June 21, 1966 I. DUMM, III 3,257,034

LIQUID FLOW CONTROLLER

Filed Aug. 31, 1964

FIG_1

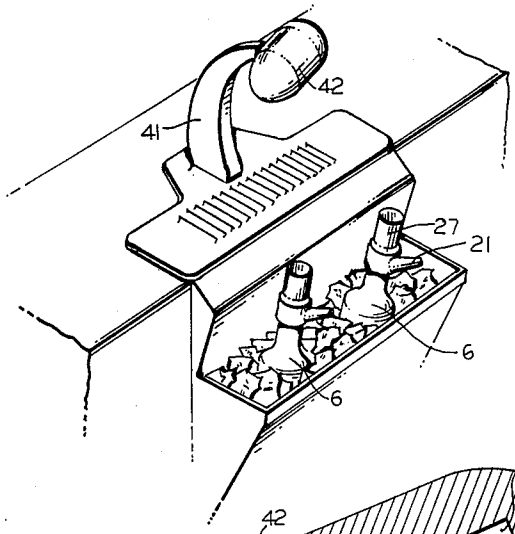


FIG_4

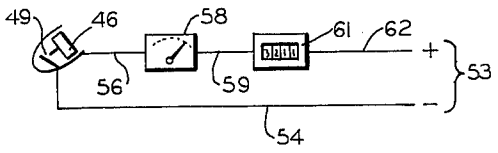


FIG_2

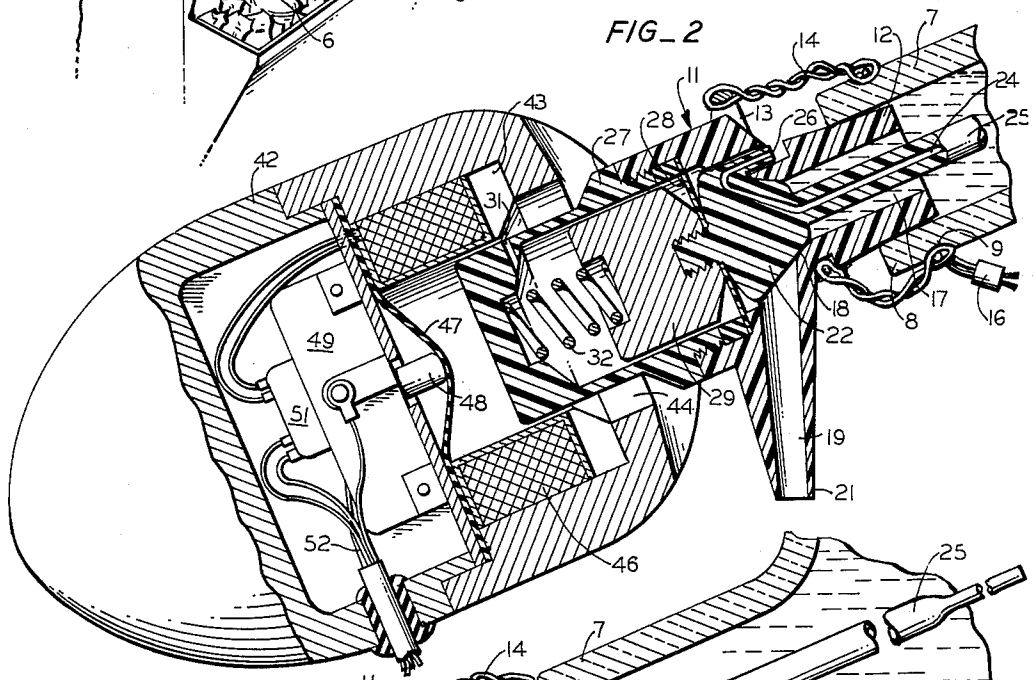
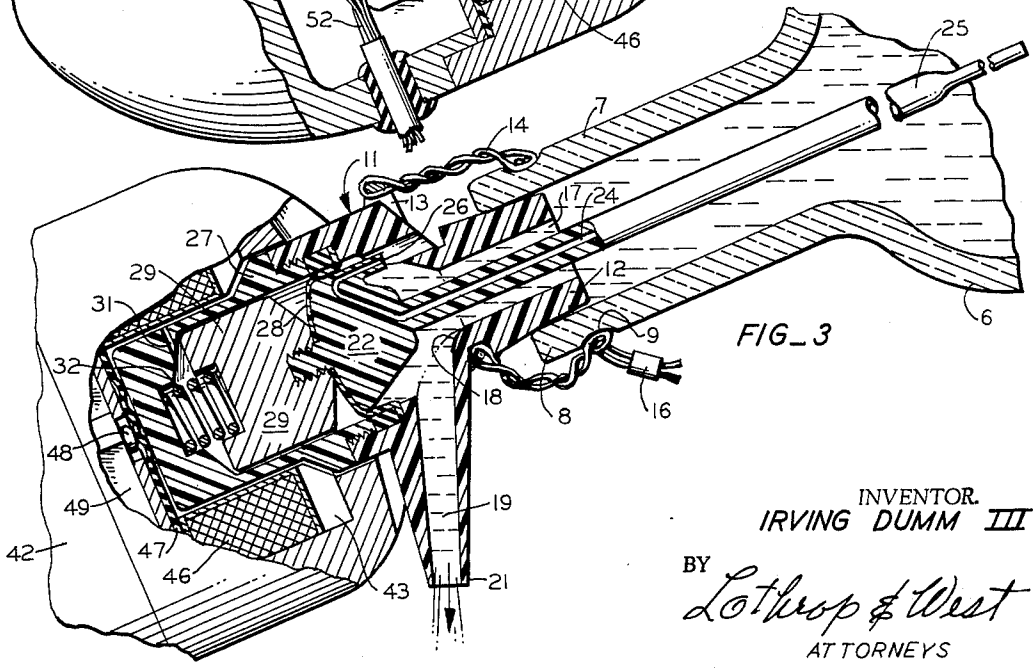


