No. 653,198. Patented July 3, 1900.

S. P. MACKEY.

LIQUID WEIGHING MACHINE.

(Application filed Feb. 1, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1.

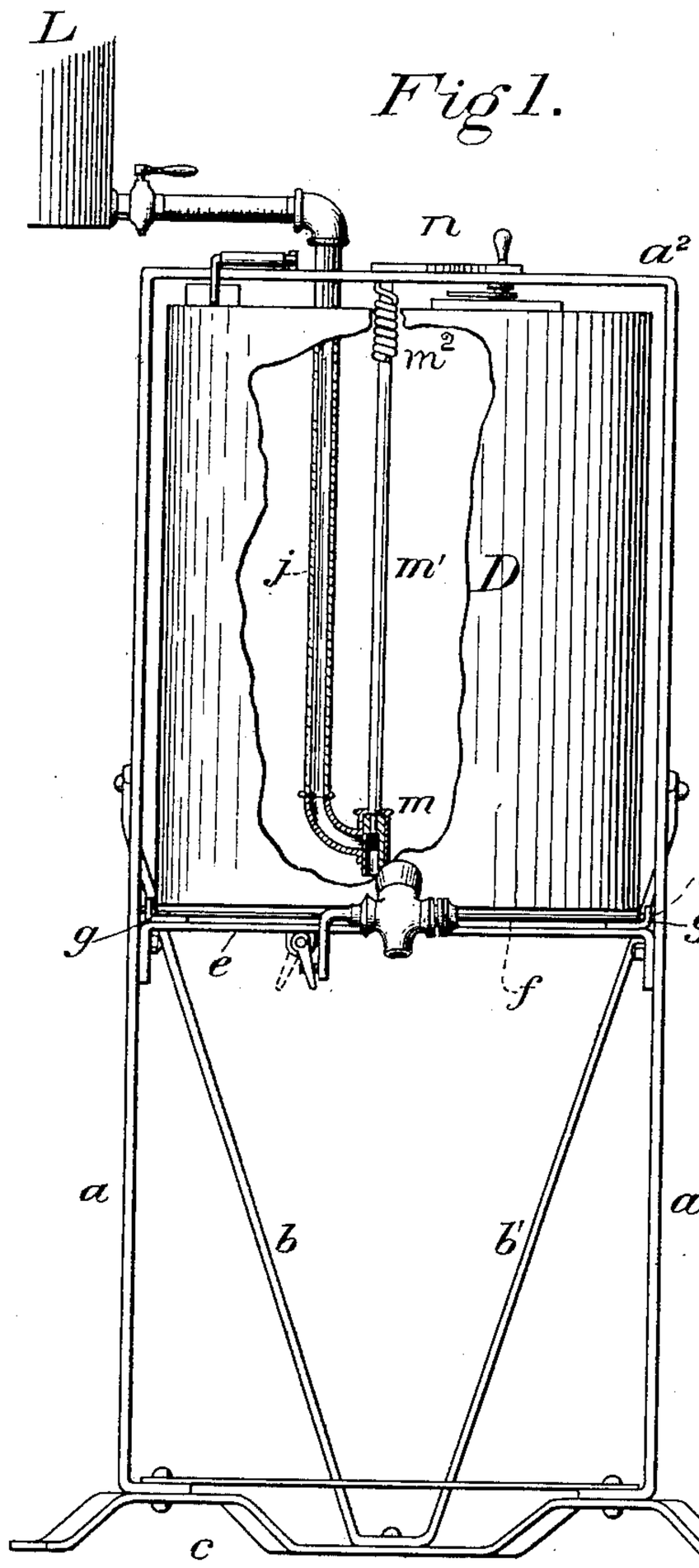


Fig 2.

