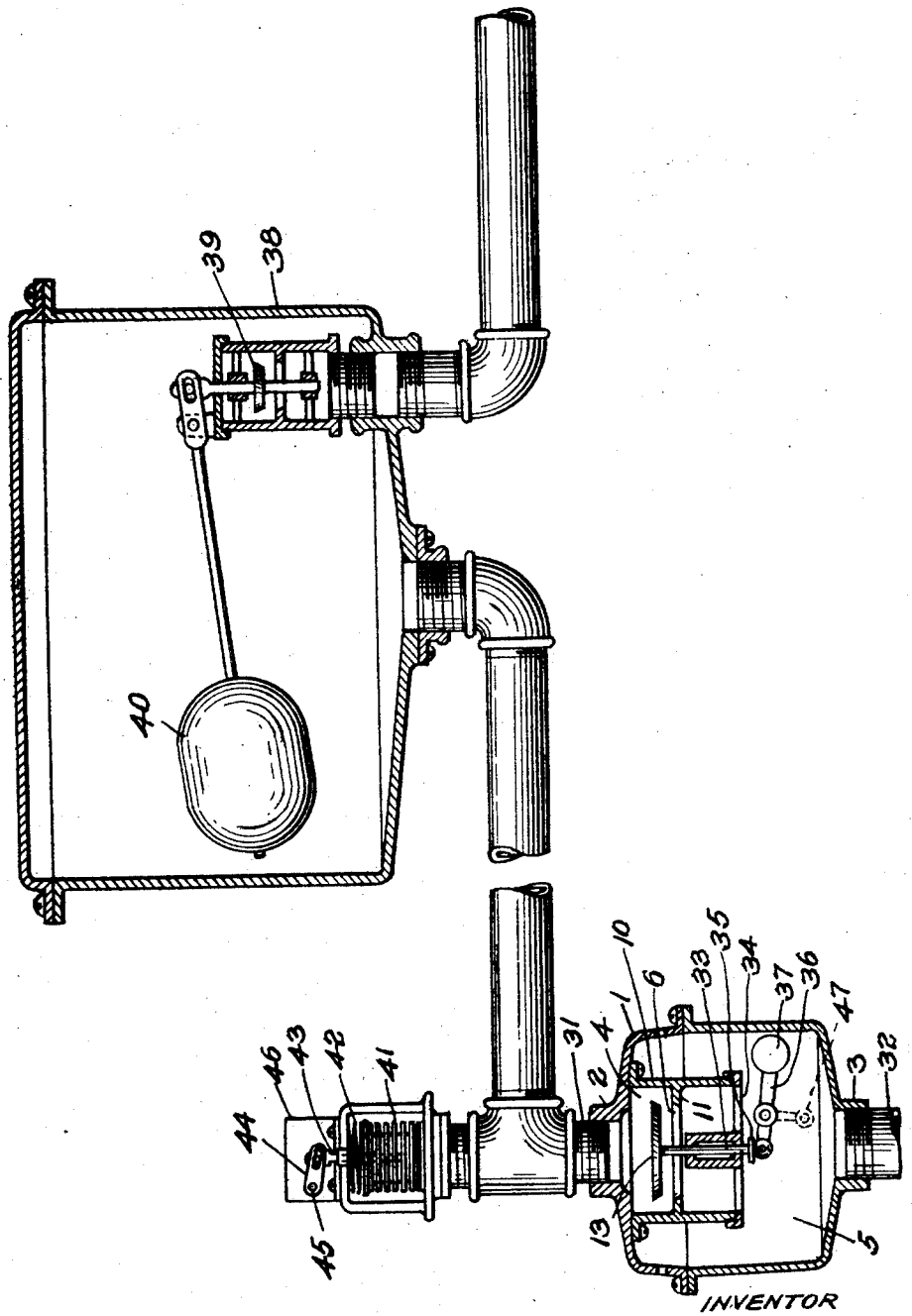
Nov. 17, 1925. 1,561,655

G. W. MacKENZIE

LIQUID DISPENSING APPARATUS

Filed May 22, 1924



INVENTOR

WITNESSES

J. Herbert Bradley.

Percy A. English

George W. MacKenzie

by Christy and Christy

his attorneys

Patented Nov. 17, 1925. 1,561,655

UNITED STATES PATENT OFFICE.

