

[54] **DISCHARGE QUANTITY CONTROL
DEVICE**

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[51] Int. Cl..... **G01f 1/06**

[58] Field of Search **222/14, 16, 17, 20;
251/15, 48**

[56] **References Cited**

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[57] **ABSTRACT**

A mixing faucet feeds a fluid motor through a valve. The valve is closed in response to rotation of the fluid motor output shaft through a predetermined angle.

1 Claim, 4 Drawing Figures

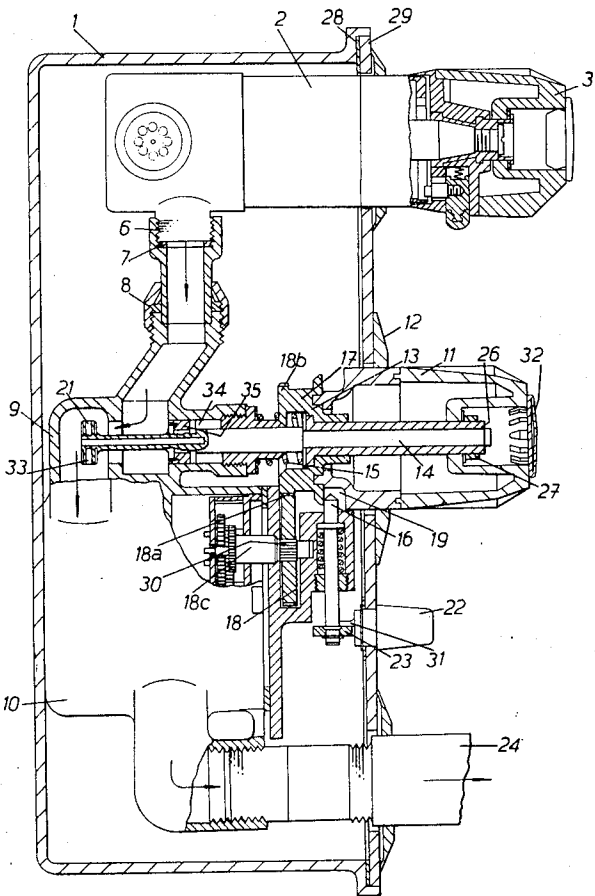


FIG. 1

