June 26, 1962 A. F. M. BLANCHET 3,040,930

APPARATUS FOR MEASURING AND DISPENSING LIQUIDS

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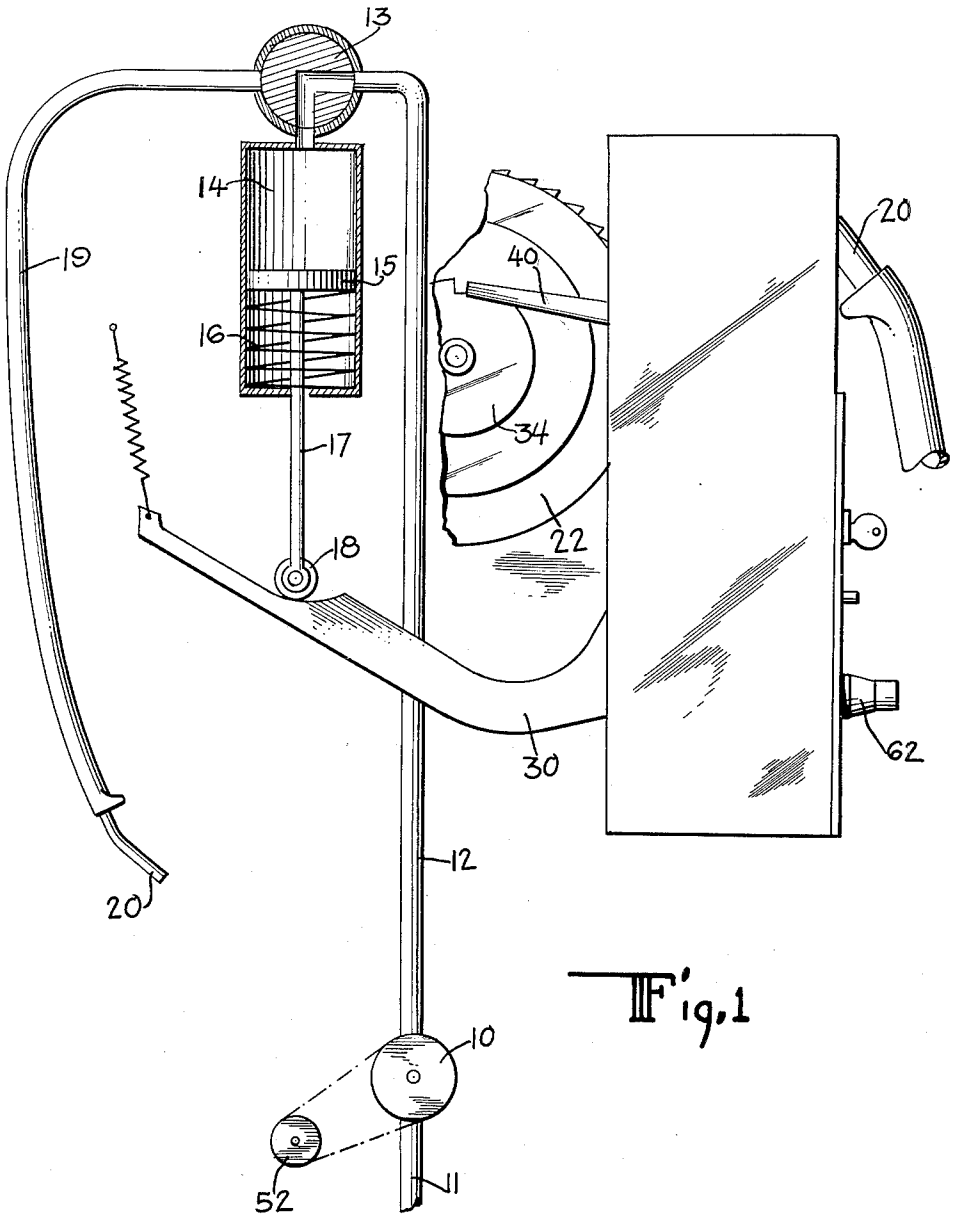