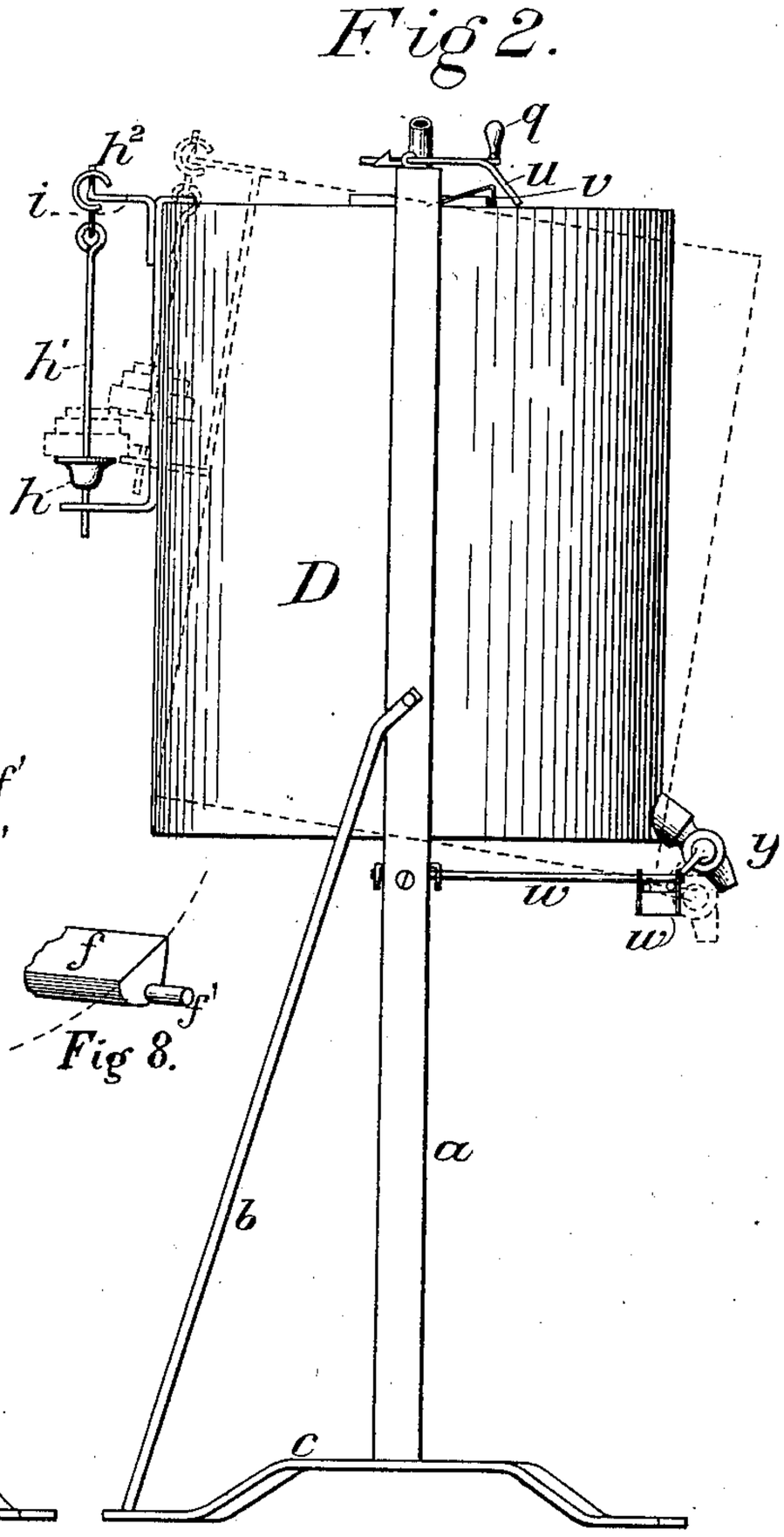
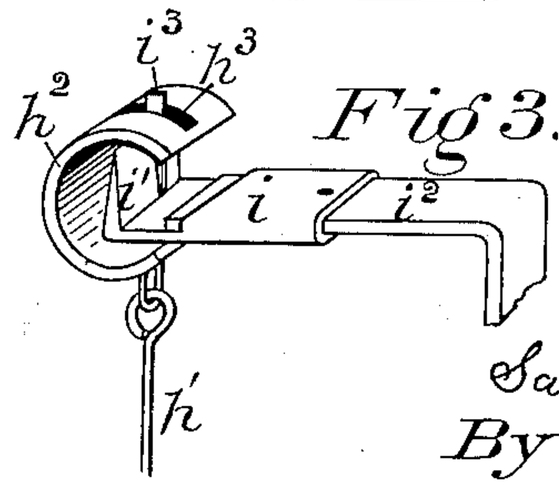