FIG_3



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LIQUID FLOW CONTROLLER

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My invention relates to means primarily useful in controlling and counting the flow of liquid from bottles and similar containers, for example in bars, grills and other liquid dispensatories. It is usually difficult for the owner of a bar, for example, to keep precise track of the amount of liquor that is dispensed by his employees, and the discrepancy in his liquor records may well amount to the difference between profit and loss. Various schemes for the purpose of measuring or accounting for the liquor dispensed have been utilized and proposed, but so far as I know, none of them has met with much success in practice.

It is therefore an object of my invention to provide a liquid flow controller that can readily and easily be installed on the regular bottles utilized in a bar and operated in connection with other equipment of the invention in order plainly and clearly to control the amount of liquor dispensed for each cycle of operation and also to afford an indication of the amount of liquor dispensed from time to time.

Another object of the invention is to provide a liquid flow controller that cannot easily be surreptitiously actuated by any commonly available means.

Another object of the invention is to provide a liquid flow controller that is sufficiently cheap, reliable and accurate as to justify its use in a liquor dispensing operation.

Another object of the invention is to provide a liquid flow controller that is not susceptible to tampering by unauthorized persons.

Another object of the invention is to provide a liquid flow controller which can be adjusted from time to time to vary the measured amount of liquid to be dispensed.

A still further object of the invention is in general to provide an improved liquid flow controller.

Other objects together with the foregoing are attained in the embodiment of the invention described in the accompanying description and illustrated in the accompanying drawings, in which:

FIGURE 1 is an isometric view of a portion of a bar provided with the liquid flow controller of the invention;

FIGURE 2 is a cross section on a central longitudinal plane through one portion of the liquid flow controller of the invention, a part of the showing being in elevation;

FIGURE 3 is a view similar to FIGURE 2, but showing the parts in a different relationship; and

FIGURE 4 is a wiring diagram of the circuitry employed in connection with my liquid flow controller.