Fig. 1

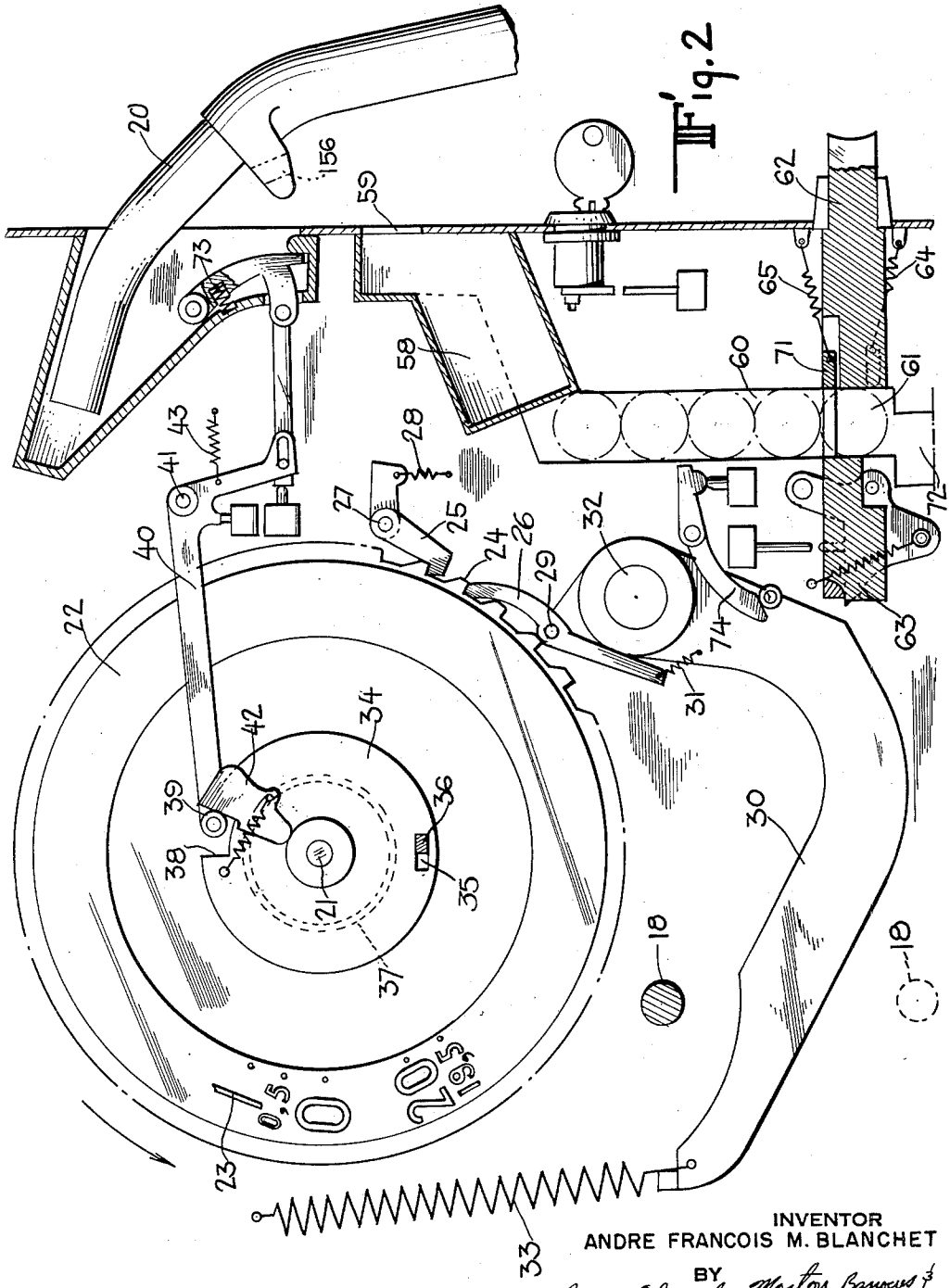
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APPARATUS FOR MEASURING AND DISPENSING LIQUIDS

