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LIQUID DISPENSING CONTROL DEVICE

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FIG. 1

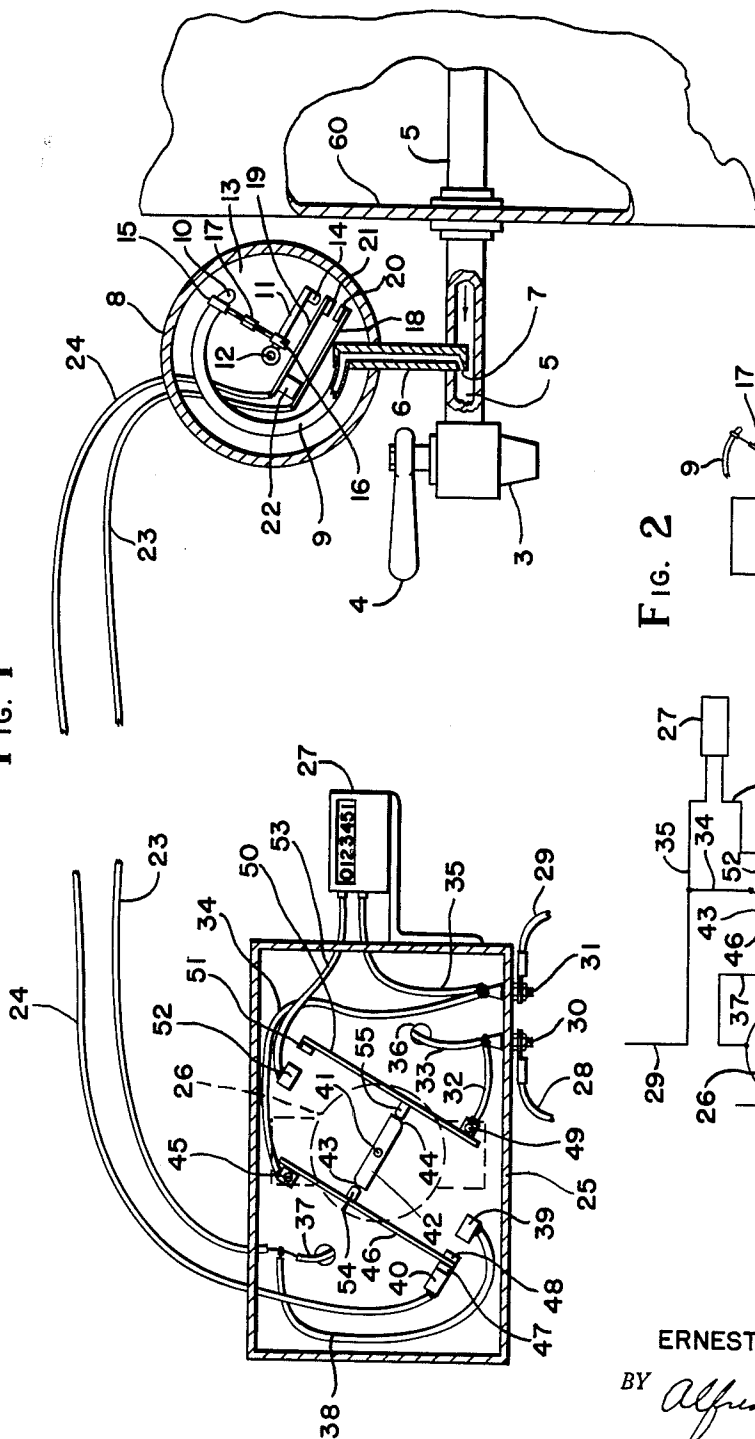
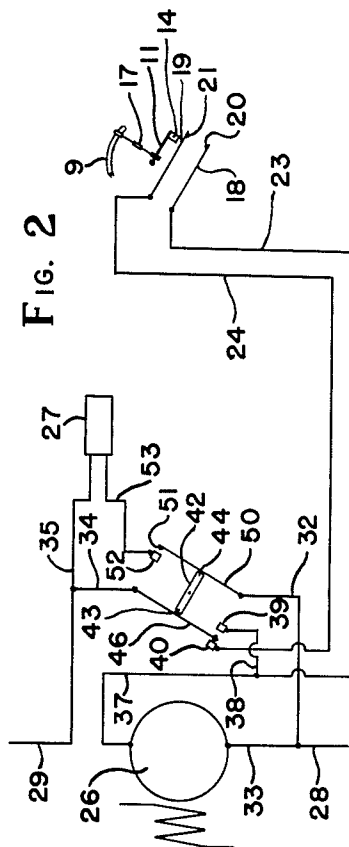


FIG. 2



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LIQUID DISPENSING CONTROL DEVICE

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10 Claims. (Cl. 235—92)

My invention relates to controlling means for liquid dispensing devices, and more particularly to time and fluid pressure controlled means for counting the dispensation of predetermined quantities of liquid.

