(No Model.)

W. J. TOWLE.

AUTOMATIC LIQUID MEASURING AND FILLING APPARATUS.

No. 598,035. Patented Jan. 25, 1898.

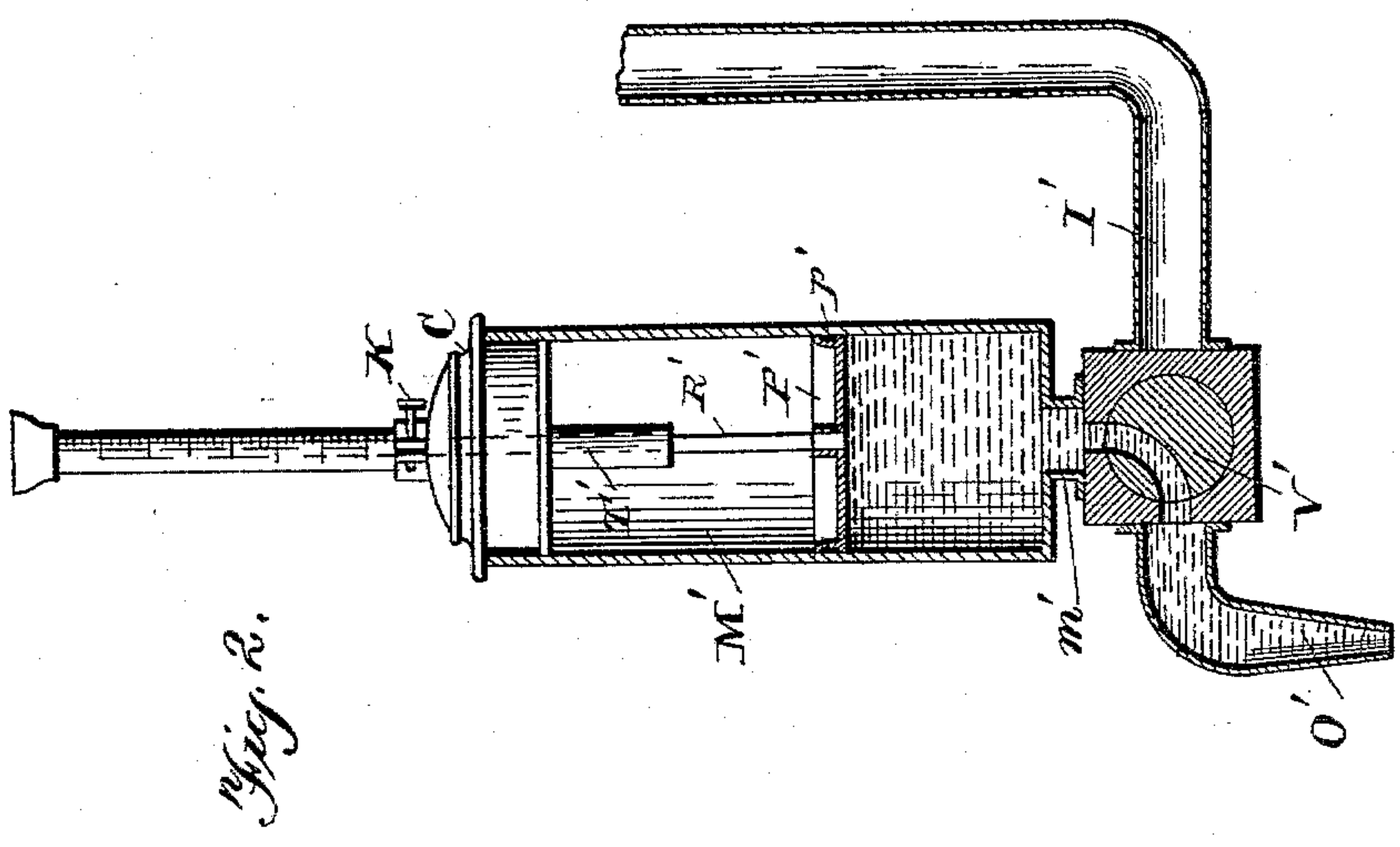

Fig. 2.