Fig 8.

Fig 3.



Witnesses:
L. M. Morden
M. McIntyre,

Inventor,
Samuel P. Mackey
By F. J. Fleisler
His Attorney.

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Fig 7.

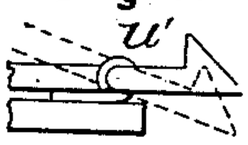


Fig 4.

Fig 6.

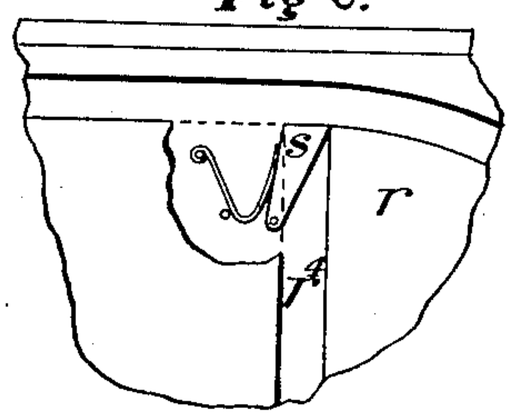
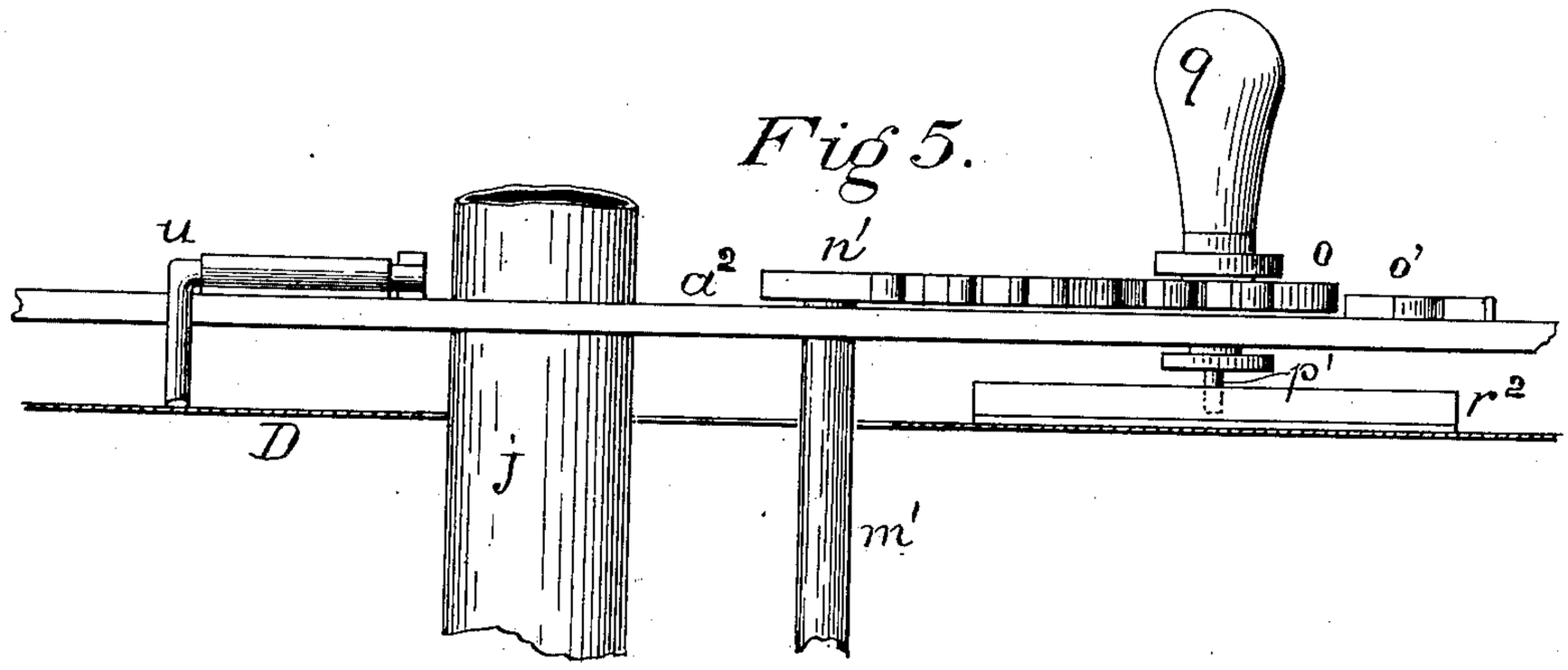