GEORGE W. MacKENZIE, OF BEAVER, PENNSYLVANIA.

LIQUID-DISPENSING APPARATUS.

Application filed May 22, 1924. Serial No. 715,089.

To all whom it may concern:

Be it known that I, GEORGE W. MacKENZIE, residing at Beaver, in the county of Beaver and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Liquid-Dispensing Apparatus, of which improvements the following is a specification.

My application relates to improvements in liquid-dispensing apparatus, and specifically, to improvements in apparatus possessing the general characteristics of that shown and described in an application for Letters Patent of the United States, filed by me November 16, 1923, Serial No. 675,127. The object of the present improvements is simplification of structure, with consequent economy and better serviceability.

My invention is illustrated in the accompanying drawing, which shows in vertical and medial section apparatus which embodies it.

In my prior application alluded to above, I show and describe a vertically standing casing, provided above and below with inlet and outlet taps, and divided interiorly by a horizontally extending web into an upper inlet chamber and a lower outlet chamber. In the dividing web is an orifice and above the orifice is a vertically oscillatory weightless valve—the weight of the valve being more or less completely rendered ineffective by a sustaining spring. I describe in the specification of that prior application that, having provided such a structure, the provision of a liquid supply entering the inlet chamber under head will effect oscillation of the valve, and a consequent delivery to the outlet chamber of a succession of units of liquid, segregated by the oscillations of the valve from the constantly entering stream. My further invention as disclosed in the prior application is found in specific means for establishing uniformity in the volume of the units successively delivered to the outlet chamber. My present invention lies in alternative specific means for achieving this same end,—the end, namely, that with each oscillation of the valve a unit volume of invariable value will be segregated and delivered to the outlet chamber. Incidentally I have simplified the form and structure of certain accessory mechanical features.

I have found, and herein lies the essence of my invention, that if the stream of liquid which enters and fills the inlet chamber be maintained under a constant head, it is unnecessary to provide the elaboration of valve structures disclosed in my earlier application, but that a single valve member oscillatory above the orifice in the dividing web will under such conditions effect, without any other or additional mechanical parts, the desired end.

Referring to the drawings, the essentially cylindrical and vertically standing casing 1 is shown, carried by the pipes connected to it, and such support may, and ordinarily will, be adequate and sufficient. Other means of support are not, however, precluded.

The casing 1 is provided above and below with inlet and outlet taps 2 and 3, and is shown in the drawings to be by these means connected through an inlet pipe 31 with a source of supply and through an outlet pipe 32 to the desired place of discharge. Ordinarily the outlet pipe will take the form of the flexible delivery hose, familiar at automobile service stations.

The casing 1 is divided internally by a horizontally extending web 11 into inlet and outlet chambers 4 and 5. Through the web opens a central circular orifice 6, and the rim of this orifice forms the seat for the valve 13 which is mounted to reciprocate vertically within chamber 4, to and from its said seat.

The dividing web 11 within casing 1 may be particularly shaped as the drawing shows. It is the lower head of a cylindrical casing 10 which depends from the upper head of casing 1. The casing 10 then forms a smaller cylindrical chamber within the cylindrical chamber formed by casing 1, and this smaller inner chamber is the inlet chamber.

The means for blanketing and for elimi-

nating mechanically the weight of valve 13 may be such as the builder prefers. I here show means which are specifically different from the means shown and described in my earlier application. The valve 13 is borne on a downwardly extending stem 33, reciprocable in suitable guides formed in a spider 34 carried by and arranged beneath the cylinder 10. It will of course be understood that this spider is a mere skeleton structure, to carry the valve-stem guides, and is no appreciable obstruction to the discharge of liquid through chamber 5 from orifice 6 to outlet pipe 32.