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Fig. 2



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APPARATUS FOR MEASURING AND DISPENSING LIQUIDS

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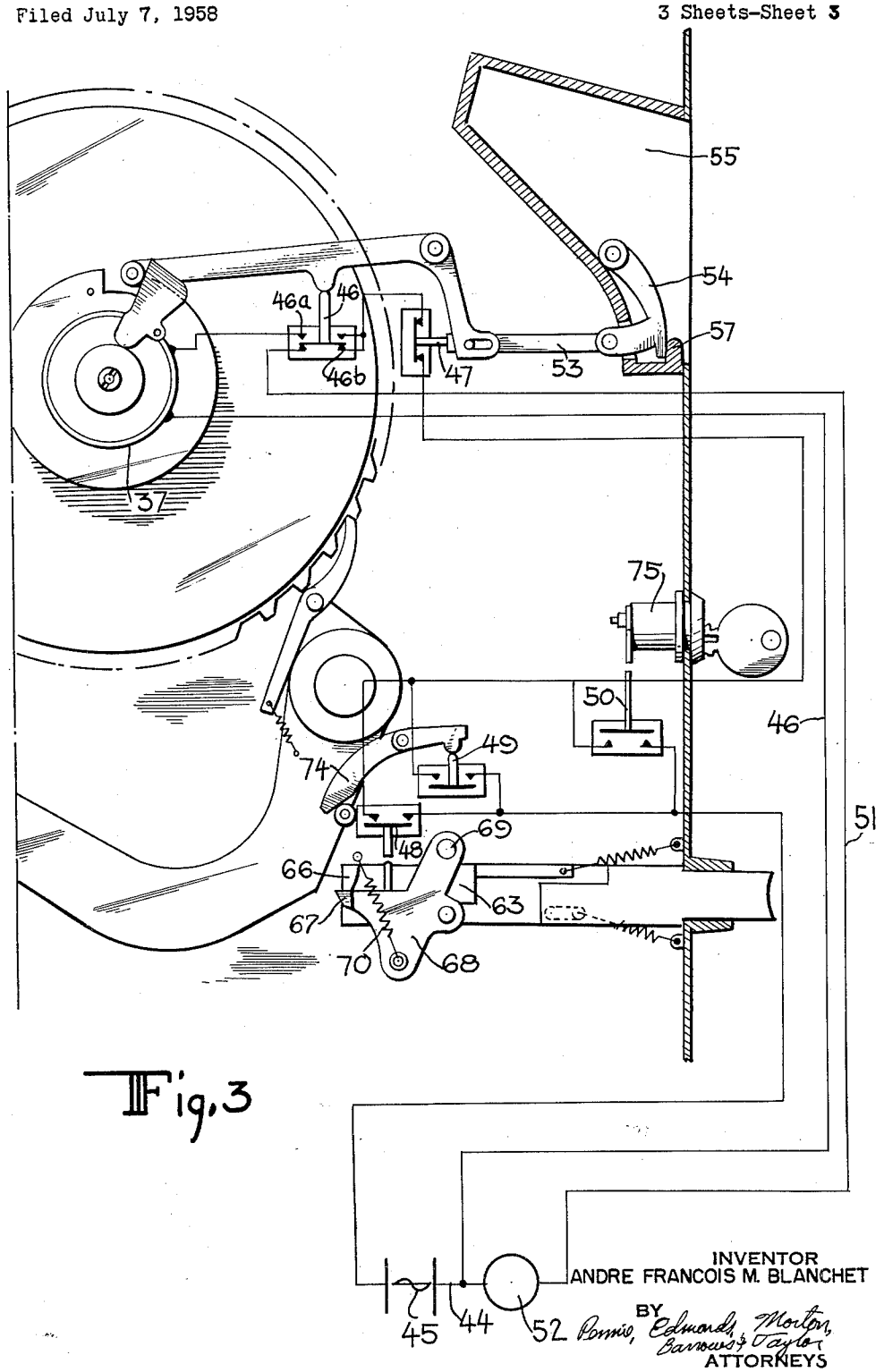


Fig. 3

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APPARATUS FOR MEASURING AND DISPENSING LIQUIDS

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6 Claims. (Cl. 222—2)

The present invention relates to apparatus for dispensing liquids, such as gasoline, and more particularly to a novel and improved apparatus for dispensing measured amounts of gasoline upon insertion of a token in a coin controlled mechanism.

