

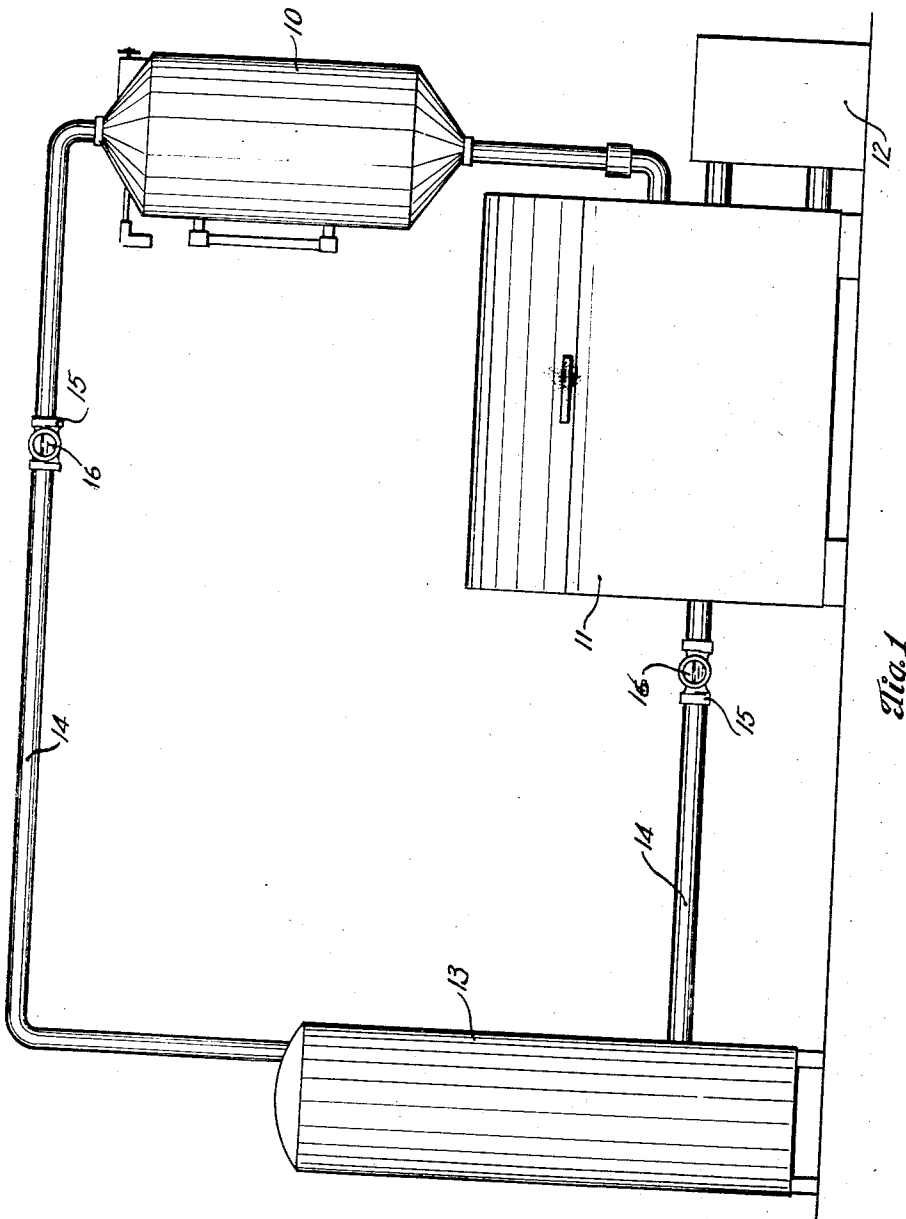
Sept. 8, 1953

H. B. CATES
FLUSHING UNIT

2,651,318

Filed Aug. 11, 1947

3 Sheets-Sheet 1



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INVENTOR.

