March 4, 1930. M. SCHNAIER 1,749,161

FILLING APPARATUS

Filed July 11, 1925 2 Sheets-Sheet 1

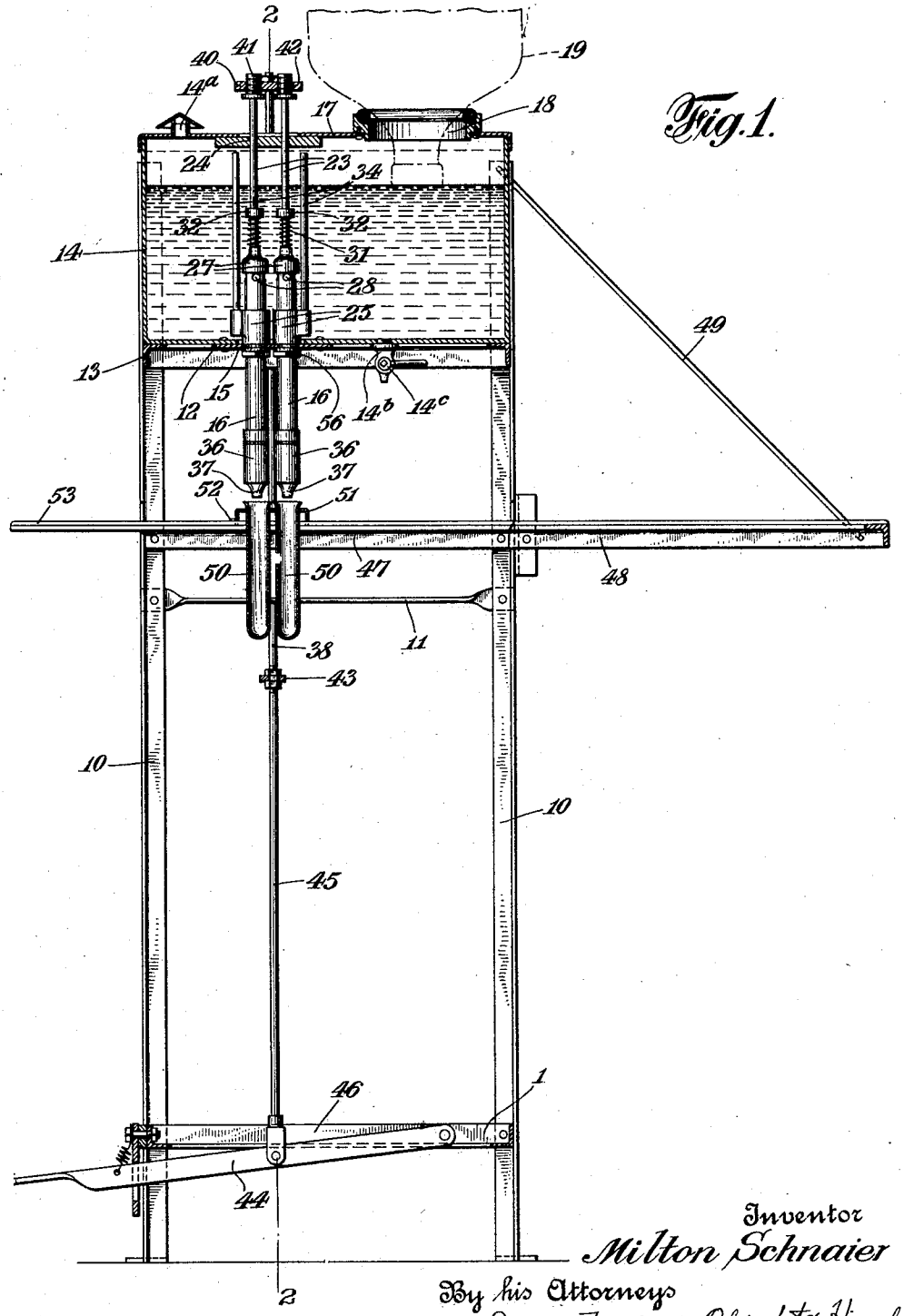


Fig. 1.

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Fig. 2.

