

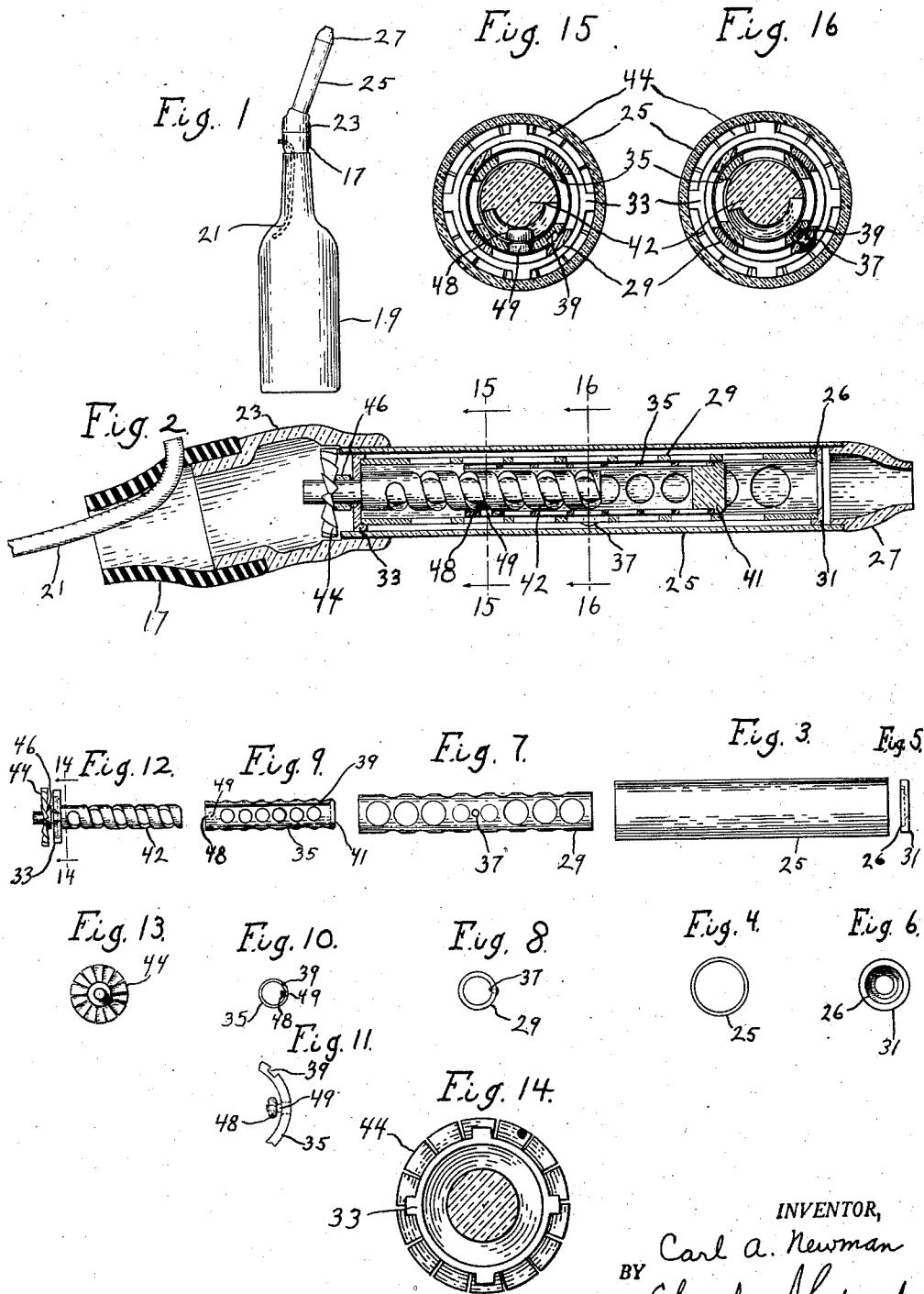
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LIQUID DISPENSING DEVICE

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LIQUID DISPENSING DEVICE

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This invention relates to liquid dispensing devices of a kind used for measuring a definite amount of liquid to be dispensed from a bottle, jug, or the like.

The principal object of the invention is to provide a simple and inexpensive device of this kind in which the liquid poured from a bottle itself operates devices for limiting the amount of liquid dispensed at one time to a predetermined measured quantity.