While the installation of the liquid flow controller can be accomplished in a number of different ways, it is convenient to have an individual installation at each station at a bar. At the station there is usually a supply of bottles **6** containing liquor. Each bottle is customarily formed with a tubular neck **7** having a pouring lip **8** and a diminished groove **9**. In accordance with the invention, each of the bottles available at the station is fitted with a casing **11**. This is made up of a number of separable parts and includes a cork-shaped end **12** designed to fit into the neck **7** of the bottle **6** and to form a liquid-tight engagement therewith. The casing is capable of being readily detached when the bottle is empty. Secured to the casing **11** is a loop **13** carrying a sealing wire **14** designed to encompass the

bottle neck in the groove **9** and to carry a deformable seal **16**, so that when the casing **11** is initially installed on the bottle neck **7**, the seal **16** can be impressed, and it is then impossible to withdraw the casing from the bottle without rupturing the seal and thus giving evidence thereof.

The casing portion **11** can conveniently be fabricated, for example, of a plastic material and is provided with a generally cylindrical inlet passage **17** opening into the interior of the bottle neck and also passing a valve seat **18** as it leads to a discharge passage **19** formed in a spout **21** on the casing **11**.

A valve **22** is designed to move within the casing between a position onto the seat **18** as shown in FIGURE 2 and another position off of the seat as shown in FIGURE 3. The valve **22** is conveniently provided with a through air passage **24** extending by means of a stem **25** into the interior of the bottle and extending to an opening **26** to the atmosphere.

The casing **11** has an extension in the form of a magnetically permeable tube **27** screwed into position and clamping in place a diaphragm **28** spanning the interior of the casing and intervening between the valve **22** and a solenoid core **29** freely movable within the tube **27**. An atmospheric vent opening **31** precludes fluctuations in pressure in the interior of the tube as the core moves. A coil spring **32** is situated within the tube, bearing against one end thereof and also bearing against the core **29**. The spring has sufficient force to urge the valve **22** tightly onto its seat despite adverse pressure thereon by the contents of the bottle no matter what the bottle position. Stated differently, it is not possible to get any outflow from the bottle merely by inverting the bottle since the spring **32** keeps the valve **22** tightly closed.

The structure as so far described is all that is attached to the bottle **6** and, once being attached thereto, remains thereon until the bottle is completely empty and the owner removes the casing **11** by breaking the seal **16** and installing the casing onto a subsequently used full bottle. Similar casings are applied to all of the bottles available for use. Since the casings are all virtually identical, they can be interchangeably utilized.

Also pursuant to the invention, there is provided at each individual bar station a support frame **41** comprising an upright member terminating in an inclined or angled head **42** made up of a number of parts and particularly having an entrance portion defining an internal recess **43** with an opening **44** leading thereinto. Located within the recess **43** is a coil **46** of a solenoid designed when energized to generate a magnetic field within the recess **43**.

Spanning the separate parts of the support frame is a diaphragm **47** which overlies the projecting central button **48** of an electrical switch **49** mounted in the head **42**. The switch **49** is customarily provided with a rectifier **51** joined in suitable electrical circuitry **52** to a source **53** (FIGURE 4) of electrical power. One of the conductors **54** extending from the source **53** goes to one side of the switch **49**, while the other side of the switch is connected to the solenoid coil **46**. A conductor **56** leads from the solenoid coil through a timer **58**. A conductor **59** extends to a counter **61** and another lead **62** joins the counter to the source **53** of electricity.

In the operation of the structure, the timer **58** has been preset and cannot be tampered with. When a drink is to be dispensed, the particular bottle **6** selected is then withdrawn and is partially inverted to make the spout **21** substantially vertical over a receiving glass on the bar, and the tube **27** is introduced into the recess **43**. When the tube is almost fully home, the end of

the tube, through the diaphragm 47, actuates the stem 48 of the switch 49 and completes the electrical circuit.

As soon as the circuit is closed, the solenoid coil 46 is energized. This immediately sets up a local magnetic field permeating the tube 27 and effective upon the solenoid core 29 to draw the core into the coil. This not only compresses the spring 32, but particularly unseats the valve 22 and establishes communication between the inlet and the outlet of the liquid passage through the casing 11. This permits liquid to flow from the bottle through the spout 21, the volume of liquid leaving being replaced by an inflow of air through the passage 24.