One of the features of the invention resides in the provision of a gasoline dispensing apparatus which, upon insertion of a coin, resets an indicator to zero and then commences to deliver a measured quantity of gasoline, as determined by the setting of the apparatus. On separate occasions of use, the apparatus resets to zero prior to delivering the desired quantity of gasoline. However, a single operator of the apparatus may effect actuation thereof several times in succession without resetting the indicator to zero, whereby a totalizing of the plurality of units delivered may be realized.

In general, the new apparatus comprises an electrically operated delivery system controlled by a plurality of switches, at least one of which is actuated by removal of the delivery nozzle from its hanger and at least another of which is actuated by a coin controlled mechanism. Upon removal of the nozzle from its hanger and actuation of the coin controlled mechanism, the delivery indicator resets to zero, following which delivery of the desired quantity is effected. Further actuations of the coin controlled mechanism without, however, returning the nozzle to its hanger result in the delivery of successive unit quantities without returning the indicator to zero. The operating mechanism and control circuitry of the new apparatus, while providing for substantially automatic dispensing of gasoline or other liquids, is relatively simplified and foolproof in nature, enabling the dispensing apparatus to be left unattended. However, means are advantageously provided for rendering the coin controlled system ineffective, whereby the apparatus may be operated in a more or less usual manner by an attendant.

For a further discussion of the above and other novel and advantageous features of the invention, reference should be made to the following detailed description and to the accompanying drawings, in which:

FIG. 1 is a simplified representation of a typical gasoline delivery system incorporating the control system of the invention;

FIG. 2 is a more detailed schematic representation of control mechanism incorporated in the system of FIG. 1; and

FIG. 3 is a more detailed schematic representation of the new control system, including electrical circuitry incorporated therein.

Referring now to the drawings, and initially to FIG. 1, the numeral **10** designates a liquid pump which connects through a conduit **11** to a supply source (not shown) and discharges into a pressure line **12**. The pressure line **12** is connected to a three-way valve **13** which, in the position of the valve illustrated in FIG. 1, connects the pressure line to a cylinder **14**. A piston **15** is urged upwardly in the cylinder by a spring **16** and has a piston rod **17** mounting a cam follower **18** at its lower end.

When liquid under pressure is delivered into the cylinder **14**, the piston **15** is depressed, compressing the spring **16**. When the valve **13** is rotated clockwise one quarter turn, which may be done manually or by automatic means, the

cylinder **14** is placed in communication with a delivery line **19** leading to a discharge nozzle **20**. Pressure is thus released from the area above the piston **15**, and the piston is moved upwardly by the spring **16**, discharging a measured quantity of liquid through the line **19** and nozzle **20**.

The control mechanism of the invention comprises a shaft **21**, upon which is loosely mounted an indicator wheel **22**, the wheel being provided with suitable indicia **23** thereon. The outer periphery of the indicator wheel is provided with teeth **24** engaged by a ratchet **25** and pawl **26** respectively. The ratchet **25** is pivoted on a pin **27** and urged in a clockwise direction by a spring **28**, whereby to normally engage the teeth **24** and prevent clockwise rotation of the indicator wheel **22**. The pawl **26** is pivoted on a pin **29**, mounted on a lever **30** to be described, and is urged to pivot in a counterclockwise direction by a spring **31**.

As illustrated in FIGS. 1 and 2, the lever **30**, which may be referred to as the control lever, is pivoted on a shaft **32** and has a portion underlying the cam follower **18** on the end of the piston rod **17**. Accordingly, when the piston **15** is depressed, as by the delivery of liquid under pressure into the cylinder **14**, the control lever **30** pivots counterclockwise, carrying the pawl **26** along the periphery of the indicator wheel **22**, into engagement with an adjacent tooth. At an appropriate time, as will be further explained, downward movement of the piston **15** is halted and delivery of the liquid through the nozzle **20** is initiated. This is accompanied by raising of the piston **15**, permitting the control lever **30** to be drawn upwardly by a spring **33**. The pawl **26** is thereby carried upwardly, shifting the indicator wheel **22** in a counterclockwise direction, to indicate the delivery of a unit quantity of liquid.