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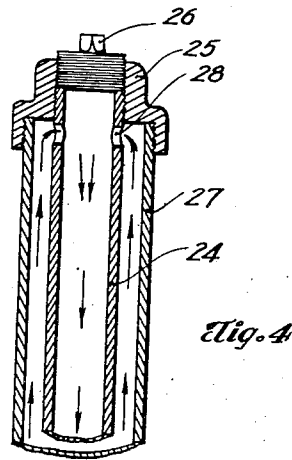
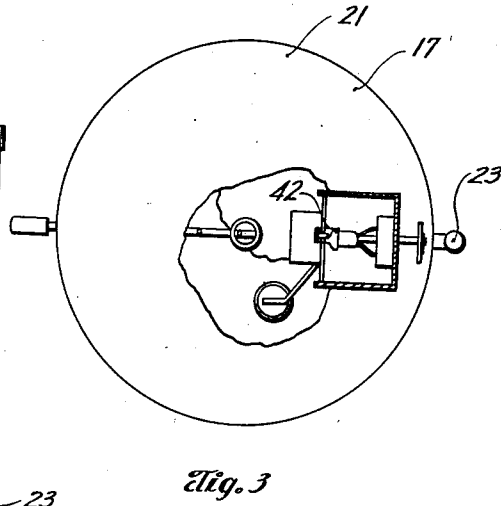
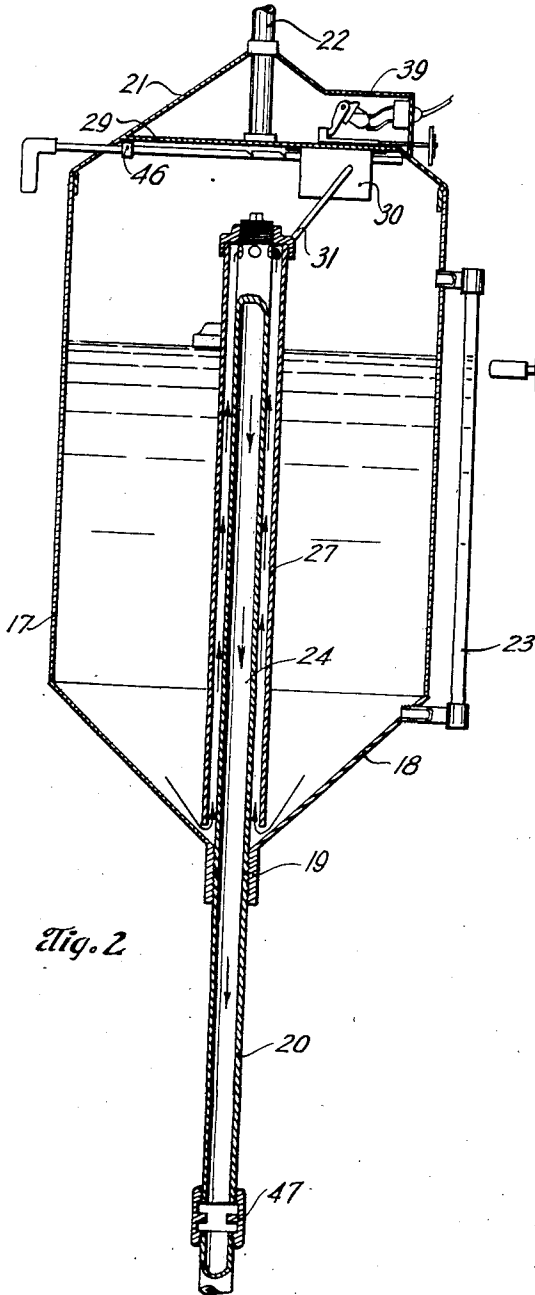
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3 Sheets-Sheet 3