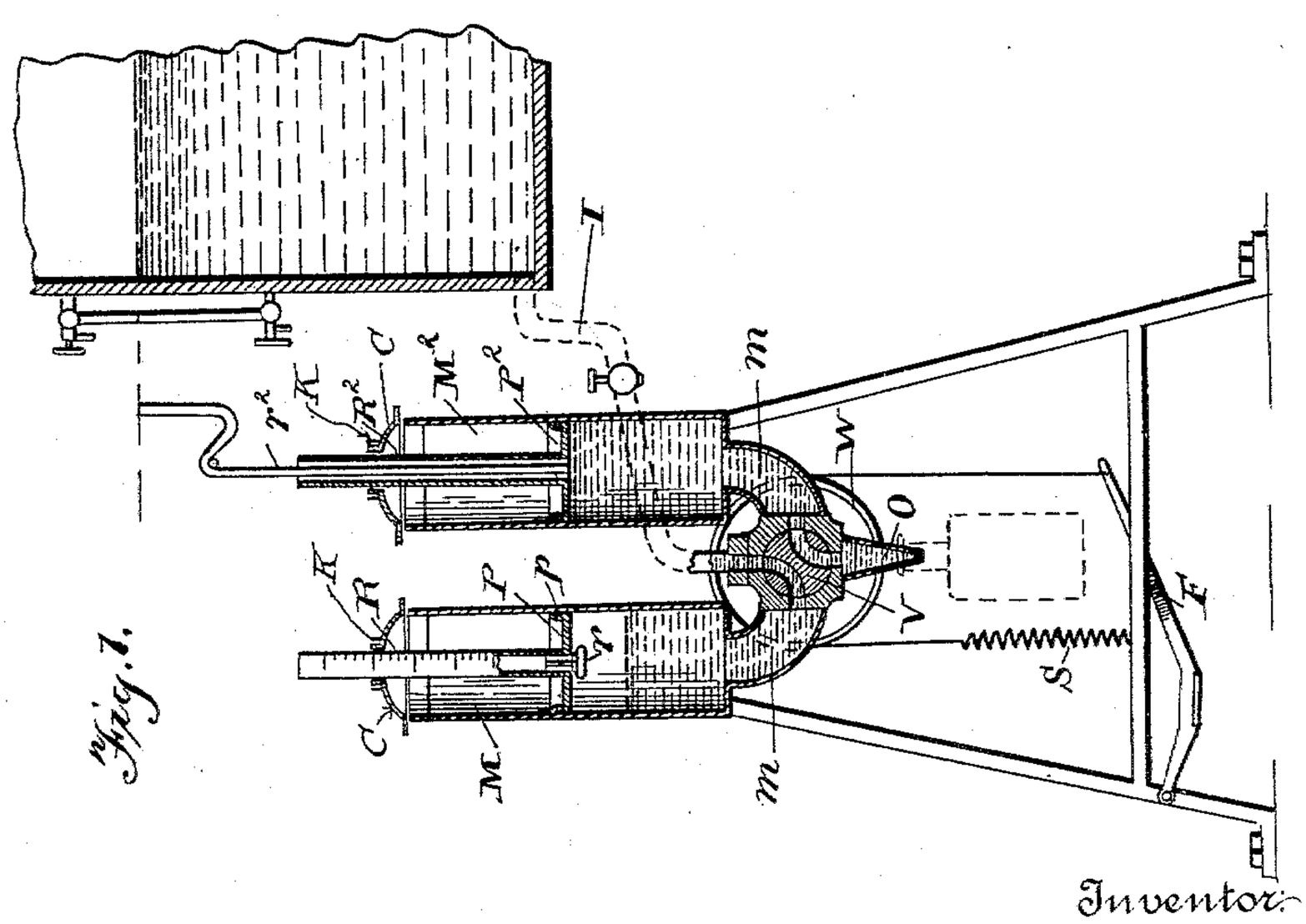

Fig. 1.

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UNITED STATES PATENT OFFICE.

WILLIAM JOSEPH TOWLE, OF ST. PAUL, MINNESOTA.