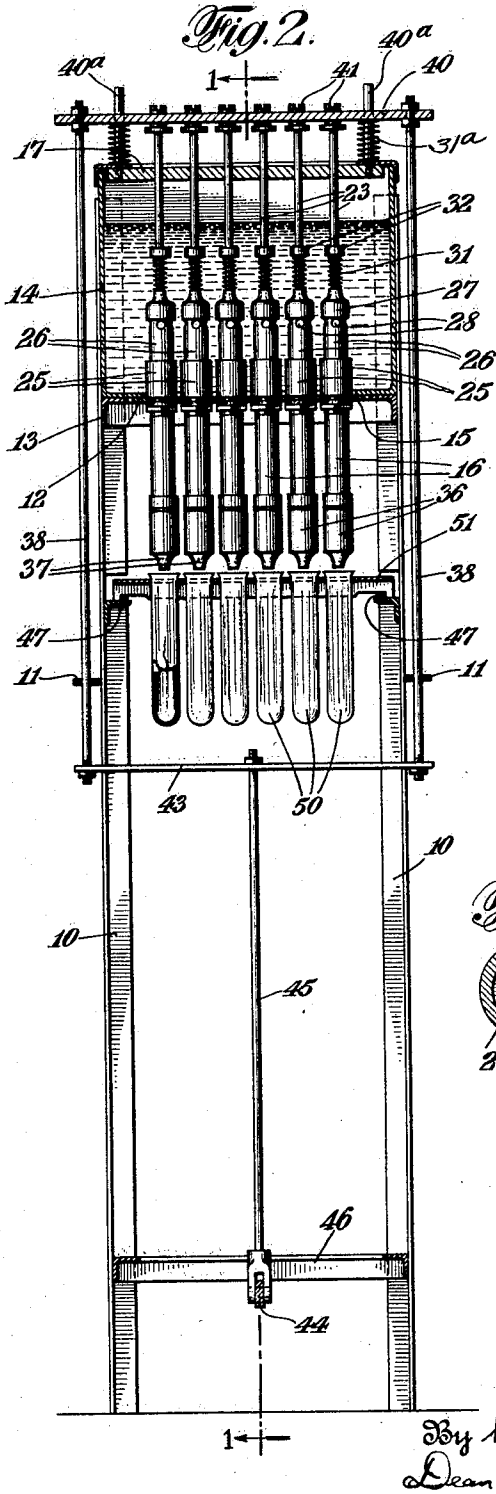


Fig. 3.

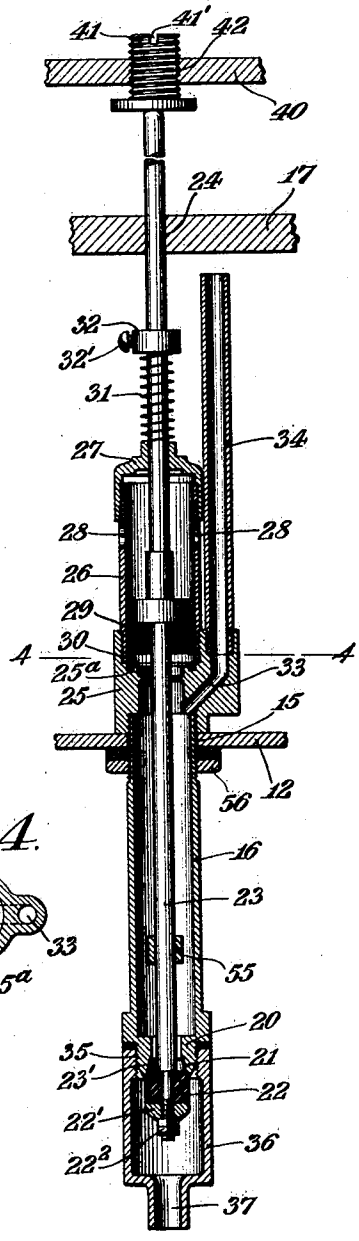
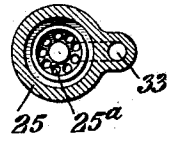


Fig. 4.



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Patented Mar. 4, 1930 1,749,161

UNITED STATES PATENT OFFICE

MILTON SCHNAIER, OF NEW YORK, N. Y.

FILLING APPARATUS

Application filed July 11, 1925. Serial No. 42,877.

My present invention relates to apparatus for dispensing measured quantities of liquid, more particularly for simultaneously filling a predetermined volume in each of a plurality of liquid containers.