Another object of the invention is to provide a device of this kind in which the movable parts are returned to initial position by the liquid itself.

Still another object of the invention is the provision of a device of this kind in which the flow of the liquid is controlled by a bodily movable valve which is operated by the flow of the liquid.

These and other desirable objects are accomplished by the construction disclosed as an illustrative embodiment of the invention in the following description and in the accompanying drawings forming a part hereof, in which:

Fig. 1 is a side elevation of a liquid dispenser constructed according to one possible embodiment of the invention and shown in position on a bottle;

Fig. 2 is a longitudinal section of the device somewhat enlarged;

Fig. 3 is a side view of an outer or measuring tube;

Fig. 4 is an end view of the same;

Figs. 5 and 6 are side and plan views, respectively, of a valve seat detached from the outer tube;

Figs. 7 and 8 are side and end views, respectively, of an outer perforated tube;

Figs. 9 and 10 are side and end views, respectively, of a valve member;

Fig. 11 is an enlarged fragmentary view of a part of the valve member;

Fig. 12 is a side view of a worm for operating the valve;

Fig. 13 is detail view of a liquid driven wheel;

Fig. 14 is a sectional view taken substantially on line 14—14 of Fig. 12;

Fig. 15 is an enlarged section taken substantially on line 15—15 of Fig. 2; and

Fig. 16 is an enlarged section taken substantially on line 16—16 of Fig. 2.

The same reference numerals throughout the several views indicate the same parts.

The form of the invention illustrated herein is especially designed for use on a bottle from which it is desired to dispense liquors, such as

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whiskey or gin, in measured quantities, and comprises a hollow connector 17, preferably of rubber, to make a liquid tight seal either inside or outside the neck of a bottle 19. The connector has a tube 21 of glass or other suitable material extending therethrough and into the bottle for admitting air to maintain the atmospheric pressure within the bottle. Seated in the outer end of the hollow connector or stopper 17 is a short tube 23, preferably constructed of substantially transparent plastic, or glass, that has an enlarged internal diameter for increasing its capacity.

Seated in the upper or outer end of the short tube 23 is an outer tube 25 of cylindrical form and preferably constructed of substantially transparent plastic or similar material and constitutes, in effect, a reservoir and conduit for the liquid dispensed. Mounted in the outer end of the tube 25 is a restricted pouring spout 27, also of transparent material, which may be secured therein by any suitable means, as by friction or cement, or it may be formed integrally with the tube 25.

Seated within the tube 25 and concentric therewith is a perforated tube 29, of smaller diameter and slightly shorter than the tube 25. The perforated tube 29 is retained in the tube 25 by engagement with an annular valve seat 31 secured by a frictional fit or by transparent cement in the tube 25 adjacent its outer end, and has an annular rim 26 in which the outer end of the tube 29 is secured by friction or transparent cement. Thus the valve seat surrounds the outer end of the perforated tube 29 and is secured to both of said tubes. At its inner end the tube 29 is seated in an annular groove in a spider 33 secured to both the perforated and outer tubes by means of friction or cement and has openings for permitting liquid to flow therethrough. By this arrangement, the perforated tube 29 is fixed within and concentric with the outer tube 25 and surrounds the opening in the valve seat 31 at its outer end.

Arranged within the perforated tube 29 is a valve member in the form of a perforated tube 35 slidable axially in the tube 29 and held against rotation relatively to said tube by means of a tongue in the form of a stud or lug 37 projecting inwardly from the tube 29 and engaging a longitudinal groove 39 in the outer wall of the valve 35. Said tube 35 is considerably shorter than the tube 29, in which it is axially slidable to and from engagement with the valve seat 31 at the outer end of the tube 29, and it has its outer end closed by means of a plug 41 retained therein

by friction or cement and movable into engagement with the valve seat 31 for preventing the escape of liquid from the tube 25 when it engages the valve seat. The groove 39 stops short of the forward end of the tube 35, so as not to destroy the liquid tightness of the valve.