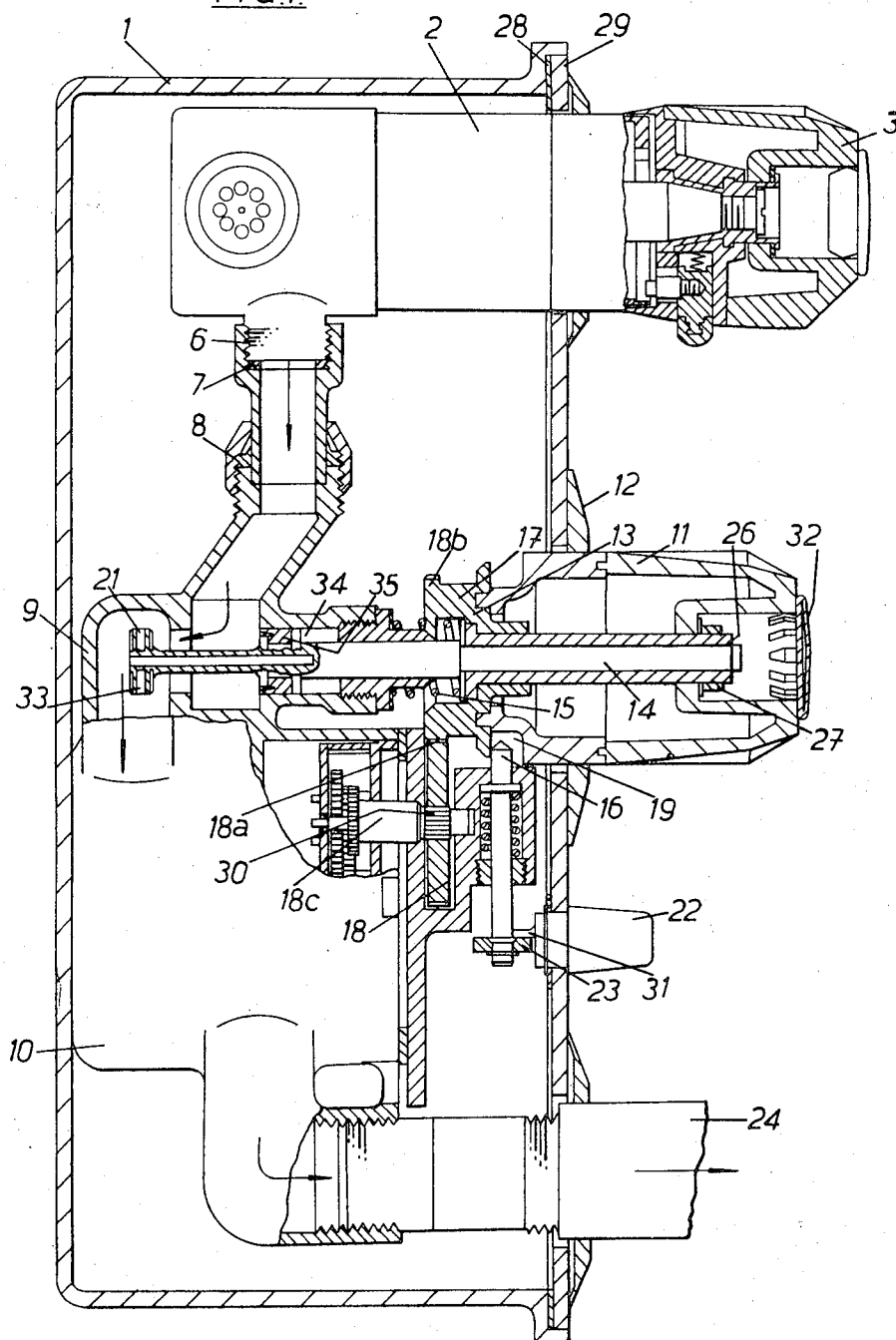


FIG. 2

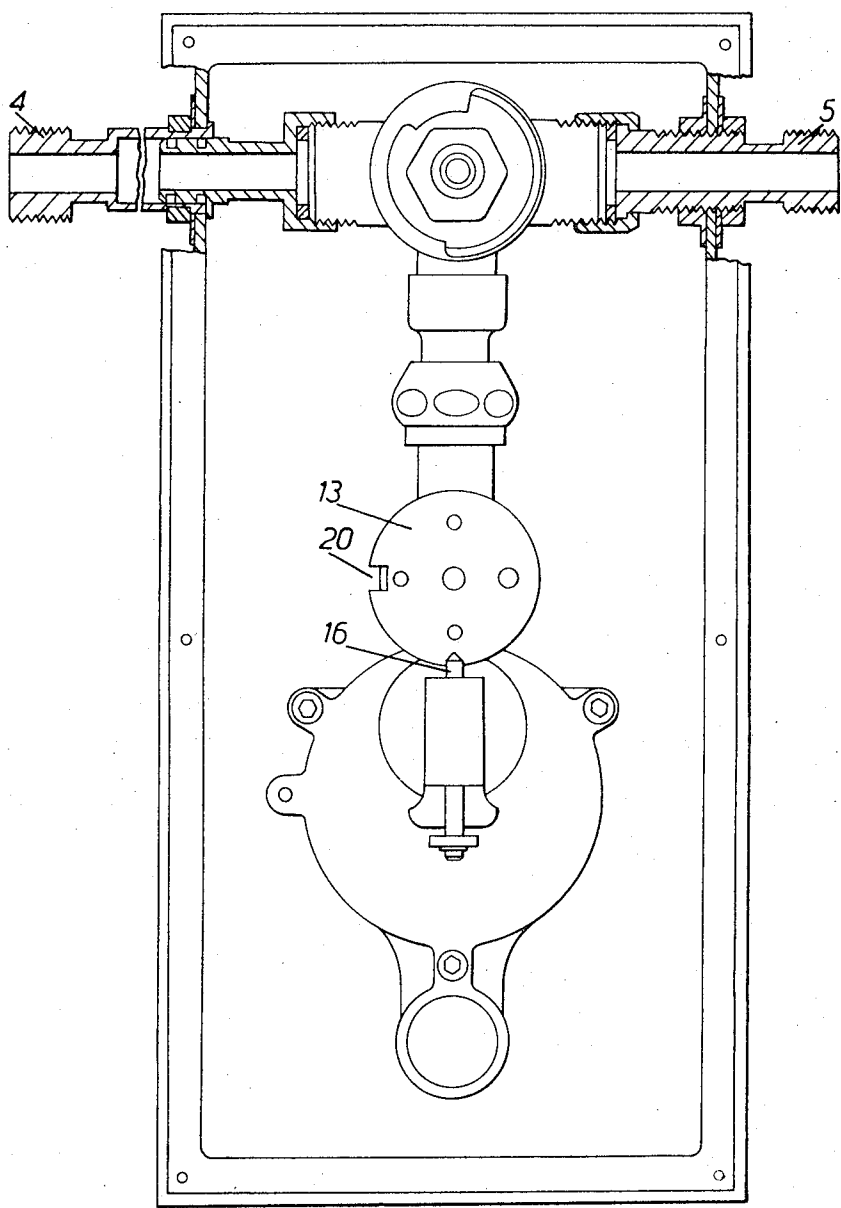


FIG. 3

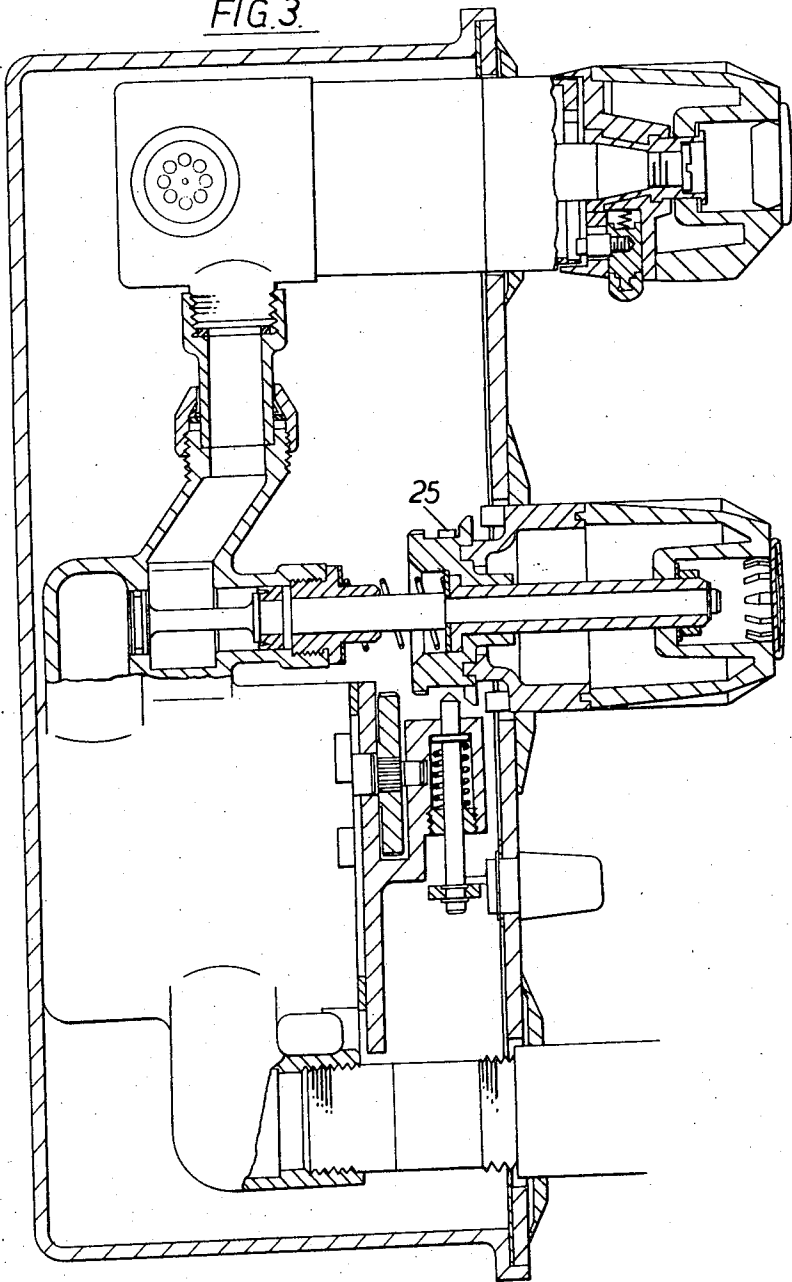
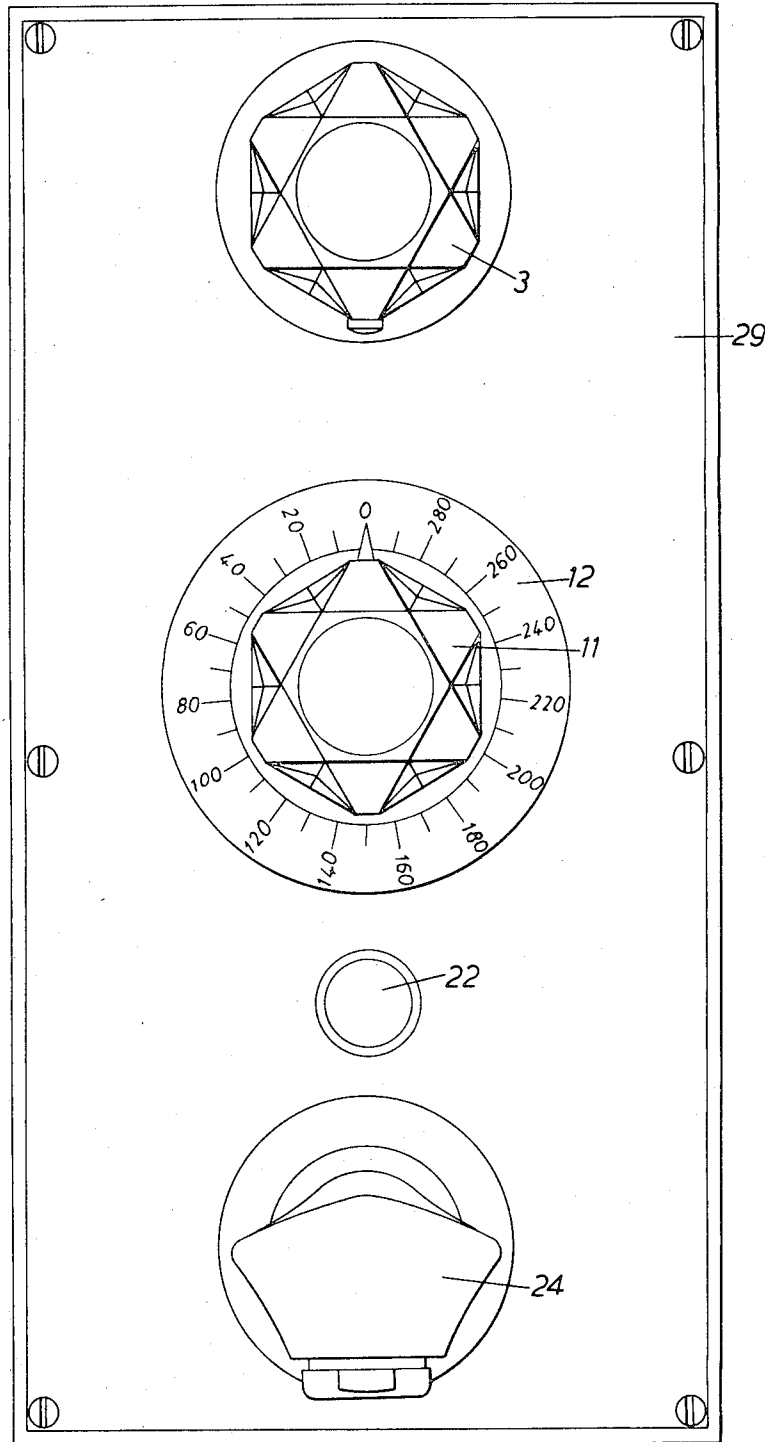


