July 18, 1950 A. KROMHOUT 2,515,235

CHEMICAL TREATMENT FEED INDICATOR

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Fig. 3

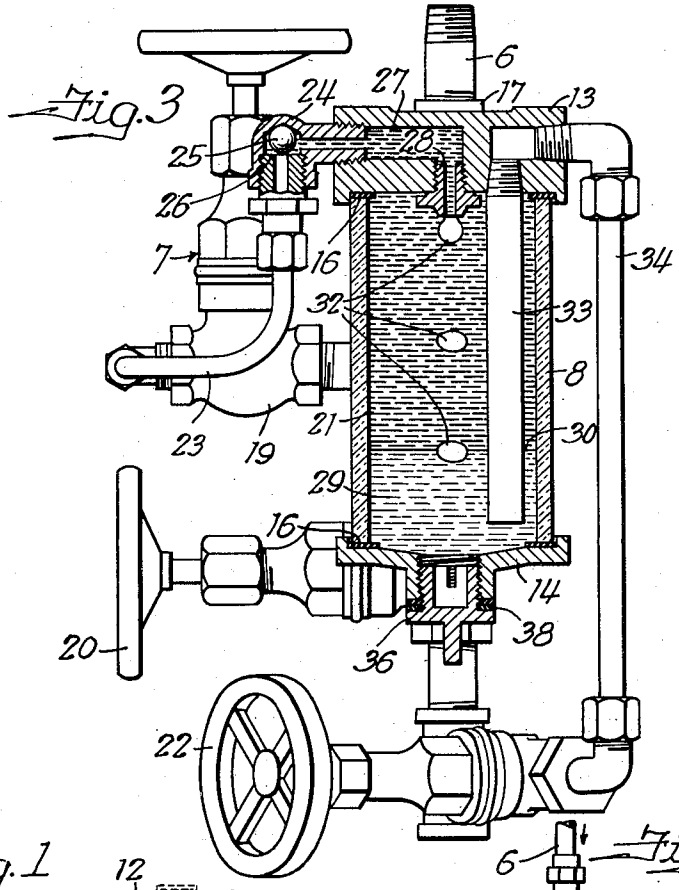



Fig. 1

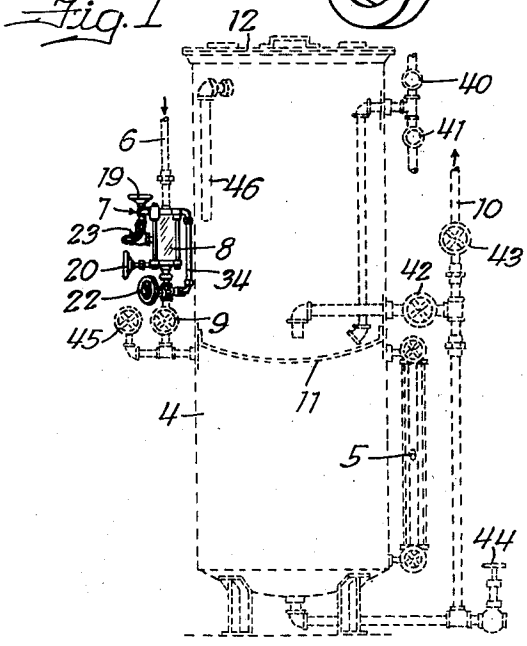
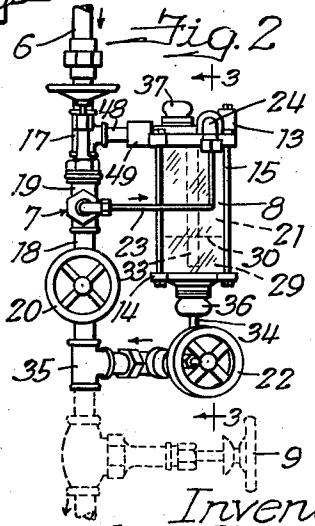



Fig. 2

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## CHEMICAL TREATMENT FEED INDICATOR

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10 Claims. (Cl. 210—1)

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This invention relates to a new and improved chemical treatment feed indicator for use in connection with the delivery of a liquid chemical reagent into a line, drop by drop, or in a steady stream under adjustable control, the reagent so introduced being a water softening agent, sterilizing agent, coagulating agent, or the like.

I am aware that treatment feed indicators showing the drop by drop feeding of chemicals are old, but most of those heretofore devised have been objectionable for one reason or another and required too frequent servicing to obtain accurate and reliable indications of the rate of feed, and in most cases, the operator was forced to rely to a large extent upon guesswork and approximation. It is, therefore, the principal object of my invention to provide a treatment feed indicator of simple and economical construction incorporating a sight feed and flow control valve in conjunction therewith, enabling the operator to check accurately the rate of feed and make accurate adjustments as conditions require.

In the treatment feed indicator of my invention an indicator fluid such as a white mineral oil is used in the sight tube so that the rate of flow may be clearly indicated by the drops of water coming down through this liquid, the rate of flow being controlled by means of a flow-control valve in the water line to the treatment feeder on the outlet side of the sight tube, and, inasmuch as the indicator fluid is lighter than water and will not mix with it, the indicator when once properly installed will operate indefinitely without requiring attention.

