the liquid flow conduit **14**. At the lower portion of the reservoir opens a liquid flow conduit **16** to the intake of a filter housing **17**, while from the discharge of the filter housing, a liquid flow conduit **18** extends to a conventional tap or faucet **19** of the tap means E.

The electrical components includes the electric current supply conductors **25** and **26**, with leads **27** and **28** electrically connected with the conductors **25** and **26** respectively and electrical signal means, which is preferably a conventional electric lamp **29** interposed in the lead **28**. Leads **30** and **31** are in circuit with the conductors **25** and **26** and an electrical operating means, shown diagrammatically as an electric motor **32** of the liquid flow control means A, more fully described in my application therefor referred to above, with an electric switch **33** interposed in the lead **30**. Leads **30** and **31** are also electrically connected with the electric switch **34** of a conventional pressure responsive switch actuator **35** which may be housed in the tank **15** above the liquid level. The switch **34** is adapted to open or close the electric circuit to the electric motor **36** which operates the pump **13**, as is well known in the art. A manually-operated electric switch **37** is interposed in the lead **31** for manually stopping and starting the motor **36**.

Referring now to the liquid feed tank means H, the same includes a tank or housing **40** having a tubular side wall **41**, a bottom wall **42** and detachable cover or closure **43** which latter is preferably a disc, having a depending skirt or flange **44** encircling the outer face of the upper open end of the wall **41**. The tank or housing **40** is preferably of fiberglass, or similar material which is not attacked by sodium hypochlorite solutions, oil or acids which generally might be employed in a liquid feed tank. Disposed within the tank is float means **45** which is adapted to selectively open or close valve means **51** of the tank and also open or close an electric circuit as will be described.

The float means **45** comprises a suitable float **46**, preferably substantially as illustrated, and of polyethylene, having a vertically-reciprocating float rod **47** of fiberglass.

At the lower end of the float **46** is the downwardly-extending valve head **50** of the valve means **51** for seating upon the seat **52** of a valve seat block **53** which block is disposed upon the bottom wall **42** and has a liquid conduit **54'** opening to the lower end of the seat and opening into the liquid flow conduit **10** which extends from the block **53** upwardly through the tank **40** and exteriorly thereof through a suitable opening in the wall **41**. The conduit **10**, as has been stated, opens to the liquid flow control means A.

In order to provide for positive seating of the valve head **50**, I prefer to provide vertically extending guide rods **54** with their lower ends secured to the block **53** and their upper ends secured to a block **55** carried by the wall **41** below but preferably adjacent the cover **43**. This block **55** has another function as will be subsequently described. The blocks **53** and **55** are preferably of nylon and the rods **54** of fiberglass, and the latter provide a cage and guides for the float **46** and are adapted to contact the valve body but not prevent vertical reciprocation thereof.

The reciprocating rod **47** carries a sleeve **56** of electricity-conducting material disposed adjacent the upper portion of the rod **47** but spaced below the free end thereof. The rod **47** and sleeve **56** slide through a suitable vertical opening **57** in the block **55** and the sleeve

is adapted to be contacted by the free ends of two preferably axially-aligned electrical terminals 58 and 59 carried by the block 55. I prefer to form these terminals with exterior screw threads to mate with the interior screw threads of bores of the block 55 so that adjustments of the terminals may be made so that, while they will positively contact the outer face of the sleeve 56, they do not bind the sleeve.

Electrically connected with the terminal 58, as by means of a conventional clip 61, is the lead 28 and electrically connected with the terminal 59, as by a conventional clip 62, is the lead 27.

Preferably, the upper end portion of the float rod 47 and the sleeve 56 above the block 55 are housed in a small auxiliary housing 60 carried by the cover 43 with the housing 60 opening, at its lower end, into the interior of the tank 40, and the extremity of the rod 47 slidable through a small opening in the upper end of the housing 60. The housing 60 may be of any dielectric material so that the electricity-conducting sleeve 56 will not come into contact with an object exteriorly of the housing 60 or tank 40.

By removing the cover 43, a charge of liquid J may be introduced into the tank 40 and the float 46 will rise accordingly, unseating the valve head 50 from the valve seat 52 and permitting flow of a volume of liquid J into the conduit 10 only to the same level as the progressive rise of the level of the liquid in the tank. Of course the rod 47 and its sleeve 56 will rise accordingly to a point where the sleeve will be wholly above the terminals 58 and 59, in fact will be considerably above them when the top of the float 46 is closely adjacent the bottom of the block 55. As the liquid level drops, the sleeve 56 will finally contact the terminals 58 and 59 and an electric circuit will be closed to cause the lamp 29 to become illuminated as a signal that more liquid should be introduced into the tank 40.

Upon starting the motor 36 by closing the switch 37 and, consequently, starting operation of the pump 13, suction will draw the liquid J in the conduit 10, through the liquid flow control means A and into the conduit 12 to mingle with the liquid (as water) from a suitable supply source (not shown) and the mingled liquid J and water will then flow through the pump, into the conduit 14 and discharge into the tank 15, to then enter, upon operation of the tap 19, the filter D housing 17 where undesirable constituents of the water will be retained and the water discharged from the open tap 19.

If the observer does not see the lighted lamp 29 at first, no damage to the system occurs, since the float 46 will finally descend and the valve head 50 will seat. This will cause the liquid flow control means A to receive no liquid J from the conduit 10.

Various changes in the size, shape and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of the invention or scope of the claims.

What is claimed is:

1. A liquid feed tank structure including a tank, valve means therein, including a valve head, a valve seat structure provided with a valve seat, float means including a float within said tank, an elongated float rod extending from said float and movable upon movements of said float, a plurality of guide rods for and surrounding said float secured at one end of each guide rod to said valve seat structure, a support spaced above said valve seat structure with the other ends of said guide rods secured to said support, said support being provided with an opening therethrough, an elongated member of electricity conducting material and less in length than the length of said float rod, carried by said float rod and slidable through said opening, two electric terminals carried by said support and with one end portion of each terminal extending into said opening, and means carried by said terminals to electrically connect an electric signal means thereto, said terminals being disposed to contact said elongated member upon movement of said rod and float during a portion of said movement thereof and upon seating of said valve head upon said seat.

2. A liquid feed tank structure according to claim 1 characterized in that said elongated member is a sleeve surrounding a portion of said float rod intermediate the ends thereof.

3. A liquid feed tank structure according to claim 1 characterized in that said elongated member is a cylindrical sleeve surrounding a portion of said float rod intermediate the ends thereof and disposed intermediate the ends of said rod.

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