FIG 4.



DISCHARGE QUANTITY CONTROL DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a device which delivers a predetermined quantity of a liquid such as water, and more particularly, to a liquid discharge device with an automatic shutoff.

Not infrequently containers such as bathtubs are filled to an excessively high level or are even allowed to overflow because the shut-off element is not closed when the proper quantities of liquids have been discharged. Such events occur in particular at places like official baths, sanatoriums, hospitals, etc. To prevent such events from occurring, for example, in a bathtub, float valves, light barriers, optical or acoustical signals or combinations of these systems are used. So are timers. The discharge quantity is not only a function of time, it is also a function of the pressure of the liquid. Further, this pressure keeps changing. The setting of the timer, therefore, does not produce a total discharge which is desired.

SUMMARY OF THE INVENTION

The present invention fulfills a need in that it ensures accurate total discharge of a desired quantity of a liquid.

The invention includes the use of a valve having first and second positions, and a reset mechanism to move it to the second position from the first position.

In accordance with the foregoing, the valve may be manually set and locked in an open position, and, if desired, set to deliver a predetermined quantity of a liquid. The valve then may be closed by a reset mechanism which causes the valve to close when the total volume flow reaches said predetermined quantity.

The valve closing operation may be effected electrically by energizing or deenergizing a solenoid. However, the present invention may be practiced without the use of electricity. Note will be taken that electricity is not desirable in sanatory facilities.

The above-described and other advantages of the present invention will be better understood from the following detailed description when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings which are to be regarded as merely illustrative:

FIG. 1 is a vertical sectional view, partly in elevation, of one embodiment of the present invention;

FIG. 2 is a front elevational view, partly in section, of the embodiment shown in FIG. 1 with a casing cover plate removed;

FIG. 3 is a positional view similar to FIG. 1; and

FIG. 4 is a front elevational view.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1, a casing 1 is shown which may be located behind a plaster wall. Casing 1 is provided with a cover plate 29. A thermostat mixing faucet 2 is also provided. Faucet 2 has connections 4 and 5 shown in FIG. 2 for hot and cold water. Faucet 2 has a handle 3 for selection of mixed water temperature. Connection of the mixing faucet 2 to a control portion 9 of a conventional water meter arranged in a separate casing 10 is made

partially by means of a connection 6 coupled with the mixing faucet 2 by a seal 7. The faucet-to-control portion 9 connection is completed by means of a union 8.

