

June 24, 1930.

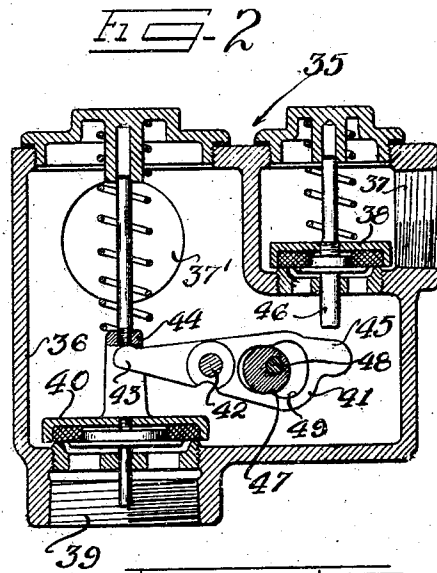
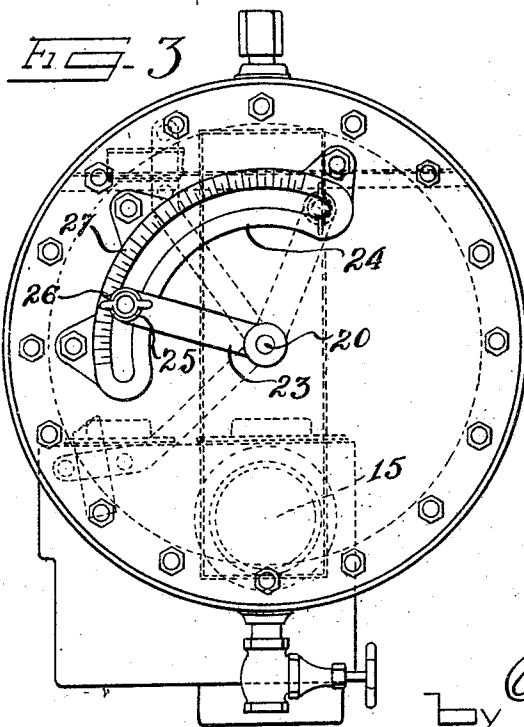
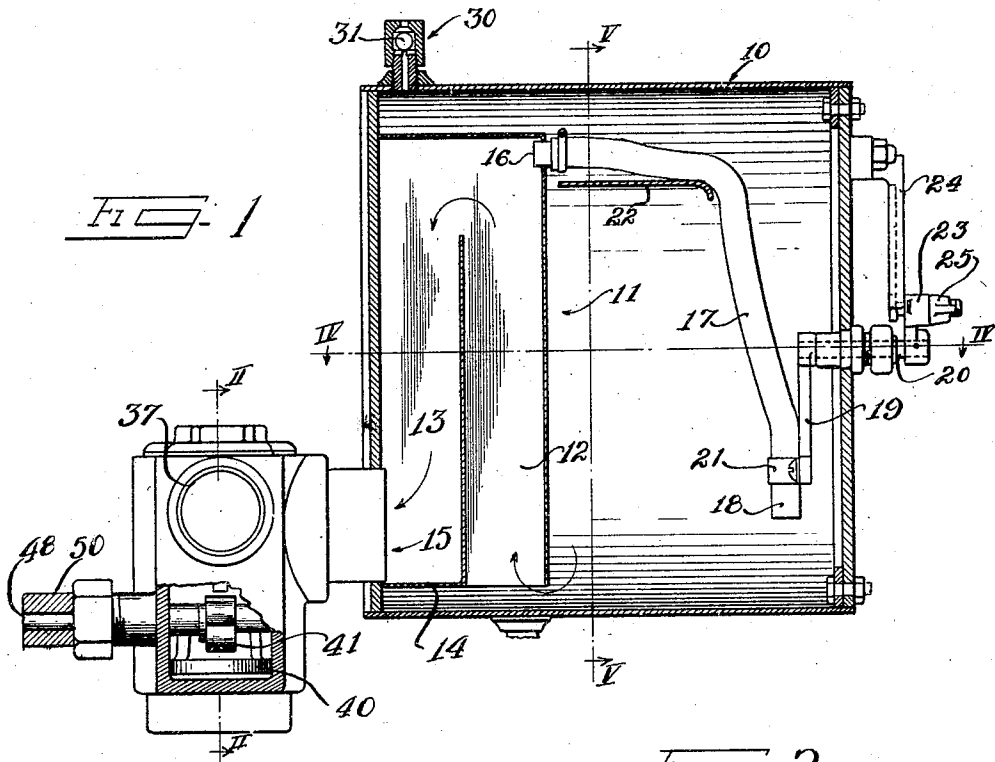
W. B. KNICKERBOCKER

1,767,244

LIQUID METERING TANK

Filed Nov. 7, 1927

2 Sheets-Sheet 1



INVENTOR
William B. Knickerbocker

by Charles H. Kelly Attorney

June 24, 1930.