Resetting of the indicator to zero is effected by a cam **34** fixed to the shaft **21** and carrying a lug **35** adapted to engage an abutment **36** carried by the indicator wheel **22**, the physical interconnection between the abutment **36** and wheel **22** not being illustrated in the schematic representation. The shaft **21** and cam **34** are driven by a reset motor **37**, illustrated schematically, and are arranged to be rotated through one complete revolution during a resetting operation.

As shown best in FIG. 2, the cam **34** has a notch **38** therein adapted to receive an arm **39** of a bell crank lever **40**, when the cam is in a "zero" position. At a desired time, the lever **40** is pivoted clockwise, about its axis **41**, raising the arm **39** and permitting a spring urged shutter **42** to block the cam opening **38**. Thereafter, even though the bell crank lever **40** is released, the arm **39** is prevented from entering the opening **38**. Subsequently, when the motor **37** is energized to rotate the cam **34** in a counterclockwise direction, the abutment **36** will be picked up by the lug **35** and the cam and indicator wheel will be caused to rotate counterclockwise in unison. As the cam **34** approaches the zero position, the shutter **42** is picked up by the arm **39** and held in the position illustrated in FIG. 2 while the cam and indicator continue to rotate. The cam opening **38** is thereby exposed, permitting the lever **40** to pivot counterclockwise under the influence of a spring **43**, whereby the cam is again locked in its zero position. And, when the mechanism is thus conditioned, the indicator wheel **22** is in a position to indicate "zero," prior to the delivery of one or more units of liquid.

As shown in FIG. 3, one terminal of the reset motor **37** is connected to one side **44** of an electrical supply source **45**, through a conductor **46**. The other terminal of the reset motor is connected to the opposite side of the source **45** through a series of control switches **46–50**. Upper contacts **46***a* of the switch **46** are connected in series with the switch **47**, while the switches **48–50**, all three connected in parallel, are as a bank connected in series

with the switches 46, 47. Thus, upon closure of any one of switches 48–50 and closure of the switch 47 as well as the contacts 46*a*, the energizing circuit for the reset motor 37 is completed. The switch 46 also has lower contacts 46*b* which, when closed, complete a circuit through conductor 51 to a motor 52 which drives the liquid pump 10.

In the illustrated apparatus, the switch 47 is actuated by a link 53 connected to a lever 54 provided in the nozzle hanger 55. Thus, when the nozzle 20 is hung up after use, as by placing a reset lug 56 upon a projection 57, the lever 54 is pivoted clockwise, driving the link 53 to the left and opening the switch 47. Accordingly, when the dispensing nozzle 20 is hung up after use, the circuits to the reset and pump motors 37, 52 are opened, preventing operation of either motor.

The switch 46 is arranged so that one or the other of the contacts 46*a*, 46*b* thereof will be closed at any time. Thus, the reset and pump motors 37, 52 may be energized alternatively, but not at the same time.

In accordance with one aspect of the invention, energization of the control apparatus is effected by means of a coin controlled device, shown best in FIG. 2. The device includes a coin chute 58 adapted to receive coins inserted through a slot 59 and to discharge the coin or coins into a channel 60. A coin received in the channel 60 is stopped at a position, indicated at 61, between a manually operable plunger 62 and a coin actuated latch 63. The latch 63 and plunger 62 are urged by springs 64, 65 respectively into the positions shown in FIG. 2, in which the separate members provide a space just wide enough to receive the coin. With the coin in the operative position 61, the latch 63 is effectively connected to the plunger 62, whereby the latch is shifted to the left when the plunger is depressed.

As shown best in FIG. 3, the latch 63 is provided at its inner or left hand end with an arm 66 which normally overlies a projection 67 on a lever 68. The lever 68 is pivoted at 69 and is urged in a clockwise direction by a spring 70.