The control portion 9 includes valve and O-ring seal portions 33 and 21, respectively, mounted on a valve rod 14. Valve rod 14 is constantly forced towards its closed position by a spring 15. Mounted on the valve rod 14 and forming an integral unit with the latter is a knob 11 with graduation marks thereon. Knob 11 thus provides means by which the desired discharge quantity is set. This quantity is determined by the amount of rotation thereof. A fixed scale ring 12 is also provided. As the knob 11 forces the valve rod 14 into valve open position, a conically pointed pawl pin 16 slides over a flange on a collar 17. A spring 30 thus yields. Pin 16 thus holds the valve in open position. In the position shown in FIG. 1, gear teeth 18b on collar 17 mesh with gear teeth 18a on a gear 18. A gear 18 is mounted on a shaft 18c coupled with the motion gear of the meter and projecting from the casing 10. The flow-meter may be of any conventional type to produce rotation of gear 18 at a rate directly proportional to the volume flow rate.

A conventional gear reducer is employed to produce a rate of rotation of gear 18 which is substantially less than the rate of rotation of the flow-meter output shaft, as is conventional. The flange of the collar 17 has a recess 20 on its periphery (see FIG. 2) through which the pawl pin 16 can pass. The angular position of recess 20 initially corresponds with the previously set discharge quantity. Upon slow rotation of the collar 17, recess 20 eventually reaches the position of the pawl pin 16. Upon this occurrence, the valve rod 14 and knob 11 are released, the spring 15 forcing both back to the closed position. As a result of an auxiliary piston acting on a piston chamber 34 with bore 35, a slow, smooth return movement of the valve rod is ensured. The discharge operation is now complete. The drive of collar 17 from the flowmeter may be reduced to an extent such that a maximum discharge quantity will not require more than one rotation of the knob 11, if desired. It is evident that with a maximum discharge quantity of, say, 10 litres, the transmission ratio must be different from what it would be for a maximum quantity of, say, 200 litres.

Where one and the same discharge quantities are regularly required, such as in hospitals for tub filling, exact resetting on the setting handle can be dispensed with to permit mechanical action without attention. Toward this end, the invention provides for a screw-type stop 25, as shown in FIG. 3. Stop 25 is provided on the mean periphery of the collar 17 to ensure that the knob can only be rotated to this stop. With the help of several threaded bores on the periphery of the collar 17, the screw stop 25 can be used at different angular positions. For stop changes in such a case, it is, therefore, necessary only to remove a cap 32, a snap ring 26 and knob 11 from the valve rod 14.

It may be desirable to interrupt the discharge operation before the previously set quantity has been discharged. In order to accomplish this, the present invention provides an interruption button 22. This axially fixed, but rotatable button has an eccentric pin 31 which can make contact with a disc 23 fixed relative to the pawl pin 16. Upon rotation of the interruption button 22, the eccentric pin 31 moves the pawl pin 16

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withdrawing it from the position shown and as viewed in FIG. 1. In this way, the collar 17 previously locked by the pawl pin 16 is released and the valve 33/21 forced to closed position under the pressure of spring 15.

What is claimed is:

1. Fluid metering apparatus comprising: a valve body having an inlet and an outlet; a valve guided for movement in said body in a manner such that said valve may be moved to first and second positions to open and to close, respectively, communication between the inlet of said body and the outlet therefrom; a device connected to said valve body in a manner to receive the fluid passing therethrough, said device having a mechanism actuable to move said valve to said second position when a predetermined volume of water has passed through said device; said valve being a poppet valve having a stem, a handle rotatable on said stem but fixed axially thereon, a collar fixed relative to said handle, said collar having a first set of gear teeth therearound,

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said device including a fluid motor, said fluid motor having an output shaft which rotates at an angular velocity directly proportional to the volume rate of fluid flow through said valve, said shaft having a gear fixed relative thereto with a second set of gear teeth therearound, a spring to bias said collar to a valve closing position, said collar having a notched flange, spring biased detent means, said flange being movable past said detent means to remove said detent means and allow it to snap back behind said flange and hold said valve in open position, said first set of gear teeth being contemporaneously movable into mesh with said second set thereof, said detent means falling through said flange notch and allowing said valve to close when said gear has rotated through a predetermined angle, and manual means to withdraw said detent means and to allow said collar to snap back and close said valve at any arbitrary time.

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