AUTOMATIC LIQUID MEASURING AND FILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 598,035, dated January 25, 1898.

Application filed February 2, 1897. Serial No. 621,645. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOSEPH TOWLE, a citizen of the United States, residing at St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Automatic Liquid Measuring and Filling Apparatus, of which the following is a specification.

This invention relates to packaging and dispensing liquids, and more especially to filling-machines such as employ a gage to determine the size of the charge; and the object of the same is to effect certain improvements in devices of this character.

To this end the invention consists in the specific details of construction described and claimed below and as illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section of the machine in its double form, showing the left plunger (my preferred form thereof) with the liquid as rising into its chamber and the right plunger (a modified form thereof) with the liquid as descending from its chamber to fill the bottle or other receptacle. (Not shown.) Fig. 2 is a similar section of the machine in its single form, showing a second modified form of plunger as here descending.

The same letters of reference with different supernumerals indicate corresponding parts throughout.

It is well known by those who are compelled to fill bottles and other packages of similar character that the ordinary use of a funnel, even of the measuring type, is a slow, tedious, and at best inaccurate method, owing to the amount of liquid which will be invariably spilled and to the fact that it is quite difficult to fill a funnel just up to a gage-mark and hold it at all times truly vertical. Machines have been devised for doing this work, but they are more or less expensive, complicated, and heavy; and my object is to produce a simple, cheap, and light device for filling bottles and the like with a predetermined amount of liquid and in the shortest possible space of time.

I have illustrated two forms of this machine, that in Fig. 1 being double or so constructed for the use of large concerns as to charge or fill one measuring-chamber while the bottle is being filled from the other chamber, and that in Fig. 2 being single or so constructed for the use of retailers or small concerns as to fill with the same accuracy but as to necessitate the emptying of the measuring-chamber into one bottle before another charge can be passed into said chamber. The action of these two forms is analogous, and with them I employ plungers of several different types, three of which are shown herein and any of which may be used in any position, not necessarily in the locations shown in the drawings.

The letters M M^2 designate two upright measuring-chambers, each preferably having a cover C, and from the lower ends of these chambers pipes or elbows *m* lead to opposite sides of a valve-casing containing a valve-plug V, constructed with the ways shown. Into the upper side of this casing leads the inlet from a suitable reservoir, as indicated at I, and from its lower side leads the outlet O, which is shown as tapered, so as to conveniently enter a bottle-mouth. The valve is turned by any suitable mechanism; but that shown in the drawings consists of a wheel W, mounted on the valve-spindle and turned in one direction by a spring S, while a treadle or foot-lever F turns it in the opposite direction, as will be understood. The ways through the valve are so arranged that when one connects the inlet I with one chamber (the left, as here shown) the other connects the other chamber with the outlet O, and hence while one chamber is being filled to the desired degree the other chamber is being emptied of its measured charge into the bottle. As soon as the latter is filled it is removed, an empty bottle substituted, and the valve rotated for one-quarter of a revolution by means of the actuating mechanism, so as to reverse the position of parts and again fill the empty and empty the full chambers.

The letter M′ designates the upright measuring-chamber of the single-form machine illustrated in Fig. 2, from which a pipe *m′* leads to the valve-casing containing the valve V′, having here but a single way, as shown, and to opposite sides of this casing are connected the inlet I′ from the reservoir and the outlet O′ to the bottle. The valve-actuating mech-

anism is not shown, but it may be the same as that shown in Fig. 1 or any other that will answer, excepting that the valve must be limited in its rotary movement, so as to turn only from the position here shown, where the chamber M′ is emptying, backward a quarter-revolution, so as to cause the way in the valve-plug to connect the inlet I′ with the chamber for filling the latter. The operation is the same as that of the double form, excepting that one bottle cannot be filled while the opposite chamber is receiving its charge from the reservoir, as will be clear.