While the device may have numerous applications in the arts, it is primarily designed for use in filling molds for frozen confections of the character disclosed in my copending application, Serial No. 689,746, filed January 3, 1924, or in my application, Serial No. 709,178, filed April 26, 1924.

The machine is of the type that includes a tank containing the liquid to be dispensed, a plurality of measuring cylinders supplied from the tank, and means for supporting a series of containers or molds with their open ends in alignment with the lower or discharge ends of the measuring cylinders.

An object of the invention is to provide apparatus of this class, which is of simple and rugged construction and capable of speedily charging the molds and without substantial delay between successive charging operations.

Another object is to provide a sanitary device of the type mentioned, which can be actuated by an unskilled user, and more particularly which requires no sequence of steps but merely a single non-selective operation.

A feature of the invention is the provision of self-draining venting means in the measuring cylinders for insuring the rapid emptying and refilling thereof. This feature is of particular importance where heavy syrups or the like are to be handled and where horizontal vents might become clogged and ineffective, or the operation rendered slow by sluggish flow of viscous liquids.

Notwithstanding the use of the venting means, should the liquid recharge the measuring cylinders, by a sudden rush, there would be a likelihood of the air in the cylinder blocking the free flow of the liquid thereinto, so that air would temporarily at least, sustain the liquid near the top of the cylinder and thereby seal the vent and also preclude complete filling of the cylinder. It is, accordingly, another object to break up the stream recharging the cylinder or to reduce its cross-sectional area, so that the liquid flows downward while the air therein readily escapes through the vent. This result is accomplished by the simple expedient of providing a plurality of small inlet ports rather than one large port at the top of the measuring cylinders.

Another object is to provide convenient means for filling, groups of a battery of molds or containers to be successively charged and this without the need for lifting, raising or shifting any relatively bulky or heavy mass.

Preferably the molds are on tray units mounted on rails and shifted by a simple manual thrust to bring the groups of molds successively in registry with the measuring cylinders, a stop on the guide rail facilitating such registry.

The tray supporting means when in operative position projects from one side of the machine, said tray supporting means being preferably arranged to be folded and swung down out of the way when out of use.

Preferably the individual measuring cylinders are provided each with an inlet and an outlet valve, both of the reciprocating type, rigidly connected upon a stem through the cylinder, various stems simultaneously depressed for discharge by a thrust transmitted through a cross bar directly over the upper ends of the stems, springs about the stems returning the valves to normal position in which they are re-charged.

The cross bar is provided preferably with threaded plugs adjustable to effect minute adjustments in the settings of the valves of the individual measuring cylinders, so that all of the valves will be effectively seated at the same time.

The invention may be more fully understood from the following description in connection with the accompanying drawings, wherein,

Fig. 1 is a longitudinal vertical sectional view therethrough taken along the line 1—1 of Fig. 2,

Fig. 2 is a longitudinal sectional view taken along the line 2—2 of Fig. 1,

Fig. 3 is an enlarged vertical sectional

view through one of the measuring cylinders and associated mechanism, and;

Fig. 4 is a transverse sectional view taken along the line 4—4 of Fig. 3.

Referring now to the drawings, the machine includes a supporting frame work which may conveniently comprise four upright corner posts 10 strengthened by a number of transverse braces 11, the posts and braces preferably all of angle iron. Near the top of the posts, I provide a horizontal supporting platform 12 including downwardly turned marginal flanges 13 secured to the uprights 10. A reservoir 14 is held against lateral displacement by the upper ends of the corner posts and includes a substantially closed bottom resting on the platform 12. The platform has a number of threaded openings 15 therein adapted to receive the lower sections 16 of the measuring cylinders, as will be later described. Preferably the reservior 14 is provided with a removable cover 17 having a convenient socket opening 18 therein for supporting the mouth of a bottle or demijohn 19 from which the reservoir is filled, and is provided with a protected vent opening such as 14^a. A drain plug 14^b is controlled by a manually operated drain cock 14^c.