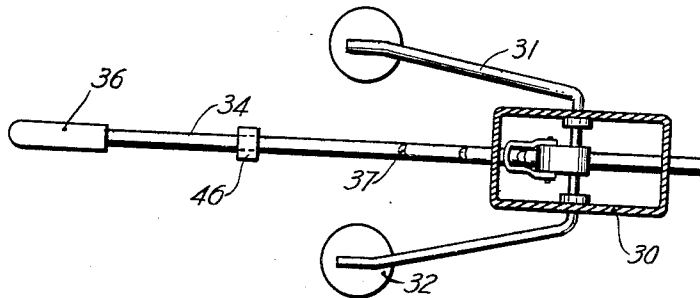


Fig. 5

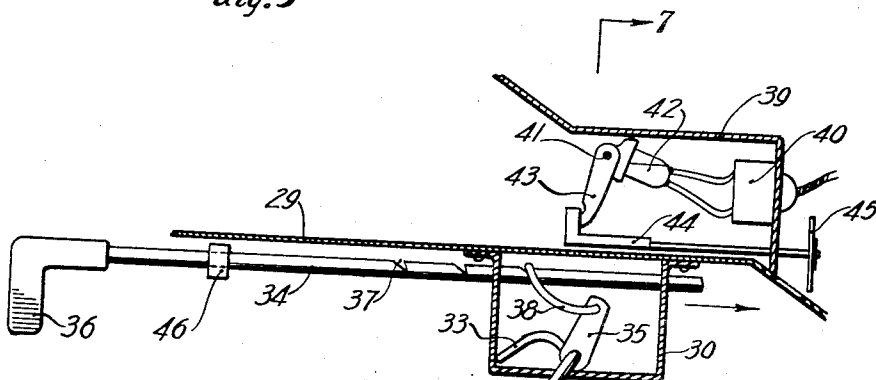


Fig. 6

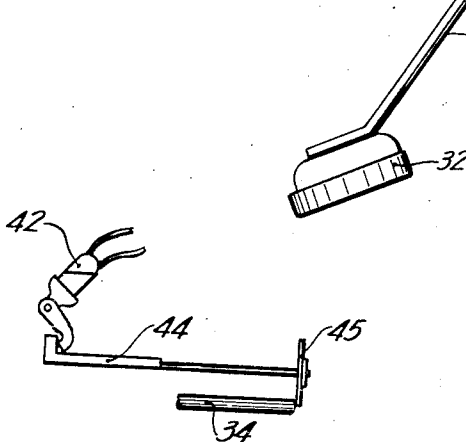


Fig. 7

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UNITED STATES PATENT OFFICE

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FLUSHING UNIT

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9 Claims. (Cl. 137-132)

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My invention relates to laundry equipment generally, but more in particular to a flushing unit adapted to be positioned in the flow lines of the cleaning solvent in a manner to automatically flush the same into the water.

It is the primary object of this invention to provide a flushing unit to be used in connection with a washer that will periodically and automatically flush a desired amount of a cleaning solvent into the washer after each draining of the same, and to automatically shut off the flow of solvent therethrough when a desired number of flushings have been made.

Another object of my invention is to provide a flushing unit that may be economically manufactured and that may be easily adapted for use on various types and sizes of equipment.

Other objects and advantages will be found in the course of the following detailed description and claims when viewed together with the accompanying drawings in which

Fig. 1 shows my invention in a flushing unit as being used in connection with a washer and filter of a dry cleaning system.

Fig. 2 is a vertical sectional view through the flushing unit.

Fig. 3 is a partially broken top view thereof.

Fig. 4 is a sectional view through the upper end of the syphoning mechanism of the flushing unit.

Fig. 5 is a plan view of the float mechanism and actuating rod elements.

Fig. 6 is a side view of the float mechanism shown in its position relative to the cut-off switch.

Fig. 7 is a sectional view taken along lines 7-7 of Fig. 6.

Fig. 8 is a detailed view showing the position of the mechanically operated actuating rod element at the end of a series of flushings.

In the drawings numeral 10 designates my flushing unit generally, and in Fig. 1 it is shown in connection with the usual dry cleaning parts consisting of a washer 11, a pumping unit 12, and a filter 13, all connected by solvent flow lines 14. As common to a system of this type, I have used the ordinary visual indicating couplings 15 which are provided with transparent windows 16 through which an operator can note the flow of the solvent through the flow lines. When the solvent that leaves the washer 11 becomes as clear as the solvent that leaves the filter, the operator knows that the laundry is clean.

In the prior art systems, the pumping unit 12 is connected directly to the flow line 14 coming from the filter 13. Some operators fill the washer 11 with the cleaning solvent before beginning the washing operation. Other operators adjust the pumping mechanism to maintain a small flow of clean solvent through the reservoir in the washer in an attempt to wash and rinse simultaneously by gradually ridding the washer

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reservoir of the dirty solvent. Since there is no provision for draining the solvent from the washer reservoir when the clothes are clean, the operator must reach down into the washer reservoir to remove the clothes to an extractor for drying them. It can be easily seen that constant dipping of the hands and arms down into the solvent could easily cause permanent injury to an operator. While rubber gloves are sometimes provided for such a purpose, they are considered bunglesome and a waste of time.