In each chamber of either form of machine is located a plunger which is adjustable, so as to regulate the size of the charge the chamber shall receive, and hence the amount of liquid that shall be fed into the bottle. The preferred form of this plunger is illustrated at the left of Fig. 1 and consists of the plunger-head P, which is an ordinary piston with packing *p* around its edges and a hollow plunger-rod R, rising from the head and passing through any suitable form of clamp K, mounted on the cover C. The exterior of the rod is marked with a gage, whereby it can be adjusted to any desired height by loosening the clamp, sliding the rod therethrough, and tightening the clamp again. The upper end of the rod R opens into the air, while in its lower end is a float-valve *r*, so arranged as to close upwardly when the rising liquid reaches it and thus prevent the entrance of further liquid into the chamber. The tubular bore of the rod, when the valve is open, serves simply as an air-passage, as will be clear. In Fig. 2 is shown a modified form of plunger and rod, although it is to be understood that this modification is not especially adapted to the single form of the machine. Here the head P′ is secured to the lower end of a solid rod R′, which latter slides vertically within a tube T′, and it is the tube forming part of the plunger-stem that extends upward through the clamp in the cover and is gaged so as to be set at the desired point. The incoming liquid forces the plunger and its rod upward until the head strikes the lower end of the tube T and is stopped thereby, thus limiting the size of the charge. It will be understood that this form of plunger moves with the inlet and outlet of the liquid, whereas the other forms described are only moved by the operator in the act of setting them. At the right of Fig. 1 is shown a second modification wherein the head P^2 carries a tubular rod R^2, passing through the cover and clamp like the rod R, first described, and also similarly marked so it can be adjusted and set where desired; but in this case a fine tube r^2 leads upward through the tubular rod R^2, and its upper end is elevated to a height corresponding to the level of the liquid in the supply-reservoir. Hence when the liquid enters the measuring-chamber it rises therein and also within the fine tube to a height equal to that in the reservoir and no more can be admitted to the chamber. In other words, the plunger P (which I prefer for commercial reasons) checks the inflow by the floating properties of the valve *r*, P′ rises and falls with the surface of the liquid within the chamber and its upward movement is arrested by the lower end of the tube T′, and P^2 checks the inflow by the hydraulic properties of the small column of liquid within the fine tube r^2. The latter may possibly feed a trifle too much liquid to the bottle if that within the fine tube runs out; but this excess will be very small indeed. Each form may have its advantages and disadvantages and hence the selection will be left to the purchaser or user of the machine.

In operation the reservoir is connected with the inlet and the actuating mechanism operated so as to turn the way in the valve into communication between such inlet and the measuring-chamber. The latter then receives the charge, whose size is predetermined by setting the stem of the plunger as above described, and finally a bottle is placed beneath the outlet and the actuating mechanism operated to reverse the position of the way in the valve and connect the chamber with the outlet, when the measured charge will run out into the bottle. Meanwhile, if the double form is used a second charge is being passed into the other chamber, and after the latter is filled a second bottle is placed in position and the valve returned to the initial position, and so on. All parts are of the desired sizes, shapes, proportions, and materials, and considerable change in and addition to the details of construction—such, for instance, as cocks, pressure-gages, and glass-tube levels—may be made without departing from the principle of my invention.

What is claimed as new is—

1. In a liquid-measuring machine, the combination with an upright chamber, a cover thereon, and pipes for admitting liquid to and exhausting it from the lower end of the chamber; of a plunger within the chamber consisting of a head and a tubular stem connected with and rising from the head through the cover, and a clamp on the latter for supporting the stem at any height desired, as and for the purpose set forth.

2. In a liquid-measuring machine, the combination with an upright chamber having a cover, and pipes for admitting liquid to and exhausting it from the lower end of the chamber; of a plunger within the chamber comprising a solid head and a tubular plunger-rod rising therefrom and opening below the head and above the cover, and a clamp on the latter for supporting the rod at adjusted heights, as and for the purpose set forth.

3. In a liquid-measuring machine, the combination with an upright measuring-chamber, and pipes for admitting liquid to and exhausting it from the lower end thereof; of a plunger within the chamber comprising a solid

head, a tubular rod opening through such head and rising therefrom above the chamber and an upwardly-closing float-valve in the lower end of the rod, and means substantially as described for adjustably setting the plunger at the desired height, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM JOSEPH TOWLE.

Witnesses:

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GEO. E. SCALES.