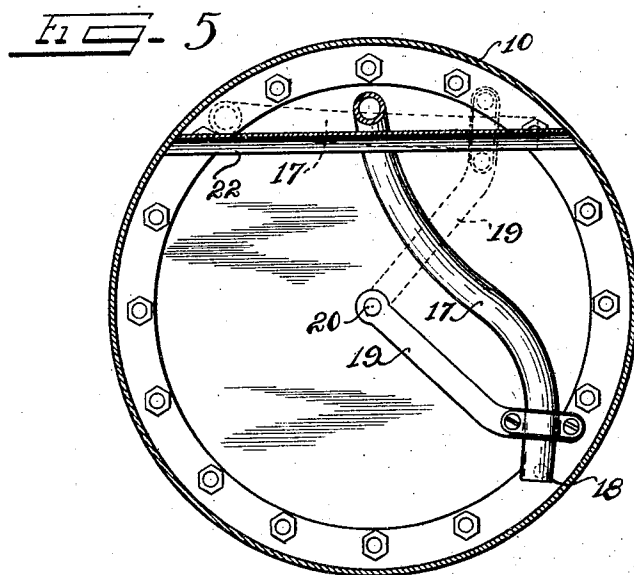
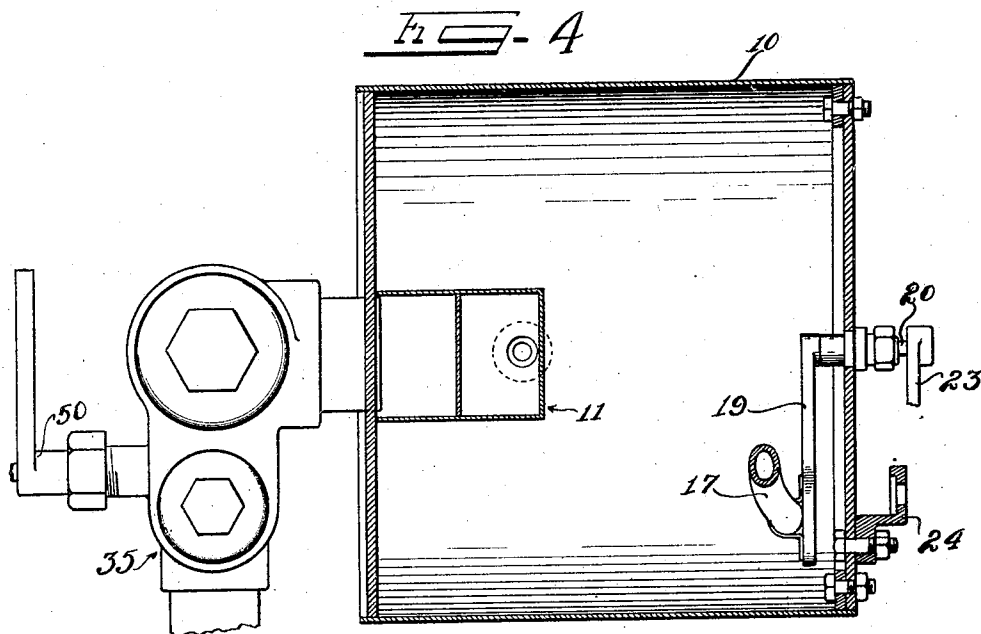
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LIQUID METERING TANK

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2 Sheets-Sheet 2



INVENTOR

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UNITED STATES PATENT OFFICE

WILLIAM B. KNICKERBOCKER, OF JACKSON, MICHIGAN, ASSIGNOR TO THE KNICKERBOCKER COMPANY, A CORPORATION OF MICHIGAN

LIQUID-METERING TANK

Application filed November 7, 1927. Serial No. 231,428.

The invention relates to liquid-metering tanks.

One of the objects is to improve metering devices of this character.

5 Metering tanks for automatically measuring succeeding charges of liquid, as for mixing in batches of cement and sand, for making mortar, and for like or similar other purposes, are very desirable when they are accurate and reliable in operation.

10 Attempts have heretofore been made to produce such devices. Those with which I have become familiar have not been satisfactory because they do not have a sharp positive cut off and they dribble to an un-uniform extent which affects their reliability.

15 Furthermore, many of such devices are dependent for correctness of operation upon a time element, and therefore any contraction or enlargement of the path through which the liquid flows introduces a variable in its operation.

20 In the embodiment of the present invention, the tank is invariably and substantially filled with the liquid and the amount to be discharged therefrom will be dependent upon the position of the submerged syphon vent through which air will pass to break the syphon or the syphon stream.

25 Other objects, advantages and benefits of the invention will become readily apparent from a consideration of the following description when taken in conjunction with the drawings forming parts hereof, wherein:

30 Figure 1 is a vertical elevation of a structure showing my invention and showing parts in section.

40 Figure 2 is a section taken on line II—II of Figure 1 through the valve controller.

Figure 3 is an end elevation showing interior parts by broken lines.

45 Figure 4 is a plan, central section, through the tank.

Figure 5 is a transverse section, taken on line V—V of Figure 1.

In all the views the same reference characters indicate similar parts.