Fig 5.



Witnesses
L. M. Morden.
M. McIntyre.

Inventor
Samuel P. Mackey
By F. J. Geisler
his Attorney

UNITED STATES PATENT OFFICE.

SAMUEL P. MACKEY, OF RIDGEFIELD, WASHINGTON.

LIQUID-WEIGHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 653,198, dated July 3, 1900.

Application filed February 1, 1899. Serial No. 704,157. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL P. MACKEY, a citizen of the United States of America, and a resident of Ridgefield, Clark county, Washington, have invented certain new and useful Improvements in Liquid-Weighing Machines, of which the following is a specification, reference being had to the accompanying drawings as a part thereof.

My invention relates to devices for measuring out a certain quantity of liquid by weight; and the object of my invention is to obtain a contrivance of this class of accurate, serviceable, and inexpensive construction and well adapted for use in all trades handling liquids.

The construction and use of my invention are best understood by reference to the drawings above mentioned and a description of its parts therein illustrated.

In the drawings, Figure 1 is a front elevation of my weighing-machine, the front wall of the receptacle being broken away to permit a partial interior view. Fig. 2 is a side elevation of my invention. Fig. 3 is a detail of construction. Fig. 4 is a partial plan showing the valve-operating and locking mechanism of the cover of the fluid-receptacle D. Fig. 5 is a partial elevation corresponding to the parts shown in Fig. 4; and Figs. 6, 7, and 8 are other details of construction, which will be more fully explained hereinafter.

The letters of reference designate the parts referred to.

My invention comprises a cylindrical receptacle supported on a suitable frame, which frame allows the receptacle to rest in an upright and tilted or leaning position. A weight suspended from an arm projecting from the upper rear part of the receptacle holds the latter in its upright position until the liquid introduced therein overbalances the measuring-weights and causes the latter to tilt forward. A filling-pipe leads into and to nearly the bottom of the receptacle and has at its discharge end a spring-controlled valve, having a stem provided with an arm, which arm is connected with a latch or lock, and the valve is held open thereby until the receptacle tilts because of the weight of the liquid therein introduced. A faucet is provided at the base of the receptacle for emptying the same, and such faucet is adapted to be automatically opened by some contrivance operated by the tilting of the receptacle. The leaning position is the normal state of the receptacle, as in this condition the liquid contained therein has been emptied and no liquid can be again admitted until the valve-latching mechanism has been operated, as will be described, unless the valve be purposely held open by the hand.