When the time set by the timer 58 has elapsed, the timer interrupts the circuit, restoring it to its former condition, and permitting the counter 61 to be actuated once. Since the coil 46 is then deenergized, the spring 32 is effective to restore the solenoid core 29 to its former position, thus seating the valve 22 and stopping the further flow of liquor. The bottle is then withdrawn from the recess and the mechanism is ready for reuse. The circuitry is such that for repeated insertions of the tube 27 and repeated actuations of the switch 49, the counter 61 is similarly actuated so that an accurate tally of the number of drinks dispensed is kept. The timer is effective so that a standard amount of liquor is discharged for each actuation, being neither short nor over. The timer can readily be adjusted only by the owner in order to set the amount dispensed at each actuation. In this fashion, there is provided an improved liquid flow controller particularly for use in the surroundings described.

What is claimed is:

1. A liquid flow controller comprising a casing, means on said casing adapted to engage the neck of a bottle and defining an inlet passage, means on said casing defining an outlet passage meeting said inlet passage at a valve seat, a valve disposed in said casing and adapted to move onto and off of said valve seat, a magnetically permeable tube included in said casing and defining an extension thereof, a solenoid core secured to said valve and disposed within said permeable tube, a spring in said casing and urging said valve onto said seat, a support frame having a recess adapted to receive said tube, and a solenoid coil in said frame and surrounding said recess to affect said core magnetically when said coil is energized and said tube is in said recess to urge said valve off of said seat.

2. A liquid flow controller comprising a casing, means on said casing adapted to engage the neck of a bottle and defining an inlet passage, means on said casing defining an outlet passage meeting said inlet passage in a valve seat, a valve disposed in said casing and adapted to move onto and off of said valve seat, an air tube on said valve adapted to extend into said bottle and opening to the outside of said casing, a tube of magnetically permeable material included in said casing and extending therefrom, a solenoid core secured to said valve and movable within said tube, a spring urging said valve to move onto said seat, a support frame having a recess adapted to receive said tube, a solenoid coil in said frame and surrounding said recess, an electrical switch in said frame in the path of said tube entering said recess, and means for electrically connecting said switch and said coil to energize said coil when said tube is in said recess and to move said coil magnetically

to urge said valve off of said seat against the urgency of said spring.

3. A liquid flow meter as in claim 2 including a timer in said connecting means for deenergizing said coil after a predetermined time.

4. A liquid flow meter as in claim 2 including a counter in said connecting means for counting each actuation of said coil.

5. A liquid flow meter comprising a casing, means on said casing adapted to fit a bottle neck, means defining a flow passage through said casing from said bottle neck, a normally closed magnetically opened valve in said casing controlling flow through said passage, a frame, a solenoid coil on said frame, a switch on said frame for controlling said coil, and means on said casing for operating said switch when said valve is in the magnetic field of said coil.

6. A liquid flow meter as in claim 5 in which said valve includes an air passage between the inside of said bottle neck and the atmosphere.

7. A liquid flow controller as in claim 1 in which said spring is sufficiently strong to keep said valve onto said seat in all positions of said bottle.

8. A liquid flow controller comprising a casing, a cork-shaped end on said casing adapted to fit into the neck of a bottle, means in said casing defining a liquid passage therethrough from said end to a point of discharge, means defining a valve seat in said liquid passage, a valve in said casing and movable onto and off of said seat, means defining an air passage through said valve from the interior of said bottle to the atmosphere, a magnetically permeable tube forming part of and extending from said casing, a solenoid core movable within said tube, a diaphragm spanning the interior of said casing and secured thereto, means for fastening said core and said valve together with said diaphragm intervening, a spring in said tube bearing against said core and urging said valve onto said seat, a support frame having a recess therein, a solenoid coil on said support frame and surrounding said recess, a switch on said support frame and extending into said recess in the path of said tube, and means for electrically connecting said switch to energize said coil when said tube is initially introduced into said recess.

9. A device as in claim 8 in which a second diaphragm is secured to said support frame and intervenes between said switch and said tube.

10. A liquid flow meter for use on a bottle comprising one part mounted on said bottle and having a magnetically responsive valve for controlling flow from said bottle, and another part normally unconnected to said bottle and having a coil for generating a magnetic field to actuate said valve and having a switch physically actuated by said one part to energize said coil, said switch being in an electric circuit containing a timer for deenergizing said coil.

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