The invention is illustrated in the accompanying drawing, in which

Fig. 1 is a front view of a treatment feeder tank with the treatment feed indicator of my invention shown as installed in the water supply line thereto;

Fig. 2 is a larger size view of the treatment feed indicator, and

Fig. 3 is a vertical section through the feed indicator on the line 3—3 of Fig. 2 on a still further enlarged scale, this view being approximately two-thirds full size.

The same reference numerals are applied to corresponding parts throughout the views.

Referring first to Fig. 1, the reference numeral 4 designates the treatment feeder tank in which the level of the liquid chemical reagent being used for a given system is indicated by a float 5 in a sight tube. Water from the operating water supply source is conducted to the tank 4 through a pipe 6, and, as will soon appear, the rate of its

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delivery into the tank 4 is indicated by the device 7 of my invention—the treatment feed indicator—by the drops of water which can be easily seen through the sight tube 8. The rate of flow of the water admitted to the tank 4 is regulated by a flow-control valve 9, and the water entering the tank 4 displaces the liquid chemical reagent from said tank at a corresponding rate through the pipe 10.

The tank is divided by a partition 11 into an upper mixing chamber and a lower pressure chamber. The top cover 12 is hinged to swing open for charging the mixing chamber with chemical. The cover is then closed and steam and/or water admitted through valves 40 and 41. After this mixing, these valves are closed and valve 42 is opened, allowing the batch to flow by gravity into the pressure chamber. Valve 42 is then closed and valves 9 and 43 are opened to start the feeding. Pipe 6 leads from an upstream point in the water main and pipe 10 to a downstream point in said main. 44 is a drain valve and 45 is an air vent valve for the pressure chamber. 46 is an overflow pipe for the mixing chamber.

Referring now more particularly to Figs. 2 and 3 illustrating the treatment feed indicator 7, the sight tube 8 is clamped between top and bottom covers 13 and 14 by the tightening of tie-rods 15 to obtain a water-tight joint at both ends of the tube where the rubber gaskets 16 are provided. A T-fitting 17, forming a part of the inlet pipe connections, has a nipple 48 threaded in the laterally projecting branch thereof, and threaded in a hollow boss 49 provided on the top cover 13 whereby to support the sight tube assembly on the water supply pipe 6 which threads into the upwardly projecting branch of the T-fitting 17 as indicated. The downwardly projecting branch of the T-fitting 17 communicates with a pipe 18 and with an inlet shut-off valve 19, and the pipe 18 communicates with a by-pass valve 20 which under normal operating conditions is left closed and will be opened only whenever it may be necessary to drain the sight tube 8 to replace the indicator fluid 21. Under such conditions, the inlet shut-off valve 19 and the outlet shut-off valve 22 will both be closed. The inlet shut-off valve 19 has a tube 23 connected to the outlet side thereof and extending to a check valve fitting 24 on the top cover 13 in which a ball check valve 25 is provided seating on a seat 26 to prevent any possibility of back flow into the water supply line inasmuch as that would mean a loss of the indicator fluid 21. A passage 27 in the

top cover 13 into which the fitting 24 is connected leads to a nozzle 28 projecting downwardly from the cover 13 into the top of the sight tube 8 at the approximate center thereof. The indicator fluid 21 fills about three-fourths of the tube 8 and, being lighter than the water 29 in the bottom portion of the tube, gives a clearly defined line of demarcation as indicated at 30 due to the whitish cast of the mineral oil 21, and the bubbles of water are clearly visible as they move slowly downwardly through this liquid, as indicated at 32. A pipe 33 extends downwardly from the top cover 13 to a point near the bottom of the tube 8 and serves to conduct the water out of the tube to a tube 34 which extends from the top cover 13 to the outlet shut-off valve 22. The water is conducted from the valve 22 to a T-fitting 35, the upwardly extending branch of which communicates with the by-pass valve 20 and a lower extending branch of which communicates with the flow-control valve 9.

In operation, the operator adjusts the flow-control valve 9 while watching the flow of drops of water 32 downwardly through the indicator 21 in the sight tube 8 so as to obtain a desired increase or decrease in the rate of feed of liquid chemical reagent to the system. The fact that it is water, and not liquid chemical coming in contact with the indicating fluid, simplifies matters and makes it a practical proposition to use the present indicator with a large variety of installations, without regard to the kind of reagent employed, and using the same type of indicator fluid 21 for all of these installations. The fact that the sight tube assembly is supported at the top only by the pipe fitting 48 relieves the sight tube of any uneven stresses to which it might otherwise be subjected. The tie-rods 15 are tightened fairly evenly to exert substantially equal pressure on all sides of the tube 8. The tightening is sufficient to withstand the water pressure and avoid danger of leakage of water or indicator fluid. There is no danger of the indicator fluid 21, due to its lower specific gravity than water, seeping upwardly out of the sight tube 8 and rendering the indicator inoperative, because, for one thing, the inlet tube 23 extends downwardly so far below the level of the top inlet nozzle 28, and the check valve 25 prevents back flow by engagement with the seat 26, thereby positively trapping the indicator fluid 21 in the sight tube 8, even in the event of a back pressure in the line with which the outlet or discharge pipe 34 communicates, and, of course, the flow control valve 9 restricts the flow in the normal direction to such an extent that there is no danger at all of the indicator fluid being washed out by the incoming water.