The standards *a a'* and the braces *b b'*, all mounted on the feet *c*, provide the frame supporting the receptacle D. The upper ends of the standards are united by a cross-bar a^2, the whole being one bar of iron. The bar *e* serves as a middle brace and also provides the seat for the balancing-bearings. Such bearings are represented in the drawings as consisting of a half-round bar *f*, secured transversely on the bottom of the receptacle and provided with journal ends *f'*, (see small detail thereof,) inserted and turning in a pair of perforated lugs *g g'*. The perforations in said lugs are made sufficiently large to admit of the turning or rolling of the journal ends *f'* therein when the receptacle tilts. The motion of the receptacle while tilting being but very slight, the described bearings answer very well, and the same have been adopted because of the simplicity thereof. If it is desired to have more delicate bearings, the usual knife-edge or ball-bearings may be substituted for those described. The top of the receptacle is provided with a partial cover to furnish a support for the locking and valve-operating mechanism, such cover inclosing the forward end to avoid loss of liquid by splashing while the receptacle is filling or tilting. The balance of the receptacle is so adjusted that the receptacle will tilt forward when not provided with a counterbalancing-weight. The balancing-weight *h* is suspended by a rod *h'*, depending from a holder h^2, supported on a knife-edge ridge *i'* on the end of the bracket *i*. The bracket when manufactured is made in two parts, the rear part i^2 being rigidly attached to the receptacle and the forward part having a sleeve in which to receive the part i^2, as seen from Fig. 3. This construction is adapted to provide for the adjustment in length of the bracket *i* when balancing the receptacle.

When once properly adjusted, the two portions of said bracket are permanently united by a drop of solder or other convenient means.

The holder h^2 is provided with a slot h^3, and the knife-edge i' has a pin i^3 inserted in said slot for retaining the holder in its place. The weight h is hollow and is provided with a small opening into which to drop shot or other small weights when adjusting the balance of the receptacle. The balance of such receptacle should be so adjusted that the same will remain upright when lifted to that position and will be tilted forward by a fraction of an ounce of weight introduced into the receptacle. On the balancing-weight h are placed the measuring-weights, which may be graduated to represent pints, quarts, gallons, &c. The weights are flat and circular and slotted, that they may be readily inserted on and removed again from the rod h'. The weights would have to be graduated to conform to the particular substance for which the machine will be used. The position of the balancing and measuring weights, as shown, is such that upon the receptacle being started to tilt by the weight of the substance therein introduced the weights are immediately moved farther inward toward the fulcrum, considerably diminishing their counterbalancing or retarding influence and facilitating the tilting of the receptacle by the weight of the liquid. The filling-pipe j is connected with the tank L, from which the liquid to be measured is drawn. The arrangement of the filling-pipe is of special importance. By introducing the valve m at the discharge end of such pipe the actual amount of liquid admitted through the same is accurately weighed, and said pipe discharging at the bottom of the receptacle, immediately over the axis thereof, thereby insures an even distribution of the liquid and avoids disturbance of the balance. The described arrangement of my filling-pipe renders unnecessary the use of any equalizing contrivance to compensate for any variation in the pressure of the liquid in the tank from which it is drawn. The pipe j is rigidly held by the bar a^2. The valve-stem m' extends upward to the operating and latching mechanism n, and the valve is held normally shut by the spiral spring m^2.