The construction and advantages of my flushing mechanism will be more clearly understood by reference to Figs. 2, 3, and 4 of the drawing wherein numeral 17 designates a cylindrical housing having a volume slightly less than the volume of the reservoir of the washer 11. This reservoir 17 is provided with a cone shaped bottom 18 having a threaded connection 19 to receive an outlet pipe 20. The upper end of the housing 17 is provided with a removable cone-shaped lid 21 through which is extended the inlet pipe 22. This cone-shaped lid 21 is fitted loosely into the housing 17 so that sufficient air might enter therein to assist in the syphoning action that will be described later in this specification. The housing 17 is also provided with a visual liquid level indicator 23.

Connected in abutting relationship to the end of the outlet housing 20 in the threaded coupling 19, I have positioned a syphon outlet pipe 24 threadedly engaging a cap member 25 on its upper end. This cap member 25 is also adapted to receive a plug 26 and a hollow sleeve 27 which terminates inwardly of the bottom 18 of the housing 17. The upper end of the syphon outlet pipe 24 is provided with several radially disposed holes 28 through which the liquid solvent is carried to the outlet pipe 20 and on to the washer 11 as shown by the directional arrows in both Figs. 3 and 4.

In the upper lid 21 I have placed a false bottom 29 affixed at its peripheral edge portion to the cone shaped lid 21. Mounted on the underside of this false bottom 29 I have positioned a float bracket 30 arranged to pivotally support a pair of float arms 31 having a float 32 connected to the ends thereof. The float arms 31, in this instance, consist of a continuous rod extended through the two side walls of the float bracket 30 and bent at an outwardly converging angle therefrom. Between the two side walls of the support bracket 30 I have attached an integrally mounted link 35 to the float arm 31 which also has a stop member 33 arranged to determine the distance that the floats 32 may move in a downward direction in the housing 17. Extending axially through the lower portion of the upper lid 21, I have positioned an actuating rod 34 provided with a handle 36 mounted on one of its ends. This actuating rod 34 is loosely mounted in holes aligned through the lid 21 and the float

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 bracket 30 and is provided with substantially V-shaped notches 37 placed near the end opposite the handle 36. Looped over the actuating rod 34 in a manner to engage the notches 37, I have placed an engaging link 38 which is pivotally mounted to the link 35. By reference to Fig. 6 of the drawing, it can be seen that as the float, due to the rising liquid, rises in the housing 17, the link 35 will be rotated in clockwise fashion; and the engaging link 38, positioned in one of the notches 37, will advance the actuating rod 34 in the direction of the arrow. When the liquid in the housing falls, the floats 32 will drop again, thus re-positioning the engaging link 38 in a second notch. Note that any number of notches may be placed on the actuating rod 34 to effect as many flushings of the housing 17 as desired.

Above the false bottom 29 I have placed a switch box 39 arranged to carry an electrical outlet plug 40. Extending transversely through the side walls of the switch box 39 I have placed a pin 41 on which is mounted a mercury type actuating switch 42. This switch 42 may be pivotally mounted on the pin 41 or may be firmly fixed thereon and the pin 41 rotatably mounted in the side walls of the switch box 39. In any event the switch 42 must be able to tilt upwardly and downwardly to effect an opening and closing of the electrical circuit. I have arranged a stop lever 43 to pivot with the switch 42. This stop lever 43 is adapted to be engaged by a switch bar 44, the end of which is extended through a hole in the switch box 39 to a point outside thereof. The end of the switch bar 44 is provided with a stop 45 which is adapted to be engaged by the end of the actuating rod 34 to effect an opening of the electrical circuit as shown in Fig. 8.

To re-position the actuating rod 34, the handle 36 may be turned approximately 90 degrees either to the right or the left, or even in an inverted position, and drawn back against the positioning stop 46. This adjustable stop 46 is so placed to allow the actuating link 38 to engage the first of the notches 37 on the actuating rod 34. The weight of the mercury in the switch is sufficient to reposition the switch bar 44 to a position as shown in Fig. 6.