A drain plug 36 is threaded into an opening in the center of the bottom cover 14 and a similar plug 37 is threaded in the opening in the top cover 13 to serve as a filler plug and air vent. Suitable gaskets are provided in connection with both of these plugs as indicated at 38 in Fig. 3 to avoid danger of leakage.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

I claim:

1. A liquid chemical treatment feed indicator for use with a tank containing a supply of liquid chemical to be injected into a water main, and a water inlet pipe and a treatment outlet pipe for said tank leading from an upstream point and to a downstream point of said main, respectively, said indicator comprising a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said inlet pipe, a water outlet pipe extending downwardly in said sight tube to the level of the water and communicating with said tank, and a manually adjustable valve for regulating the rate of flow of water into said tank from said water outlet pipe.

2. A liquid chemical treatment feed indicator for use with a tank containing a supply of liquid chemical to be injected into a water main, and a water inlet pipe and a treatment outlet pipe for said tank leading from an upstream point and to a downstream point of said main, respectively, said indicator comprising a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said inlet pipe, a water outlet pipe extending downwardly in said sight tube to the level of the water and communicating with said tank, a manually adjustable valve for regulating the rate of flow of water into said tank from said water outlet pipe, and an outwardly seating check valve between said inlet pipe and the inlet port preventing back-flow from said sight tube to said inlet pipe.

3. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said supply pipe, an outwardly seating check valve in said indicator in upstream relation to said inlet port, a water outlet pipe extending downwardly in said sight tube to the level of the water and communicating with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water into said delivery pipe from said water outlet pipe.

4. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said supply pipe, a water outlet pipe extending downwardly in said sight tube to the level of the water and communicating with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water into said delivery pipe from said water outlet pipe.

5. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube, top and bottom closure plates fixed thereon, the top plate having a blind boss, a pipe threaded therein at one end and at its other end in a fitting in the supply pipe for the suspension of said sight tube

on said supply pipe, said sight tube containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the top plate communicating with said supply pipe, a water outlet pipe extending downwardly from said top plate in said sight tube to the level of the water and communicating with said delivery pipe, a manually adjustable valve for regulating the rate of flow of water into said delivery pipe from said water outlet pipe, and an outwardly seating check valve in said top plate between said inlet pipe and the inlet port preventing back-flow from said sight tube to said inlet pipe.

6. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said supply pipe, an outwardly seating check valve in said indicator in upstream relation to said inlet port, the supply pipe having a portion thereof extending downwardly to an elevation appreciably below the elevation of the inlet port to insure maintenance of at least a predetermined column of indicator liquid in the sight tube sufficient to serve as a drop by drop feed indicator, a water outlet pipe communicating with the bottom water space in said sight tube and with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water through said delivery pipe.

7. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said supply pipe, the supply pipe having a portion thereof extending downwardly to an elevation appreciably below the elevation of the inlet port to insure maintenance of at least a predetermined column of indicator liquid in the sight tube sufficient to serve as a drop by drop feed indicator, a water outlet pipe communicating with the bottom water space in said sight tube and with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water through said delivery pipe.

8. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said supply pipe, the supply pipe having a portion thereof extending downwardly to an elevation appreciably below the elevation of the inlet port but above the level of the lower end of the water outlet pipe to insure maintenance of at least a predetermined column of indicator liquid in the sight tube sufficient to serve as a drop by drop feed indicator, a water outlet pipe extending downwardly in said sight tube to the level of the water and communicating with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water into said delivery pipe from said water outlet pipe.



9. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube closed at top and bottom and containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the closed top of said tube communicating with said supply pipe, the supply pipe having a portion thereof extending downwardly to an elevation appreciably below the elevation of the inlet port but above the level of the lower end of the water outlet pipe to insure maintenance of at least a predetermined column of indicator liquid in the sight tube sufficient to serve as a drop by drop feed indicator, an outwardly seating check valve to prevent back flow from said sight tube to said supply pipe for positively trapping the indicator liquid in the sight tube, a water outlet pipe extending downwardly in said sight tube to the level of the water and communicating with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water into said delivery pipe from said water outlet pipe.

10. A drop by drop liquid feed indicator comprising in combination with a water supply pipe containing water under pressure, and a delivery pipe, a substantially vertical, elongated sight tube, top and bottom closure plates fixed thereon, the top plate having a blind boss, a pipe threaded therein at one end and at its other end in a fitting in the supply pipe for the suspension of said sight tube on said supply pipe, said sight tube containing some water and above it a water insoluble indicator liquid that is lighter than water and of a contrasting appearance, an inlet port for water in the top plate communicating with said supply pipe, a water outlet pipe extending downwardly from said top plate in said sight tube to the level of the water and communicating with said delivery pipe, and a manually adjustable valve for regulating the rate of flow of water into said delivery pipe from said water outlet pipe.

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