Advantageously, when the plunger and latch are shifted to the left, a coin being entrained therebetween, the arm 66 clears the end of the projection 67 to a limited extent, sufficient to permit the spring 70 to urge the lever upwardly, in a clockwise pivoting direction. The projection 67, acting on the curved or inclined surface of the arm 66 forces the latch 63 inwardly, independently of the plunger 62, so that a slotted portion 71 of the latch closes off the coin channel 60. When the parts are thus positioned, the coin is permitted to drop into a receiver 72. At the same time, the upward pivoting movement of the lever 68 causes the latch 63 to be locked in its extended position and causes the switch 48 to be closed.

To initiate a delivery operation, the nozzle 20 is removed from its hanger 55, permitting the lever 54 to pivot counterclockwise under the action of a spring 73. This not only effects closure of the switch 47 but releases the bell crank lever 40 and permits counterclockwise pivotal movement thereof. The arm 39 of the bell crank lever is prevented from entering the cam opening 38, however, by the presence of the shutter 42, which closes the cam slot on the previous occasion of the hanging up of the nozzle 20. Accordingly, the left hand portion of the crank 40 is in its upper position, so that contacts 46*a* are closed while contacts 46*b* are open.

If, subsequent to the operations recited in the foregoing paragraph, the coin operated mechanism is actuated in the manner previously described, the switch 48 will be closed to complete a circuit through switches 48, 47 and contacts 46*a* to the reset motor 37. The reset motor is thereby energized and drives the cam 34 through a single revolution, resetting the indicator wheel 22 to zero from any position.

The reset phase of the operation is terminated by the entry of the crank arm 39 into the cam slot 38, opening the contacts 46*a* and closing the contacts 46*b*. This substantially simultaneously de-energizes the reset motor 37 and energizes the pump motor 52, initiating the delivery of liquid under pressure to the measuring cylinder 14.

As the piston 15 is depressed, pivoting the control lever 30 in a counterclockwise direction, a switch lever 74 is released to permit the closing of switch 49. Continued pivoting movement of the lever 30 causes the lever 68 to be engaged and depressed, eventually releasing the latch 63, which may then return to its normal position as illustrated in FIG. 2. The switch 48 is thereby open, of course, but the pump motor circuit remains closed through the now closed switch 49.

When the measuring cylinder 14 is completely filled with liquid, further flow of liquid from the pump 10 may be returned, as by a suitable release valve (not shown) and/or the three-way valve 13 may be shifted by automatic or manual means. In either case, the valve 13 is shifted to effect delivery of the liquid through the nozzle 20, the delivery being caused by the upward movement of the piston 15 under the action of the spring 16.

As the piston rod 17 moves upwardly, the control lever 30 pivots clockwise, rotating the indicator wheel 22 through a predetermined increment representative of the unit volume dispensed (e.g., one-half gallon). Upon full upward or clockwise movement of the lever 30, the switch 49 is opened to interrupt the pump motor circuit and terminate the operation.

If the user desires additional unit volumes of liquid, he may re-actuate the coin controlled mechanism to close the switch 48 and initiate the cycle described above, avoiding, however, the phase of the cycle in which reset of the indicator is normally effected. In this respect, once the contacts 46*b* are closed, they remain closed, and the contacts 46*a* remain open, until the bell crank is actuated by replacement of the discharge nozzle on its hanger.

Advantageously, the control system is provided with a master switch, represented by the switch 50, which is in parallel with the switches 48, 49 of the automatic mechanism, whereby the dispensing apparatus may be operated in the usual manner (i.e., by an attendant) when desired. Thus, a suitable lock 75 may be provided for closing the switch 50. The apparatus will then actuate automatically, upon removal of the dispensing nozzle from its hanger, to initiate the reset and measuring phases of a delivery operation. Actual delivery is effected in the usual way, by actuation of the valve 13 from the measuring position to the delivery position.

One of the practical advantageous features of the new apparatus resides in the fact that the apparatus may be used in a more or less conventional way, during normal business hours, and may be instantly converted for coin operation as when an operator temporarily closes his station. In addition, the apparatus is especially suited for use at self-service stations, which are normally operated with few, if any, attendants.

It should be understood that the specific apparatus herein illustrated and described is intended to be representative only, as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly, reference should be made to the following appended claims in determining the full scope of the invention.