With the foregoing construction in mind, a brief description of the operation of my invention will follow: Let us assume that my invention in a flushing mechanism is being used in connection with the other units of a prior art system as shown in Fig. 1, and that the pump mechanism 12 has pumped the solvent or other cleaning fluid through the inlet pipe 22 to a level in the housing 17 as shown by Fig. 2 of the drawing. The liquid will, of course, seek the same level inside the sleeve 27 and in the externally mounted indicator 23. During the period of filling the housing 17 the dirty fluid is being pumped from the reservoir in the washer 11, preparatory to the injection of clean fluid from my flushing unit.

As soon as the liquid level in the housing rises to a point of entering the holes 28 of the syphon outlet pipe 24, the flushing action begins. The first liquid that falls through the syphon outlet pipe 24 strikes a choke 47 and temporarily closes off all air that might come from the washer reservoir and disturb the syphoning action. When enough liquid enters the outlet pipe 24, the syphoning action begins and the entire fluid in the housing is drained into the washer reservoir.

It will be noted that as the float rises with the liquid, the engaging link 38 advances the actuating rod 34 one notch; and as it falls with the liquid it repositions itself to a second notch preparatory to advancing the rod further toward the cut-off switch 42. Thus any number of flushings of the washer with clean fluid may be made before the actuating rod 34 shuts off the pumping mechanism 12.

It is to be remembered that the diameters of the outlet pipe 20 with the related syphoning mechanism are large enough to permit the draining of the housing 17 without cutting off the flow of fluid through the inlet pipe 22. Thus the pumping mechanism 12 will provide a continuous flow of fluid through the various units until it is finally cut off at the end of a washing cycle. An operator may, of course, set any number of cycles or even shut off all flow of fluid at any time by setting the actuating rod in the proper position or engaging the cut off switch 42.

In actual practice I have found that whereas a 45 minute period for washing was formerly required, I have been able to reduce that time to 8 minutes. Not only is this a valuable aid to the cleaning industry, but the clothes cleaned by such a method are necessarily cleaner due to the periodic draining of the dirty fluid and the flushing of clean fluid into the washer by my flushing unit.

As an extra precaution against the possibility of any electrical sparks igniting the fumes from the solvent, I have purposely placed all of the switching mechanism above the false bottom 29 of the lid 21, and have also employed the enclosed mercury type actuating switch.

It will be remembered that my flushing unit may be made to contain any volume of fluid, but is preferable that it be made to contain slightly less than the volume of the washer with which it is used. In this manner it will not overflow the washer when the clothes are placed therein.

It will be further noted that I have arranged for the flow of fluid to be cut off just prior to the beginning of the syphoning action in the housing 17. This means that at the beginning of a new cycle, when another "batch" of clothes are placed in the washer reservoir, there is no time lost by having to wait for the flushing action to begin. Since the fluid has nearly filled the housing 17, the flushing will begin almost immediately after the initial starting of the cycle of washing. Also since the reservoir of the washer 11 is drained at the end of the washing cycle, it may be opened to allow an operator to remove the clothes and insert others without having to place his hands and arms beneath the surface of the cleaning fluid as is necessary in prior art devices.

While I have described my invention in detail as using a solvent of cleaning fluid, it can readily be used in water washing, in handling chemicals or any other liquid to effect a number of periodic flushings. It is understood that various changes in construction may be made without departing from the spirit and scope of my invention as fall within the following claims.

I claim:

1. A flushing unit comprising a vertically disposed tank adapted to be filled with a fluid, an outlet pipe for said tank, a lid removably mounted on said tank carrying an inlet pipe, a float controlled switch supported by said lid and

operative in accordance with the fluid level in said tank, and means for removing fluid from said tank at successive intervals for changing the level of fluid in said tank and changing the position of said float controlled switch and pumping mechanism controlled by said switch for pumping fluid into said tank.

2. A flushing unit comprising a vertically disposed tank adapted to be filled with a fluid, a fluid inlet connection on said tank, an outlet pipe for said tank for discharging fluid therefrom, a lid removably mounted on said tank carrying an inlet pipe, a syphoning mechanism connected to said outlet pipe adapted to syphon fluid from said tank at successive intervals and adjustable means supported by said lid and adapted to stop the flow of fluid into said tank through said inlet connection after a predetermined number of flushing cycles.