It is a purpose of my invention to provide means for controlling the dispensation of a liquid through a faucet or similar spigot or valve that is ordinarily operated more than once in order to fill a glass or similar container, such as is commonly the case with faucets used in the drawing of beer and similar liquids. In order to keep an accurate count of the number of containers or glasses of uniform capacity that are withdrawn through the valve or faucet it is necessary that the counting means be operated by the initial opening of the valve or faucet to draw the desired quantity of liquid into the glass or container, but to so control counting device that it will not operate to count again until a certain time interval has elapsed in which sufficient time is allowed for withdrawing the quantity of liquid necessary to fill the container, but not sufficient to fill another container or fill a substantial fraction of such another container.

In the dispensation of beverages the operator of the dispensing apparatus is enabled under ordinary circumstances to withdraw liquid in such a manner that the glass or similar container in which the beverage is filled is incompletely filled and in that way additional glasses or containers of the liquid can be obtained from the container from which these are withdrawn above those that the container would provide if each glass were properly filled, enabling the person operating the dispensing apparatus to not only perpetrate a fraud on the customer, but on the person by whom he is employed due to this possibility of operating the dispensing faucet in the above referred to manner.

By my controlling means this possibility is completely avoided, as, if the operator of the dispensing apparatus does not operate the faucet properly the time control of the apparatus will prevent him or her from gaining anything by not providing a full glass of the beverage dispensed for the customer. While the time control means provides ample time to obtain a full glass of the beverage for the customer, it prevents any possibility of obtaining any appreciable amount additional thereto by maneuvering the faucet during said time interval, thus discouraging any attempt to get more than one incompletely filled glass of the beverage through the faucet.

In order to accomplish this purpose I have provided means for operating a counter that comprises rotatable means that is actuated by a constant speed motor and means for setting the constant speed motor in operation by means that is responsive to variations in the fluid pressure in the line leading to the faucet, in combination with means for continuing the operation of the motor initiated by the fluid pressure responsive means for an interval such that any opening and closing of the faucet during that interval will have no further effect on the operation of the motor until said time interval has elapsed.

It is a further purpose of my invention to provide

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switching means in a counter circuit that is operated by the rotatable actuating means to close the counter circuit once during each such time interval to thus cause the counter to be operated only once during each such time interval controlled by one starting operation of said motor as the result of the initial opening of the faucet to reduce the pressure in the liquid line.

More specifically my invention comprises a counter and means for operating the counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, switching means actuated by pressure in the liquid line determining the starting of the motor and short circuit means for this pressure responsive switching means that is operated by the rotatable means to keep the motor circuit closed for a predetermined time interval, or in other words, for a predetermined arcuate movement of the motor shaft or of the rotatable actuating means, said rotatable actuating means also serving to close the counter circuit once during that interval in order to operate the counting means only once during that interval.

Other object and advantages of my invention will appear as the description of the drawings proceeds. I desire to have it understood, however, that I do not intend to limit myself to the particular details shown or described, except as defined in the claims.

In the drawings:

Fig. 1 is a view partly in elevation and partly in vertical section of my improved liquid dispensing control apparatus, the conductors leading from said apparatus and between the operating parts thereof being partly broken away, and

Fig. 2 is a circuit diagram of my improved controlling apparatus.

Referring in detail to the drawings, in Fig. 1 is shown a faucet 3, which is provided with any suitable operating handle 4 and which dispenses liquid fed thereto by a liquid line 5 that leads to said faucet from any suitable means, such as a cooling apparatus 60, in which a suitable container for the liquid to be dispensed may be contained. Extending through and fitted in liquid tight relation in an opening in said liquid line 5 is a tube 6 that is provided with a reduced passage 7 leading into the liquid passage 5 to serve in the manner of a venturi.

Said tubular member 6 leads into any suitable casing 8, which has contained therein a tube 9 of flexible metal, which is curved on an arc and which will change in curvature, dependent upon the pressure of the contents thereof, in a well known manner, so that the end 10 thereof will move outwardly radially when pressure in the flexible tube 9 is increased, and will move radially inwardly when pressure in the tube 9 is decreased. Obviously opening of the faucet 3 will cause a reduction of pressure in the tubular member 9 and cause the end 10 thereof to move radially inwardly, said tubular member 9 being sealed at the end 10 thereof so that it is liquid tight and has a liquid tight connection with the tubular member 6.