I provide a battery of measuring cylinders and inasmuch as they are all identical, a description of one cylinder and its associated valving and venting mechanism will suffice for all. One of the cylinders has been indicated in detail in Fig. 3, wherein it will be noted that the lower section 16 is a length of pipe having its upper end extending through the opening 15 in the platform, said cylinder formed at its lower end with a reduced portion 20 providing a downwardly facing valve seat 21 for a valve 22 carried on the lower end of vertically disposed valve stem 23 extending throughout the length of the cylinder and having its upper end projecting through an opening 24 in the reservoir cover. Valve 22 is of rubber or other suitable yielding material backed by a metal washer 22′ and urged by pressure transmitted by nut 22^2 threaded on the end of shaft 23 against a shoulder 23′ on stem 23. The upper end of section 16 has a threaded connection with a coupling member 25 engaging the upper face of platform 12, a double lock nut 56 on cylinder 16 engaging the lower face of the platform and thereby effecting a secure connection. Coupling 25 receives the inner end of upper section 26 of the measuring cylinder which is threaded thereinto. Stem 23 is guided in a collar 55 in cylinder 16 and in a spider or apertured plate 25^a fixed within the coupling member. This plate sub-divides the liquid stream flowing from 26 into 16 and effectively prevents the air blocking which might ensue from sudden inrush of a large stream. Section 26 is closed by cap 27 offering an additional guide for the valve stem 23 and is provided with a number of inlet ports 28 in its convex wall open to the fluid in the reservoir. Stem 23 carries a second valve 29 preferably of rubber or equivalent yielding material, working in the upper section 26 of the cylinder and coacting with an upwardly facing valve seat 30 formed in the coupling member. Valve 29 prevents flow of liquid from section 26 to section 16 when the valve stem is depressed. An expansion spring 31 around the stem between the cap 27 and a collar 32 fixed on the stem by set screw 32′ normally tends to maintain the stem in elevated position with the valve 29 open and the valve 22 seated. Thus the contents of the reservoir are free to flow through the ports 28 and around the valve 29 into the lower section 16 which serves as a measuring chamber. An oblique self-draining vent opening 33 in the coupling member 25 is connected to a stand pipe 34 which terminates above the liquid level in the reservoir. With the parts in the position of Fig. 3, the liquid will flow up the pipe 34 to an extent predetermined by the liquid level in the reservoir. The vent 33, 34 provides for the ready escape of air from the measuring chamber as the liquid is admitted to fill said chamber.

When the valve stem is depressed to close valve 29 and open valve 22, the contents of the measuring chamber and the stand pipe will flow downward by gravity around the valve 22. In order to prevent the liquid escaping from the measuring chamber from splashing off the surface of the valve 22, I exteriorly thread the lower end of section 16 as at 35 and couple thereto a discharge nozzle 36 having a reduced discharging end 37. This construction insures quiet flow of the liquid from the measuring chamber into the container to be filled, which is supported in receiving position in a manner to be more fully hereinafter described.

Numerous expedients might be resorted to for simultaneously operating all of the valve stems and permitting simultaneous filling and emptying of all the measuring cylinders. I prefer to use a simple construction of operating yoke which includes vertical rods 38 working in guide openings in braces 11 projecting from the legs 10. A cross head 40 is provided with screw plugs 41 screwed into openings 42 therein, said plugs forming stops for the spring pressed stems 23 and acting to simultaneously depress said stems to actuate the individual fillers, when the cross head is moved downward. The cross head is guided for vertical movement by standards 40^a carried by the reservoir cover, and preferably encircled by springs 31^a. The upper ends of the plugs are provided with fillister slots 41′ for facility of independent adjustment thereof by the aid of a screw driver, to insure proper simultaneous seating and unseating

of all the valves. A cross bar 43 connecting the lower ends or rods 38 is coupled by a pull bar 45 to a treadle lever 44 pivoted in a cross bar 46 in the lower end of the frame.

It will be understood that normally the liquid from reservoir 14 will enter the individual measuring chambers through ports 28, air blocking being prevented by the effective venting of said chambers through vents 33 and stand pipes 34 and also by the pressure of the apertured plate 25ª which sub-divides the liquid stream. The syrup will also seek the same level in stand pipes 34 as in the reservoir 14. Depression of the treadle pulls down the cross bar 43 and through rods 38 draws down the cross head 40 and moves all of the valve stems downward therewith against the resistance of their associated springs 31 and of springs 31ª to close the valves 29 and open the valves 22. The measured charges flow outward by gravity flow from the individual cylinders 16, through nozzles 36 to the molds 50 positioned therebelow. Upon release of the treadle, the combined lifting action of the springs 31 and 31ª will restore the parts to their normal position shown in Fig. 4 with the outlets from the measuring chambers closed and with the valves 29 open to permit free refilling from the reservoir of the measuring chambers and the stand pipes, as previously set forth.

