

UNITED STATES PATENT OFFICE.

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AUTOMATIC LIQUID-MEASURE.

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To all whom it may concern:

Be it known that I, FRED E. LOVEJOY, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Automatic Liquid-Measures; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an automatic liquid measure for use in measuring such liquids as kerosene oil, &c., and it is particularly designed to be used in stores where these articles are sold.

The object of the invention is to construct a liquid measure which shall be simple of construction and accurate in its working, and the invention is hereinafter fully shown and described.

In the accompanying drawing I have illustrated a liquid measure constructed according to my invention, the drawing representing a partial side elevation and partial section of the measure.

A represents the supply tank situated above the measure proper and supported by a suitable frame C. A pump is usually provided, but is not here shown, for pumping the liquid into the tank from barrels. Below the tank and supported by the same frame C is the measuring tank B here shown as having the form of a truncated cone tilted up so that one of its sides comes vertical. The cone is divided into chambers one above the other by diaphragms *b* which are arranged parallel with the base and thus each diaphragm is inclined toward the vertical side of the cone. At the highest point of each diaphragm there is a perforation *b'* for venting the chamber below it as will be hereinafter set forth. The several chambers formed by the diaphragms *b* are formed to contain certain standard quantities, as for instance, the upper or smaller chamber may contain one quart, the smallest amount desired to be measured and the chambers below it will contain the same or multiples of one quart.

The measuring tank is filled and discharged by means of two vertical pipes connected with the vertical side of the measuring tank.

These pipes G and D extend side by side, the pipe G being next to the tank. As here shown these two pipes instead of being separate are made in one casting with two longitudinal passages, the outside passage or pipe D having a discharge nozzle *d* on its lower end. The inner pipe G in addition to its longitudinal opening has lateral openings or passages connecting the lowest point of each of the measuring chambers with the outer pipe D and at these points in the pipe G are placed three way cocks I adapted to control these vertical and lateral openings. At the outlet of the upper chamber is a straight way cock J having opposite ports *j* while the other openings are all stopped by three way cocks I having ports 1, 2 and 3.

The cocks I are provided with handles *i* and the cock J has a handle *p*. As here shown the handles *i* are so adjusted that when they are turned up the port 1 will open into the measuring chamber and the opposite ports 2 and 3 will open into the pipe G thus forming a clear passage through the latter and into the chamber and cutting off the opening into the pipe D. When the handle *p* of the valve J is turned up the opposite ports connect the chamber with the pipe D and close the openings above and below in the pipe G. A supply pipe *e* connects the tank A with the upper end of the pipe G.

Means are provided for venting the measuring tank. As herein shown I place an air valve *k* on the highest point of the tank, said valve being provided with a three way plug and being also provided with a lateral opening *o* connecting with the outside air. The openings in the plug are so arranged that when the handle *r* of the valve is turned up the vent opening *o* will be open through the valve into the tank.

An air pipe *f* connects with the top of the air valve *k* and it extends above the level of the liquid in the tank and the valve handles *p* and *r* I prefer to connect by means of a link *l* for convenience of operation.

Having described the construction of my liquid measure I will now proceed to describe its operation.

In order to fill the measuring tank all the valve handles except the upper one should be turned up as shown in the drawing the

upper valve handle being turned down to a horizontal position. The liquid will then flow through the supply pipe *e* down through the cock *J* and thence through the several cocks *I* into the measuring chambers, the upper chamber which is cut off from direct communication with the pipe *G* being filled through the aperture in the diaphragm. The air valve *k* will be turned down leaving a straight passage up into the air pipe *f* and cutting off the opening *o*. As each chamber fills the air will escape through the apertures *b'* and so on up through the air pipe *f*, the liquid rising in the pipe *f* up to the level of the liquid in the supply tank. Assume now that it is desired to draw off the quantity contained in the upper chamber. The valve *J* is turned to the position shown in the drawing with the handle up thus closing connection with the supply tank and with the pipe *G* below that point and opening the connection direct from the chamber into the discharge pipe *D* through which the liquid is discharged into the receiving vessel. The air valve meanwhile has been opened into the vent opening *o* and closed toward the pipe *f* so that the liquid above the valve is prevented from running back and the air is allowed to come in to displace the liquid drawn out. The valve *J* may now be turned down and the tank refilled after which any of the valves *I* may be turned down according to the quantity of liquid required. When this is done the liquid is drawn directly from the chamber opposite the valve and from all the chambers above it, connection being cut off from all the chambers below. The inclined diaphragms cause the chambers to be quickly emptied.

It is thus evident that my liquid measure is simple, accurate and perfectly vented and that it can be operated with the least possible manipulation.

I claim—

1. The herein described automatic liquid measure consisting of a supply tank, a measuring tank having inclined diaphragms dividing it into chambers one over the other, a vertical pipe *G* adjacent to the measuring tank and a discharge pipe *D* extending along side of the pipe *G*, the said pipe *G* being provided with openings extending laterally through it, each connecting with one of said chambers and said discharge pipe *D*, a three way cock at each of said openings except the top one for controlling the same and the vertical openings in the pipe *G*, a straight way cock at the outlet of the upper chamber, a supply pipe connecting the upper end of the pipe *G* with the supply tank and means for venting said chamber.

2. The herein described automatic liquid measure consisting of a supply tank, a measuring tank having inclined diaphragms dividing it into chambers one over the other, each of said diaphragms being perforated at its highest point, a vertical pipe *G* adjacent to the measuring tank and a discharge pipe *D* extending along side of the pipe *G*, the pipe *G* being provided with openings extending laterally through it, each connecting with one of said chambers and said discharge pipe *D*, a three way cock at each of said openings except the top one for controlling the same and the vertical openings in the pipe *G*, a straight way cock at the outlet of the upper chamber, a supply pipe connecting the upper end of the pipe *G* with the supply tank, an air valve having a three way cock on the highest point of the upper chamber, an opening through the side thereof and an air pipe extending above the top of the tank and connecting with said air valve.

FRED E. LOVEJOY.

In presence of—

S. W. BATES,

E. DUDLEY FREEMAN.