Mounted within the casing 8 is a switch operating member 11, which is pivotally mounted at 12 in any manner on a side wall 13 of said casing. The switch operating member 11 preferably has a member 14 of insulating material mounted thereon and projecting downwardly therefrom in the manner shown in Fig. 1. Said operating member 11 further has a suitable adjustable connection provided between the same and the tubular member 9 adjacent the end 10 thereof, which adjustable connection may comprise a suitable sleeve 15 extending around the tubular member 9 and a similar sleeve 16 extending around the switch operating member 11, with a turnbuckle connection 17 provided between said members 15 and 16 so as to adjust the same to have the

member 14 on the switch operating member 11 in proper position so that when the faucet 3 is closed the switch operating member will not operate to close the switch to be described below.

Mounted within the casing 8 is a switch comprising a pair of flexible mounting members 18 and 19, which have the contact members 20 and 21 provided thereon, and which are mounted on a suitable insulating block 22 that is mounted in a suitable manner in the casing 8 and are normally spaced apart. The conductors 23 and 24 extend, respectively, from the flexible mounting members 18 and 19, which are made of suitable flexible conducting material, such as flexible metal.

It will accordingly be seen that if the faucet 3 is opened a reduction in pressure in the tube 9 will cause the switch operating member 11 to be moved downwardly and cause the member 14 to engage with the contact 20 and thus connect the conductors 23 and 24 with each other. This operation of the switching means will take place each time that the faucet 3 is opened and the switching means above described will be opened to disconnect the members 23 and 24 from each other each time that the faucet 3 is closed.

Mounted at any suitable point, which may be remote from the faucet 3, is a housing 25, on the back of which the motor 26 is mounted. Within the housing are suitable switching means for controlling the connection of a counter 27 with line conductors 28 and 29 and for controlling the operation of the motor 26.

The line conductors 28 and 29 are connected with suitable terminals 30 and 31 that have the conductors 32 and 33 and the conductors 34 and 35 connected therewith inside the housing 25. The conductor 33 extends directly to one terminal of the motor 26, as will be obvious from the circuit diagram shown in Fig. 2, said conductor extending through an opening 36 in the housing 25 and around the back of the same to said terminal of the motor.

A conductor 37 extends from the other terminal of the motor 26 and is connected, as will be obvious from Figs. 1 and 2, with the conductor 23 extending from the switch element 18 as well as with the conductor 38 that extends from a stationary contact 39 provided in the housing 25 and insulated therefrom. The conductor 24 extends to a similar stationary contact 40 in the housing 25, similar insulatingly mounted therein.

Mounted within the housing 25 on the shaft 41 of the motor 26 so as to rotate therewith is a switch actuating member 42, which has a pair of arms extending in diametrically opposite directions from the shaft 41, said arms terminating in ends 43 and 44 that are somewhat rounded so as to provide for the camming outwardly of switching elements that are actuated thereby in a manner to be described below.

The conductor 34 extends to a terminal 45, which is in conducting relation to a flexible switching element 46, which is preferably made of suitable flexible metal and which carries a pair of contacts 47 and 48 on opposite sides thereof. Said flexible member 46 is so mounted that said contacts 47 and 48 are located in position between the stationary contacts 39 and 40 and said switching element is movable between said stationary contacts 40 and 39 in a manner to be described below. The conductor 32 extends to a terminal 49, which is electrically conductively connected with the flexible switching element 50, which is made of suitable flexible metal conducting material, and which has a contact member 51 thereon that is adapted to engage a stationary contact member 52, from which a conductor 53 leads to the counter 27.

A block of insulating material 54 is mounted on the flexible switching element 46 and a block of insulating material 55 is mounted on the flexible switching element 50. Said insulating blocks 54 and 55 are mounted in the path of rotation of the switch actuating member

42 so that the ends 43 and 44 thereof will engage with said insulating members 54 and 55 to cam these away from the axis of rotation of said actuating member 42.

When the faucet 3 is closed, the parts are either in the position shown in Fig. 1 or with the switch actuating member 42 in a position in which the ends 43 and 44 thereof are reversed. However, this is immaterial, as the same sequence of operations will take place no matter whether the end 43 is in engagement with the insulating block 54 or the end 44 is in engagement therewith.