The arrangement of the oblique vents 33 in the couplings 25 is of particular importance when the liquid which is being handled, is heavy or viscous, such for instance, as the fluid syrups used in the manufacture of confections described in the copending application above identified. The vent 33 opening downward is self-draining and, therefore, cannot become liquid-sealed as might occur if it opened horizontally into the chamber. Moreover, the diameter of the stand pipe is sufficiently large to drain almost immediately when valve 22 is opened, especially in view of the hydrostatic head of liquid in the stand pipe.

For conveniently supporting containers in position to be filled by the discharge contents of the measuring chambers, I secure a pair of rails 47 between the legs 10 at a point just below the discharge nozzles 36. These rails may be provided with pivoted extensions 48 held in horizontal position by hangers 49 detachably engaged with the upper ends of the posts 10. By die-engaging the hangers, the rail extensions may be swung downwardly and out of the way. I have shown confection mold containers, such as those described in the copending application above referred to. These containers 50 may have their necks hung in trays 51 as set forth in said application, or they may be formed in a unit with said trays. A number of the trays may be supported in abutting relationship on the guide rails 47, 48. Small stop lugs 52 on the rails are used for aligning the trays with the discharging nozzles 36. In operation, a number of the trays are placed on the rails and the outermost tray pushed inward until the innermost one is stopped by the lugs 52. The treadle is then depressed sharply, to avoid maintaining the valves for an appreciable period between the limit of their stroke. The contents of the measuring chambers thus discharge into the molds carried by the innermost tray, the seated valves 29 preventing discharge beyond the measured quantity. The vent 14ª maintains atmospheric pressure in the reservoir 14 above the liquid level therein and vent tubes 34 communicating therewith, maintain such pressure in the measuring cylinders.

The stop lugs offer enough resistance to the sliding movement of the mold tray to apprise an operator feeding the trays that one has reached proper position but do not offer sufficient resistance to prevent the same movement from causing a filled tray to ride thereover and out on the rail extensions 53 to be subsequently placed on the freezing chamber. Accordingly, the need for separate handling is avoided, which would be incurred were it necessary to separately lift each filled mold rack from the machine, and to manually deposit an empty one in position for charging.

It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention what I claim as new and desire to secure by Letters-Patent of the United States is:—

1. An apparatus of the class described including a reservoir, a plurality of measuring cylinders having their upper ends in commuication with the reservoir, inlet valves of diameters substantially the same as the diameters of the cylinders and above the latter, outlet valves at the lower ends of the cylinders and self-draining ports opening into the upper ends of the measuring cylinders substantially directly below said inlet valves, whereby liquid may flow freely into the measuring cylinders when the outlet valves are closed and the inlet valves opened and may flow freely out of the measuring cylinders

when the inlet valves are closed and the outlet valves opened.

2. An apparatus of the class described including a reservoir, a plurality of measuring cylinders having their upper ends in communication with the reservoir, inlet valves of diameters substantially the same as the diameters of the cylinders and above the latter, outlet valves the lower ends of the cylinders and self-draining ports opening into the upper ends of the measuring cylinders substantially directly below said inlet valves, whereby liquid may flow freely into the measuring cylinders when the outlet valves are closed and the inlet valves opened and may flow freely out of the measuring cylinders when the inlet valves are closed and the outlet valves opened, said ports entering the measuring cylinders obliquely and vertical stand pipes connected to the outer ends of the ports and extending to a level higher than that of the liquid in the reservoir.

3. In apparatus of the class described including a reservoir and filling chamber therein, a plurality of measuring cylinders therein extending below said reservoir and having their upper ends in communication with the filling chambers in the reservoir, caps closing the upper ends of the chambers, valve stems vertically guided through said caps, inlet and outlet valves carried by said stems, the former of substantially the diameter of said cylinders and normally open, the latter normally closed to normally maintain the cylinders charged and to effect discharge upon raising said stems and self-draining ports substantially directly below said inlet valves draining into the upper ends of the measuring cylinders and venting the same, whereby liquid may flow freely into and out of the measuring cylinders.