Means are provided for moving the valve member axially in the perforated tube to move the valve to and from engagement with its seat. Said means comprises a screw or worm 42 having a spiral groove and arranged inside the perforated tubular valve 35 and rotatable relatively thereto. The screw 42 has a bearing in the spider 33 and has a shoulder engaging the inner wall of the spider to provide a thrust bearing therefor. The screw has a reduced shaft portion projecting inwardly through said spider and has a liquid driven wheel 44 secured to its inner end. A spacer sleeve 46 between the wheel and the bearing spider 33 serves to prevent axial movement of the screw 42. The valve tube 35 has an inwardly projecting member to engage the spiral groove of the screw, this member preferably being in the form of a tiny bead or roller 48 rotatable on a stud 49 fixed in the wall of the tube 35. Since the tube 35 is held against rotation in the tube 29, rotation of the screw 42 in one direction or the other will cause an axial movement of the slidable valve in one direction or the other to and from engagement with its seat.

In operating the device for dispensing liquid, it is seated on a bottle or other liquid container, as seen in Fig. 1, and is tipped to permit the liquid to flow from the bottle. The liquid engages the wheel 44, which is made like a fan with oblique blades very close together so that even a slight flow of liquid will turn it and with it the screw 42, to which it is secured. Rotation of the spiral screw in the direction caused by outward flow of liquid moves the valve 35 axially within the tube 29 until it reaches the limit of its movement by engagement with the valve seat, at which time the flow of liquid is shut off. The proportions of the wheel 44 and the pitch of the worm or screw thread 42 are so designed with respect to the length of the path of travel of the valve member 35, that at the time the desired measured quantity of liquid has passed through the valve seat 31, the valve comes into contact with the seat and stops the flow. That part of the outer tube 25 which lies rearwardly or inwardly from the valve seat 31 will now be full of liquid. The bottle is then tilted back to its normal upright position, whereupon the liquid in the tube 25 flows back in a reverse direction through the spider 33 and the wheel 44, rotating the wheel in the reverse direction and drawing the valve member 35 back inwardly away from the valve seat, to the extreme inner end of its path of travel. The tube 25 is made of sufficient size so the liquid capacity thereof is a little more than enough to insure adequate rotation of the wheel 44 and screw 42 to draw the valve member 35 all the way back, ready for the next forward stroke during the next liquid-measuring operation. Hence the tube 25 may be considered as a reservoir holding a supply of liquid to furnish power to restore the parts to their initial position. It is noted that the wheel 44 is of the full diameter of the tube 25 or even of slightly larger diameter, as seen in Fig. 2, so that the oblique blades of the wheel will be in the path of and be influenced by any flow of liquid, even if the flow be very slight.

A device of this kind is especially useful in measuring small quantities of liquor to be poured

directly from the bottle into the drinking glass, thus eliminating the use of a separate measuring glass or "jigger" and the attendant liability to spill when pouring from the "jigger" into the drinking glass. The device will usually be constructed to measure, say, one fluid ounce at each operation, though it may be made in a size to dispense three-quarters of an ounce or any other desired quantity.

The principal parts of the device, beyond the stopper or connector 17, are preferably made of transparent plastic material, and preferably the screw 42, valve tube 35, guide tube 29, and reservoir tube 25 are all made of different colors or tints, so that as the various parts move during operation, the movement is clearly visible and can be followed readily by the eyes of the customer whose drink is being poured, who will find this device an interesting and fascinating novelty.

It is seen from the foregoing disclosure that a construction is provided which admirably fulfills the above-mentioned objects of the invention. It is to be understood that the foregoing disclosure is given by way of illustrative example only, rather than by way of limitation, and that without departing from the invention, the construction may be varied within the scope of the appended claims.

What is claimed is:

1. A liquid dispenser comprising an outer tube, a second tube fixed within the outer tube, said second tube having openings through its side walls, a valve movable within and guided by said second tube for stopping the flow of liquid from the outer tube, and means actuated by the flow of the liquid for operating said valve.

2. A liquid dispenser comprising a tube from which liquid may be dispensed, a valve for stopping the flow of liquid therefrom, and rotary means actuated by the flow of the liquid for operating said valve, said rotary means being located on the upstream side of said valve and being rotated in a reverse direction by reverse flow of liquid trapped between said valve and said rotary means at the conclusion of a dispensing operation, to open said valve.

3. A liquid dispenser comprising a tube, a valve movable axially therein for stopping the flow of liquid therefrom, a spiral screw for operating the valve, and a current-operated wheel on the upstream side of said valve operatively connected to said screw to turn the same to operate said valve.