The mechanism n for operating, holding open, and closing again the valve m at the base of the filling-pipe is shown in plan in Fig. 4. Such mechanism is supported on the bar a^2, and its principal parts comprise the segment-gear n', affixed to the upper end of the valve-stem m', the smaller segment-gear o, mounted on a short axle journaled in the bar a^2, a crank-arm p, affixed on the axle of the wheel o below the bar a^2 and having a depending pin p' traveling in a slot r on the cover of the receptacle, and a crank-handle q for operating the described devices. The slot r is cut in the small plate r^2, attached to the cover of the receptacle. A detail of the slot h is shown in Fig. 6. The automatic switch s blocks the course r^4 of the slot r' against the entrance of the pin p' downward, and the dog o', held against the wheel p by a spring t', prevents the crank-handle from being operated the wrong way—that is, opposite to the course indicated by the arrow in Fig. 4. By operating the crank-handle in the indicated direction half-way around, supposing the receptacle to be leaning forward, (which is the normal position,) the segment-gear o is given a half-turn, the crank-arm p moving therewith and the dependent pin p' sliding in the portion r' of the slot r from the point at which it is shown in Fig. 4 to the left extremity of said slot-course r' and back to its starting-point, and the receptacle is lifted to an upright position, as indicated by the broken-line representation of the slotted plate r^2. The further operation of the crank-handle q will bring the segment-gear o in engagement with the segment-gear n' and turn the latter to the left, bringing the arm n^2 against the catch u, depressing the same as it slips by the nose u', which then engages and holds the arm n^2. The segment-gear n' being attached to the valve-stem, the valve is now opened, and the liquid enters the receptacle through the filling-pipe j. After the segment-gear n' has been operated the revolution of the crank-handle is completed, and the same, as well as the parts therewith connected and operated, is returned to its first position, the pin p' during such movement traveling down the course r^3 of the slot r, the switch s blocking the course r^4, and finally standing at the base of the course r^4. The weighing mechanism is now in position to be operated by gravity. As soon as the liquid admitted into the receptacle overbalances the measuring-weights the receptacle tilts. In so doing the pin p' slides up the course r^4, slipping by the switch s back to its starting-point, and the knee v, attached to the cover of the receptacle, tips the latch u, disengaging the arm n^2 and allowing the spring m^2 to reclose the valve m. The receptacle cannot now be refilled without going through the whole movement described, unless one purposely opens the valve m by moving the arm n^2 by hand. The emptying of the receptacle may also be accomplished automatically by the tilting of the receptacle. For this purpose I provide an arm w, having a dependent plate w', provided with a horizontally-extending slot in which is inserted the bent portion of the arm attached to the spigot of the faucet y. The operation of these parts will be readily understood from Fig. 2.

z represents the outline in part of an opening in the cover of the receptacle through which extend the filling-pipe and the valve-rod.

The stud or stop n^3, affixed on the bar a^2 and inserted in the curved slot n^4 in the segment-gear n' limits the movement of such gear to its proper positions for opening and

closing the valve m, and the pin p' on the crank-arm p limits the rocking movement of the receptacle from an upright to a slightly-tilting position to the length of the course r^4. The spring-controlled dog o' holds the segment-gear o against being operated in the wrong direction. The operating mechanism m could be dispensed with and substituted by contrivances merely limiting the movement of the receptacle. The segment-gear n' under such circumstances would be substituted by a mere arm which would be turned by hand when wishing to turn the valve-stem against the spring to open the valve. In such case a trigger-like latch, as u, would be provided for holding the arm to keep open the valve while the receptacle is filling, and a trip would have to be fixed on the top of the receptacle to lift the latch out of engagement with the valve-handle upon the weight of the liquid overbalancing the measuring-weights. The position of such trip must be carefully adjusted, so as not to come in contact with the latch until the receptacle has gained sufficient momentum to overcome the retarding effect of the impact between such trip and latch.

The means and devices employed by me for balancing the receptacle and for holding the measuring-weights, whereby such receptacle is retained in an upright position until the liquid introduced therein overbalances the said weights, of course are subject to modification, and I do not limit myself to such particular arrangement of said devices.

Now what I claim is—

1. In a liquid-weighing machine, the combination of a supporting-stand; a cylindrical rocking receptacle having a discharge-faucet and axial bearings at the base, whereby it is supported in said stand; means limiting the rocking motion of the receptacle to an upright and tilting position; means for holding a measuring-weight, whereby to retain the receptacle in an upright position until the liquid introduced therein overbalances the said weight; an inlet-pipe depending from the supporting stand or frame in said receptacle, and discharging at the bottom thereof over its axis; a spring-controlled valve normally closing the outlet of said pipe; a stem extending upwardly from the valve; an arm or handle on the said stem; a latch whereby the said arm of the valve-stem may be engaged to hold the valve open against the spring while the receptacle remains in an upright position; and means carried by the receptacle for automatically releasing the arm of the valve-stem again from the latch upon the receptacle being tilted, substantially as described.