4. In apparatus of the class described, a reservoir, a platform, cylindrical measuring containers, cylindrical inlet members communicating with said reservoir, said containers and said inlet members, at opposite sides of said platform, coupling members interposed between and rigidly connecting said containers and said members, valve stems extending through the measuring containers and cylindrical members, inlet valves carried by the stems seating to prevent flow from the upper cylindrical member into the lower measuring container, outlet valves carried by said stems and seating at the lower ends of the measuring chambers to prevent emptying of the contents thereof and means for simultaneously operating all of the valves, whereby to open all of the outlet valves and close all of the inlet valves or vice versa.

5. A device of the class described in claim 4 and wherein a cross head operated by a treadle contacts the upper ends of all of the valve stems, and coiled springs around the valve stems normally tend to maintain the outlet valves closed and the inlet valves open.

6. A device of the class described in claim 4 wherein obliquely disposed venting ports communicate with the upper ends of the measuring cylinders and vertical stand-pipes connected to the ports, terminate above the liquid level in the reservoir.

7. A device for measuring and dispensing liquids, including a two-part container, the upper part of said container constituting an entrance chamber and having inlet ports therein, the lower part of said container constituting a measuring chamber and having a vent therein, said lower part including a coupling member connecting the two parts of the container, a valve stem extending through both parts of the container and the coupling thereof, an inlet valve carried by the stem seating on the coupling member to prevent flow from the inlet chamber to the measuring chamber, and an outlet valve carried by the stem and closing the lower end of the measuring chamber when the inlet valve is open.

8. A device for measuring and dispensing liquids, including a two-part container, the upper part of said container constituting an entrance chamber and having inlet ports therein, the lower part of said container constituting a measuring chamber and having a vent therein, said lower part including a coupling member connecting the two parts of the container, a valve stem extending through both parts of the container and the coupling thereof, an inlet valve carried by the stem seating on the coupling member to prevent flow from the inlet chamber to the measuring chamber, and an outlet valve carried by the stem and closing the lower end of the measuring chamber when the inlet valve is open, and a spring around the valve stem normally tending to maintain the outlet valve closed and the inlet valve open, whereby liquid from the inlet chamber may flow freely around the inlet valve to the measuring chamber.

9. A device for measuring and dispensing liquids, including a two-part container, the upper part of said container constituting an entrance chamber and having inlet ports therein, the lower part of said container constituting a measuring chamber and having a vent therein, said lower part including a coupling member connecting the two parts of the container, a valve stem extending through both parts of the container and the coupling thereof, an inlet valve carried by the stem, seating on the coupling member to prevent flow from the inlet chamber to the measuring chamber, and an outlet valve carried by the stem and closing the lower end of the measuring chamber when the inlet valve is open, said vent being oblique and draining into said measuring chamber, and an upstanding pipe connected to the vent in the measuring chamber and extending at one side thereof.

10. A device for measuring and dispensing liquids, including a two-part container, the upper part of said container constituting an entrance chamber and having inlet ports therein, the lower part of said container constituting a measuring chamber and having a vent therein, said lower part including a coupling member connecting the two parts of the container, a valve stem extending through both parts of the container and the coupling thereof, an inlet valve carried by the stem seating on the coupling member to prevent flow from the inlet chamber to the measuring chamber, and an outlet valve carried by the stem and closing the lower end of the measuring chamber when the inlet valve is open, and a discharge nozzle connected to the lower end of the measuring chamber and enclosing the valve whereby to insure quiet flow of liquid from the measuring chamber.

11. A device for measuring and dispensing liquids, including a two-part container, the upper part of said container constituting an entrance chamber and having inlet ports therein, the lower part of said container constituting a measuring chamber and having a vent therein, said lower part including a coupling member connecting the two parts of the container, a valve stem extending through both parts of the container and the coupling thereof, an inlet valve carried by the stem seating on the coupling member to prevent flow from the inlet chamber to the measuring chamber, and an outlet valve carried by the stem and closing the lower end of the measuring chamber when the inlet valve is open, and means in the coupling member for sub-dividing and breaking up the liquid stream which flows therethrough into the measuring chamber.

12. A device for measuring and dispensing liquids, including a two-part container, the upper part of said container constituting an entrance chamber and having inlet ports therein, the lower part of said container constituting a measuring chamber, means to vent the latter, a coupling member connecting the two parts of the container, a valve stem extending through the coupling and both parts of the container, an inlet valve carried by the stem seating on the coupling member to prevent flow from the inlet chamber to the measuring chamber, and an outlet valve carried by the stem and closing the lower end of the measuring chamber when the inlet valve is open, and means in the coupling member for sub-dividing and breaking up the liquid stream which flows therethrough into the measuring chamber, said means comprising an apertured guide plate.