3. A flushing unit as claimed in claim 1 including a float mechanism supported by said lid comprising a mounting bracket, a float arm pivotally mounted on said bracket, a float mounted on said arm adapted to be raised by fluid in said tank, a rod slidably mounted on said lid, said rod provided with spaced notches, a linkage mechanism connected with said float arm adapted to successively engage said notches to successively advance said rod upon upward and downward movements of said float.

4. A flushing unit as claimed in claim 1 including a float mechanism mounted on said lid comprising a mounting bracket, a float arm pivotally mounted on said bracket, a float mounted on said float arm adapted to be raised by the level of fluid in said tank, a rod slidably mounted on said lid, said rod provided with longitudinally spaced notches, a linkage mechanism connected to said float arm adapted to successively engage said notches to successively advance said rod upon upward and downward movements of said floats, and said float controlled switch including an actuating bar adapted to be engaged by said rod.

5. In a flushing unit, a combination of a closed tank adapted to be filled with a fluid, fluid inlet and discharge connections to said closed tank, means for syphoning the fluid, a fluid flow control means including a float mechanism adapted to be actuated by rise and fall of the fluid level in said closed tank, and a timing means connected with said float mechanism adapted to be set to stop the flow of fluid into said closed tank after a predetermined number of flushing cycles are made by said syphoning means, said fluid flow control means including an electrical control switch adapted to be actuated by said timing means.

6. A flushing unit comprising a closed tank provided with an inlet pipe and an outlet pipe, said closed tank adapted to be filled with a fluid through said inlet pipe to be subsequently discharged through said outlet pipe, a syphoning mechanism attached to said outlet pipe adapted to syphon fluid from said tank, said syphoning mechanism comprising a tubular extension extending upwardly into said tank and attached to said outlet pipe, said tubular extension being open at its upper end; a casing member having its upper end closed surrounding said tubular extension; means for holding said casing member in a radially spaced position relative to said tubular extension with its lower end thereof spaced slightly above the bottom surface of said tank, whereby the fluid entering said tank will also

rise in said casing member to the point of entry of the open end of said tubular extension to effect a syphoning of the fluid in said closed tank, a yoke pivotally mounted with respect to said closed tank and extending on opposite sides of said syphoning mechanism, a float carried by each end of said yoke and controlled in position by the level of the fluid in said tank, and means controlled by said yoke for controlling the supply of fluid to said closed tank through said inlet pipe.

7. In a flushing unit including a closed tank including a removable lid therefor, a sealed compartment disposed interiorly of the lid, a fluid flow control device including an electrical switch housed in said sealed compartment, a switch actuating mechanism including a substantially horizontally slidably mounted rod operative to trip said switch, a rod actuating mechanism operated by a float adapted to move said rod into switch tripping position upon the rise and fall of the level of the fluid in said tank and reset mechanism for restoring said rod actuating mechanism to a position preparatory for a repeat operation.

8. A flushing unit comprising an elongated vertically disposed tank adapted to be filled with a fluid, said tank being provided with an outlet pipe, a removable lid for said tank carrying an inlet pipe for use in filling said tank, a partition wall in said lid forming a substantially vapor proof compartment, a float mechanism mounted beneath said compartment and adapted to be actuated by the level of fluid in said tank, a horizontally disposed rod slidably mounted in said lid beneath said compartment and operatively connected with said float mechanism and adapted to be moved by it, and an electrical control switch mounted in said compartment, said float mechanism adapted to advance said rod to effect an opening of said electrical switch according to the level of the fluid in said tank.

9. A flushing unit comprising a closed tank including a removable lid, a sealed compartment carried by said lid, a fluid flow control device including an electrical switch housed in said sealed compartment, a switch actuating mechanism mounted in said lid, said mechanism including a substantially horizontally extending slidable rod projecting through one side of said lid and movable from an initially manually set position, float control means for shifting said rod in one direction for tripping said switch actuating mechanism after a predetermined number of increases and decreases in the fluid level in said tank, and means connected with the projecting end of said rod exteriorly of said lid for manually restoring said rod to its initial position preparatory for the next tripping operation of said switch actuating mechanism.

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