4. A liquid dispenser comprising an outer tube, a second tube fixed therein, an axially movable valve in said second tube fixed against rotation therein and operable to stop the flow of liquid from the first mentioned tube, a spiral screw for operating said valve, and a liquid actuated wheel for operating the said spiral screw.

5. A liquid dispenser comprising a tube from which liquid may be dispensed, an axially movable valve therein for stopping the flow of liquid therefrom, a rotatable spiral screw substantially in axial alignment with said valve, means on said valve engaging the thread of said spiral screw for moving the valve to stop the flow of liquid, and a wheel actuated by the flow of the liquid for actuating the spiral screw.

6. A liquid dispenser comprising a tube from which liquid may be dispensed, an axially movable valve therein for stopping the flow of liquid therefrom, said valve having a tubular guiding portion, tongue and groove devices for preventing rotation of the valve, a spiral screw extending axially within said tubular portion of said valve,

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interengaging means between said valve and spiral screw for moving the valve when the screw is rotated, and liquid actuated means for rotating said screw.

7. A liquid dispenser comprising an outer tube from which liquid may be delivered, a second tube fixed within said outer tube, a valve movable in the second tube for stopping the flow of liquid from said outer tube, a spiral screw for operating said valve, a spider fixed in said outer tube in which the spiral screw is rotatably mounted, and a wheel fixed on said spiral screw and adapted to be rotated by the flow of the liquid.

8. A liquid dispenser comprising an outer tube having an outlet at one end and adapted to have its other end connected with a liquid container, a perforated tube fixed in said outer tube, a valve having a tubular stem movable axially in said perforated tube but fixed against rotation therein, a screw operatively engaged with said valve stem, and means actuated by the liquid for rotating said screw.

9. A liquid dispenser comprising a tube from which liquid may be dispensed, a valve seat in said tube, a valve movable bodily to and from engagement with said valve seat, means in said tube for guiding said valve, and means actuated by the flow of the liquid for moving the valve to and from engagement with the valve seat.

10. A liquid dispenser for attachment to a bottle to dispense a measured quantity of liquid therefrom at each operation, said dispenser comprising a reservoir having an inlet end connected to said bottle and an outlet end from which liquid may be poured, a valve seat adjacent said outlet end and a valve member movable within said reservoir toward and away from said valve seat, and liquid-flow-operated means adjacent the inlet end of said reservoir for gradually moving said valve member toward said valve seat as liquid flows from the bottle into said reservoir and for moving said valve member away from said valve seat as liquid in said reservoir flows back into the bottle.

11. A construction as described in claim 10, in which said liquid-flow-operated means includes a rotary wheel with oblique blades turned in one direction by flow of liquid from the bottle into said reservoir and turned in the opposite direction by flow of liquid from said reservoir into the bottle.

12. A construction as described in claim 10, in which said liquid-flow-operated means includes a screw member, means operated by flow of liquid

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for turning said screw member, and an operative connection between said screw member and said valve member to move said valve member longitudinally upon turning of said screw member.

13. A liquid dispenser for attachment to a bottle to dispense a measured quantity of liquid therefrom at each operation, said dispenser comprising a reservoir having an inlet end connected to said bottle and an outlet end from which liquid may be poured, a valve seat adjacent said outlet end, a foraminous tubular guiding member within said reservoir, a foraminous tubular valve member mounted to slide within said guiding member, said valve member having one end adapted when at one position to engage said valve seat to prevent flow of liquid therethrough, cooperating parts on said valve member and said guiding member to prevent rotation of said valve member within said guiding member while permitting longitudinal movement of said valve member therein, an operating member rotatable within said valve member, said operating member having a helical slot therein, means holding said operating member against longitudinal movement relative to said guiding member, a projection on said valve member extending into said helical slot so that as said operating member is turned, said valve member is moved longitudinally, and a wheel having relatively closely spaced oblique blades fixed to said operating member adjacent said inlet end of said reservoir and so arranged that liquid flowing from the bottle into said reservoir will flow past said oblique blades and turn said wheel to turn said operating member to move said valve member longitudinally into contact with said valve seat, and so that liquid flowing from said reservoir back into the bottle will turn said oblique blades in the opposite direction and move said valve member longitudinally away from said valve seat.

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