Beneath spider 34 the valve stem carries a bearing plate 35. Adjacent the lower end of the valve stem and within chamber 5 a beam 36 is pivoted to swing in vertical plane. One arm of this beam carries a weight 37, the other carries a roller through which the beam makes bearing from beneath upon the bearing plate 35 of the valve stem. Inspection of the drawing will show the arrangement of these parts to be effective to bring the weight of the valve into counterpoise with weight 37, and so substantially to eliminate from the problem of operation the weight of valve 13.

I have discovered that if the stream of liquid which flowing through pipe 31 enters and fills the inlet chamber be maintained under constant head, the relatively weightless valve 13, being once raised, will under the impulse of the flowing stream oscillate vertically, alternately descending to and rebounding from its seat, and that the volumes of liquid delivered with successive reciprocations through orifice 6 will be uniform. Thus, without more I have an adequate measuring apparatus.

Means suitable for insuring constant head for the entering stream are shown in the drawing. A tank 38 is in direct and free communication through inlet pipe 31 to the inlet chamber 4. Liquid enters tank 38 from a suitable supply pipe beneath a float controlled valve 39. The vertical position of the float 40 within tank 38 is determined by the depth of the body of liquid accumulated in the tank, and the valve 39 tends to open and close in response to the tendency of the float to sink and rise. These means for maintaining constant head are well known, and need no more minute description. Suffice it to say that liquid is thus maintained at constant depth within tank 38, and the stream of liquid enters chamber 4 under constant head,—the condition which, as I have said, assures uniformity in the volume of liquid delivered on each reciprocation of valve 13.

Inlet chamber 4 is constantly full, or substantially full of liquid. When valve 13 rises the stream flows, when the valve is seated flow is cut off. The force with which the descending valve is carried to its seat causes it to rebound and open again. Thus, as long as the conditions described continue the valve will oscillate and the pulsating delivery of liquid will continue.

It will be apparent that in the operation described, with each successive seating of the valve the walls of inlet chamber and of the conduit 31 opening to the inlet chamber will be subject to pulsations of pressure,—to water-hammer. I take advantage of this water-hammer to operate recording means. Specifically, as here shown I introduce at a suitable point in the walls subject to such pulsation of pressure a sylphon tube 41, closed at the outer end but at the inner end in open communication with the water passageway. I place this sylphon tube under the tension of a spring 42, tending always to collapse it, and I mount on the closed outer end of the sylphon tube 41 a rod 43 which I interlink with a crank-arm 44 borne by the driving shaft 45 of a tally 46. It is manifest that as valve 13 reciprocates, sylphon tube 41 will expand and collapse, and that the tally will through the instrumentality described operate in response to this movement.

I provide the beam 36 with an integral axle, and I prolong this axle through the wall of casing 1, and externally of casing 1 I provide the axle with a crank, indicated in dotted lines at 47. I have already said that, valve 13 being once unseated, the flowing stream will set up and having set up will maintain indefinitely the described automatic oscillation of valve 13. This is the condition which obtains, so long as delivery of liquid is desired. When delivery is to cease, the attendant taking hold upon crank 47 stops oscillation and arrests valve 13 in seated position. When this has been done, when the recoil of the valve in coming to its seat has so been overcome and rendered ineffective, the valve will remain on its seat and the attendant may then let go the crank. Thereafter the apparatus will continue inactive. When delivery is to be again effected, the attendant takes the crank again and, turning it, unseats valve 13, and then immediately releases the crank. The valve 13 being unseated flow recommences, and valve oscillation is resumed, and the pulsating delivery continues until again the attendant exerts his control and stops valve oscillation, in the manner already described.

Thus delivery is started and stopped. Meanwhile the tally apparatus, operated as described, makes record of the volume of liquid delivered.

The apparatus is intended primarily as gasoline-vending apparatus, but manifestly it is not necessarily limited in its use to liquid of any particular character nor to delivery under any particular circumstances.

I claim as my invention:

In liquid-dispensing apparatus the combination of a liquid container provided with a bottom orifice, a vertically reciprocable valve arranged above said orifice and adapted on descent to effect closure thereof, yielding means constantly exerted upon said valve and tending constantly to sustain it at an interval above said orifice, and means for maintaining a constant head upon a body of water filling said container.

In testimony whereof I have hereunto set my hand.

GEORGE W. MACKENZIE.