I claim:

1. Apparatus for dispensing a liquid in amounts determined by the insertion of a coin or coins, which comprises indicator means operable in accordance with delivered quantities of liquid, repetitively actuable flow control means for effecting liquid flow in response to insertion of coins, means including said repetitively actuable flow control for effecting reset of said indicator means, and disabling means operative normally to render the reset means ineffective after initiation of liquid delivery and operative selectively to render the reset means effective, said disabling means including an electrical control circuit for rendering effective the reset means, first

switch means actuated in response to delivery of unit volumes of liquid for closing said circuit, and second switch means operable selectively to maintain said circuit open to provide for the delivery of a plurality of unit volumes without effecting reset.

2. A coin actuated liquid dispensing apparatus comprising a discharge line, a measuring cylinder in the discharge line, a piston in the cylinder, means for filling the cylinder with liquid and displacing the piston, means for effecting delivery by causing return movement of the piston, a first switch for initiating the filling and discharge of the measuring cylinder, coin actuated means for closing the first switch, a second switch in parallel with the first switch, and means including the piston for closing the second switch and opening the first switch in sequence during a delivery operation and for opening the second switch at the end of a delivery operation.

3. The apparatus of claim 2, in which, the coin actuated means comprises a plunger element adapted for manual actuation upon insertion of a coin of proper denomination, and a switch actuating element movably mounted on the plunger element, the switch actuating element being movable independently of the plunger element to permit opening of the first switch regardless of the position of the plunger element.

4. Apparatus for dispensing of liquid comprising, flow control means operable upon each actuation thereof to effect delivery of a predetermined unit quantity of liquid, repetitively operable control means for actuating said flow control means, an indicator wheel mounted for rotation on a shaft, said wheel being associated with said flow control means for indicating the quantity of liquid delivered by operations of said flow control means, reset means including said repetitively operable control means for resetting said indicator wheel to zero upon actuation of said repetitively actuable control means, and controllable means for selectively disabling said reset means, said reset means comprising a cam rotatable with said shaft and having means engageable with the indicator wheel during the course of a revolution to effect rotation of the cam and wheel in unison, said disabling means comprising a lever engageable with said cam to hold it in a predetermined position, and said reset means further including means for temporarily disengaging said lever and cam and means for rotating said cam through a single revolution.

5. Apparatus for dispensing liquid in response to the insertion of a coin or coins, said apparatus comprising

liquid delivery measuring means, a pump for supply of liquid to said delivery measuring means, a pump motor coupled to said pump, indicator means having a zero position and plural non-zero digital positions, said indicator being movable from digital position to digital position upon delivery of increments of liquid through said liquid delivery measuring means in response to the insertion of coins, means to reset said indicator means to zero position, a coin-operated switch closable upon insertion of a coin or coins irrespective of the position of said indicator, a pump motor switch in series with said coin-operated switch and with said pump motor, means to open said pump motor switch, and means to close said pump motor switch only upon resetting of said indicator to zero.

6. Apparatus for dispensing liquid in unit volumes in response to the insertion of a coin or coins, said apparatus comprising unit volume measuring means, a pump operable to fill said measuring means, a pump motor coupled to said pump, indicator means having a zero digital position and plural unit volume digital positions, said indicator means being movable from position to position in response to the delivery of unit volumes from said measuring means, a delivery nozzle, a delivery nozzle support, a reset motor coupled to said indicator, a coin-operated switch closable upon insertion of a coin or coins irrespective of the position of said indicator, a delivery nozzle-operated switch closable upon removal of said nozzle from said support irrespective of the position of said indicator, said coin- and nozzle-operated switches being connected in series, a reset motor switch in series with said coin- and nozzle-operated switches and with said reset motor, and a pump motor switch in series with said coin- and nozzle-operated switches and with said pump motor, said reset motor switch being closed upon restoration of said nozzle to said support and remaining closed notwithstanding removal of said nozzle from said support until said indicator is reset, said pump motor switch being closed upon resetting of said indicator after removal of said nozzle from said support and remaining closed until said nozzle is restored to said support.

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