13. In combination with a platform having a threaded opening therein, a two-part measuring and dispensing device including a lower measuring chamber having its upper end threaded into the opening in the platform, a coupling member connected to the upper threaded end of the measuring container, an entrance cylinder screwed into the coupling member and having inlet ports therein adapted to freely communicate with a reservoir above the platform, a valve seat at the lower end of the measuring container, a valve seat in the coupling member, a valve stem projecting through both chambers, and through the coupling members, outlet and inlet valves carried thereby for coaction with the respective seats, a spring around the valve stem normally tending to seat the outlet valve at the lower end of the measuring container and to open the inlet valve, said coupling member having a vent therein communicating with the measuring container, whereby to permit rapid flow of liquid from the inlet chamber into the measuring chamber when the inlet valve is open.

14. In combination with a platform having a threaded opening therein, a two-part measuring and dispensing device including a lower measuring chamber having its upper end threaded into the opening in the platform, a coupling member connected to the upper threaded end of the measuring container, an entrance cylinder screwed into the coupling member and having inlet ports therein adapted to freely communicate with a reservoir above the platform, a valve seat at the lower end of the measuring container, a valve seat in the coupling member, a valve stem projecting through both chambers, and through the coupling members, outlet and inlet valves carried thereby for coaction with the respective seats, a spring around the valve stem normally tending to seat the outlet valve at the lower end of the measuring container and to open the inlet valve, said coupling member having a vent therein communicating with the measuring container, whereby to permit rapid flow of liquid from the inlet chamber into the measuring chamber when the inlet valve is open, and a spider guiding the movement of the valve stem through the coupling member and dividing the liquid stream to permit air blocking in the measuring container.

15. In apparatus of the class described, a reservoir, a platform, cylindrical measuring containers, cylindrical inlet members communicating with said reservoir, said containers and said inlet members, at opposite sides of said platform, coupling members interposed between and rigidly connecting said containers and said members, valve stems extending through the measuring containers and cylindrical members, inlet valves carried by the stems seating to prevent flow from the upper cylindrical member into the lower measuring container, outlet valves carried by said stems and seating at the lower ends of the measuring chambers to prevent emptying of the contents thereof and means for simul-

taneously operating all of the valves, whereby to open all of the outlet valves and close all of the inlet valves or vice versa, and a cross head having a plurality of contact members adjustable therein and engageable with the upper ends of the valve stems to effect simultaneous depression thereof.

16. A device of the character described including, in combination, a reservoir, a cylinder extending therebelow, a coupling member threaded upon said cylinder and substantially engaging the bottom of said reservoir, an inlet cylinder member threaded into the upper end of said coupling member, a stem extending through said cylinders and said coupling, a valve at the lower end of said stem normally closing the outlet of said cylinder, a valve on said stem adapted to close the inlet to said cylinder when the stem is depressed, said coupling being perforated to sub-divide the stream of liquid in its descent from said inlet cylinder to said measuring cylinder, and an oblique self-draining vent in said coupling member having a vent pipe connected to the lower end thereof extending upward above the level of liquid in said reservoir.

17. The combination set forth in claim 16 in which a plurality of the valve units set forth are disposed in side by side relation in the reservoir and in which operating means actuated by a pedal simultaneously depresses said various stems and in which a spring about each of said stems effects return of said stems after discharge to re-seat the outlet valve and to unseat the inlet valve for permitting refilling of the measuring cylinders.

18. In a device of the character described, in combination, a reservoir, a battery of measuring cylinders protruding downward below the bottom of said reservoir and having portions extending thereabove, reciprocating control valves in said cylinders, a stem operating the valves of each cylinder, springs urging said stems upward to permit charging of said cylinders and to maintain said cylinders against discharge, a common operating member extending transversely across the upper ends of said various stems and screw plugs in said operating member, one against each of said stems, said plugs adjustable to effect accuracy in setting of the various valves.

Signed at city of New York, in the county of New York and State of New York, this 8th day of July, A. D. 1925.

MILTON SCHNAIER.