50 The tank 10 may be of any desired size

and shape according to the exigency of the case.

A syphon 11 is placed inside of the tank. The leg 12 is open at its lower end, through which liquid passes upwardly and downwardly into and is discharged from the tank.

The leg 13 is closed at its lower end, as at 14 but it has a side opening 15, through which a liquid is admitted and discharged.

60 A vent 16 is made near the juncture of the legs 12 and 13 of the syphon. A flexible hose 17 extends from the vent and it has a free end 18 which may be raised and lowered in the tank to determine the quantity of liquid to be drawn from the tank.

65 A crank arm 19 is connected to a stud shaft 20 which passes through the wall of the tank at its cylindrical axis.

70 The arm 19 is connected to the free end 18 of the hose 17 by a strap 21. The arm holds the end rigidly to prevent kinking of the hose 17, so that the intermediate portion of the hose 17 will never be below the open end 18 of the hose 17, hence air traps will not be formed by liquid in the hose while the liquid content of the tank is being discharged.

75 The upper part of the hose 17 rests upon a cross bar or bridge 22 to prevent sagging thereof during the shifting movements of the free end 18. It will be observed that as the lower free end 18 is raised, the upper part of the hose will slide along the bar 22 as indicated in dotted lines in Figure 5 and cannot sag and create a trap. In its elevated position, the hose is situated in a substantially horizontal plane. When the hose 17 is lowered from its highest position to its lowest position it is, in shape, substantially as shown in Figure 1. In any position there are no liquid pockets formed in the hose which would prevent the free entry of air into the syphon when the free end 18 of the hose is uncovered by the discharging liquid.

80 On the outside of the tank, and connected to the stud shaft 20, is another crank arm 23 which sweeps over a quadrant 24 and is secured thereto by a wing nut 25.

85 The arm 23 has an index, or pointer 26,

which cooperates with the scale 27 to indicate the position of the end 18 of the hose 17. The scale 27 may be calibrated to read in terms of gallons, if desired.

5 An air admitting check valve, 30, may be of any suitable character. This valve remains open until the tank is filled with a liquid, whereupon the liquid when the tank is full, and while under some pressure, will maintain the valve closed.

10 The valve proper, 31, may be of the float valve type.

The operation of the tank is clearly manifest. If, and when the tank is filled with liquid the syphon will start itself when discharge opening 15 is open. The liquid will continue to flow through the syphon until the tank has been discharged, provided that vent 16 remains closed.

20 Vent 16 will be opened whenever the liquid level is below the end 18 of the hose, whereupon a rush of air through 16 and 17 will be of so great that the syphon stream will be broken instantly and liquid will cease to flow from the tank. A valve controller 25 has its casing 36 connected to the tank 10 through the opening 37' which registers with opening 15 from the syphon 11.

30 The intake opening 37 is to be connected to the source of liquid supply, the liquid from which is to be measured by the metering tank 10.

35 A spring-pressed valve 38 is normally in closed position and stops the inflow into the tank.

A discharge opening 39, through which liquid passes from the tank, is normally closed by a spring-pressed valve 40.

40 When the tank is full of liquid, both of these valves remain closed.

To discharge the liquid from the tank, valve 40 is to be opened and held open so long as liquid is flowing from the tank.

45 After the tank has been emptied, valve 40 being closed, valve 38 should be opened and held open so long as liquid is flowing into the tank.

A convenient means for alternately opening the aforesaid valves, and holding them open, is an eccentrically operated lever 41, pivoted, as at 42, and having one end, 43, under the stirrup 44, extending from valve 40. The other end 45 is under stem 46 depending from valve 38.

55 An eccentric 47 is mounted on a stud shaft 48 and is contained within an opening 49 of the lever 41.

60 Either valve 38 or 40 may be opened and held open by oscillation of the eccentric. The eccentric is oscillated by an arm 50 secured to the shaft 48 outside of the controller.

65 The lever may be automatically moved in time relation with another machine, such as a cement mixer, a scale beam or other mecha-

nism which may be readily suggested by the requirements. While the device described may well be used for measuring water under pressure, and the tank is shown to be substantially closed, and normally under pressure, it will be understood, by persons skilled in the art, that pressure is not a necessary concomitant for the operation of the invention except only for filling the tank.

70 I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

75 Having described my invention, what I claim is:

1. In a metering tank, a syphon for discharging the contents of said tank, a flexible hose having one end connected to said syphon, a shaft extending into said tank, a crank upon said shaft within said tank, means for connecting said crank and the free end of said hose, a crank upon said shaft without said casing, means for indicating the extent of movement of said last mentioned crank and a support within said tank for supporting said hose against sagging.

2. In a metering tank, a syphon for discharging the contents of said tank, a flexible tube connected at one end to said syphon, means connected to the other end of said tube for raising and lowering the same within said tank, and a support for said tube between said syphon and means for maintaining said tube against kinking.

In testimony whereof I have hereunto subscribed my name at Jackson, Jackson County, Michigan.

WILLIAM B. KNICKERBOCKER.