2. In a liquid-weighing machine, the combination of a supporting-stand; a cylindrical rocking receptacle, having a discharge-faucet, and axial bearings at the base, whereby it is supported in said frame; means limiting the rocking motion of the receptacle to an upright and tilting position; an arm projecting rearward from the top of the receptacle and supporting balancing and measuring weights for holding the receptacle in an upright position until the liquid introduced therein overbalances the said weights; an inlet-pipe dependent from the supporting-frame, entering said receptacle, and discharging at the bottom thereof, immediately over its axis; a spring-controlled spigot-valve normally closing the outlet of said pipe; a stem extending upward from the spigot; an arm or handle on said stem; a latch whereby the said arm of the valve-stem may be engaged to hold the valve open against the spring while the receptacle remains in an upright position, and means carried by the receptacle for automatically releasing the arm of the valve-stem again from the latch upon the receptacle being tilted, substantially as described.

3. In a liquid-weighing machine, the combination of a supporting-stand; a cylindrical rocking receptacle, having a discharge-faucet, and axial bearings at the base, whereby it is supported in said frame; means limiting the rocking motion of the receptacle to an upright and tilting position; an arm projecting rearward from the top of the receptacle and supporting balancing and measuring weights for holding the receptacle in an upright position until the liquid introduced therein overbalances the said weights; an inlet-pipe dependent from the supporting-frame, entering said receptacle, and discharging at the bottom thereof, immediately over its axis; a spring-controlled spigot-valve normally closing the outlet of said pipe; a stem extending upward from the spigot; an arm or handle on the said stem; a trigger-like latch for engaging said arm of the valve-stem, to hold the valve open against the spring while the receptacle remains in an upright position, and a trip carried by the receptacle for releasing said valve-arm from the said latch again upon the receptacle being tilted, said trip being so positioned as not to come in contact with said catch until the receptacle has gained sufficient momentum to minimize the retarding effect of the impact between the said trip and latch, substantially as described.

4. A liquid-weighing machine comprising in combination a supporting-frame, a rocking receptacle, having a discharge-faucet, the axis of motion of such receptacle being at the bottom thereof, means limiting the rocking movement of the receptacle to an upright and slightly-tilting position, an arm projecting rearward from the top of the receptacle, from which to support the balancing and measuring weights for holding the receptacle in an upright position until the liquid introduced therein overbalances the said weights, an inlet-pipe discharging at the bottom of the receptacle; a self-closing valve at the discharge end of such pipe; a mechanism supported on the frame and engaging the top of the receptacle whereby the latter

may be lifted from its normal or tilted position to its upright or receiving position, and simultaneously with such movement the inlet-valve will be opened, and a latch for holding the valve open while the receptacle remains in the receiving position, but releasing the valve again upon the receptacle beginning to tilt, substantially as described.

5. A liquid-weighing machine, comprising in combination a supporting-frame; a rocking cylindrical receptacle having an axle at the bottom thereof, slightly rearward of the center of gravity, and journaled in said frame, the box-bearings being adapted to allow the said axle to turn therein, an arm projecting rearward from the top of the receptacle from which to support the balancing and measuring weights for holding the receptacle in an upright position until the liquid introduced therein overbalances the said weights; an inlet-pipe discharging at the bottom of the receptacle, over its axis; a self-closing valve at the discharge end of such pipe; a segment-gear, as *o*, journaled in the frame; a crank-handle as *q*, and a crank-arm as *p* fast on the axle of said gear, the crank-arm having a pin traveling in a slot provided on the cover of the receptacle, there being a switch in such slot controlling the course of travel of the said pin, a dog as *o'*, a segment-gear as *n'* affixed on the inlet-valve stem, and having an arm, a latch for engaging such arm, and means for tripping the latch upon the receptacle beginning to tilt, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

SAMUEL P. MACKEY.

Witnesses:
T. J. GEISLER,
J. H. CUNNINGHAM.