Upon opening the faucet 3 the curvature of the tube 9 will change so that the insulating member 14 will engage the flexible switching element 19 and cause the circuit to be closed between the conductors 23 and 24 by engagement of the contact elements 20 and 21. As a result a circuit will be completed from line conductor 29 through the conductor 34 to the switching element 46, the stationary contact 40, the conductor 24, the contacts 20 and 21, the conductor 23 and the conductor 37 to the one terminal of the motor 26, the other terminal of the motor being connected through the conductor 33 with the other line wire 28. As a result the motor 26 will be started and very shortly after starting of the motor the end 43 of the switch actuating member 42 will move out of engagement with the insulating block 54 and substantially simultaneously the end 44 of the switch actuating member 42 will move out of engagement with the block 55. The switching element 46 is biased toward the stationary contact 39 and the switching element 50 is biased toward the stationary contact 52. Accordingly when the projecting insulating members 54 and 55 are disengaged by the actuating member 42 the contact 48 will engage the stationary contact 39 and the contact 51 will engage the stationary contact 52. When the contact 48 engages the stationary contact 39 a circuit will be completed that short circuits the pressure responsive starting switch and the motor 26 will continue to rotate. The motor, being a constant speed induction motor, will rotate at a uniform speed and thus a certain arcuate movement of the actuating member 42 will be accomplished in a definite time interval.

When the switching element 46 has its contact 48 in engagement with the contact 39 the circuit to the motor will be completed from the line wire 29 through the conductor 34 and the conductors 38 and 37 to one terminal of the motor 26 and the other line wire is, of course, connected with the motor 26 in the manner previously described. The engagement of the contact 51 with the contact 52 completes a circuit to the counter 27 from the line wires, this circuit being from the line wire 29 and the conductor 35 to said counter and from said counter through the conductor 53 to the contact 52 and contact 51 to the switching element 50 and from said switching element 50 to the conductor 32, which is connected with the line wire 28. This will cause the counting mechanism, which is ordinarily of a magnetic character, to operate once to advance the counting means one numeral. The continued maintenance of the counting circuit in closed condition has no further effect on the counting means unless the circuit is reopened and reclosed.

The motor will continue to rotate until the other end 44 of the switch actuating member 42 engages the insulating block 54 on the switching element 46 to cam it outwardly away from the position in which the contact 48 is in engagement with the contact 39 and will move it into the position shown in Fig. 1, in which the contact 47 is in engagement with the contact 40, and closing of the circuit is again dependent upon opening of the faucet 3. It will be obvious that no matter how often the faucet may have been opened during this half revolution of the actuating member 42 the motor will have continued to rotate and the circuit to the counter will have remained in closed condition. How-

ever, when the parts reach the position that the end 44 of the actuating member 42 is in engagement with the insulating member 54 the end 43 will have engaged the insulating member 55 and cammed the switching element 50 to the position shown in Fig. 1 so as to disengage the contact 51 from the contact 52, restoring the parts to the position shown in Fig. 1, whereupon another complete cycle of operations of the apparatus can take place.

What I claim is:

1. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising a rotatable switch actuating member, a constant speed motor for rotating said switch actuating member, a counter circuit, a switch determining the condition of said circuit in the path of said actuating member, a motor starting circuit, switching means responsive to pressure in said liquid line determining the condition of said starting circuit, and short circuiting means for said pressure responsive switching means comprising switching means in the path of said actuating member, said switch determining the condition of said counter circuit being out of engagement with said actuating member while said pressure responsive switching means is short circuited.
2. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising a rotatable switch actuating member, a constant speed motor for rotating said switch actuating member, a counter circuit, a switch determining the condition of said circuit in the path of said actuating member, a motor starting circuit, switching means responsive to pressure in said liquid line determining the condition of said starting circuit, and short circuiting means for said pressure responsive switching means comprising switching means in the path of said actuating member, said switch actuating member engaging said last mentioned switching means and said first mentioned switch to hold both thereof in open position until after said pressure responsive switching means has closed said starting circuit to start said motor and rotate said switch operating member through a predetermined arc, and being out of engagement with both said switch and switching means through the major portion of its motion through said arc.
3. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, a counter circuit, a switch determining the condition of said circuit in the path of said actuating means, a motor starting circuit, switching means responsive to pressure in said liquid line determining the condition of said starting circuit, and short circuiting means for said pressure responsive switching means comprising switching means in the path of said actuating means, said first mentioned switch and said last mentioned switching means each having a stationary contact and a movable contact element cooperating therewith biased toward said cooperating stationary contact and said actuating means having means thereon engaging said movable contact elements to move the movable contact element of said first mentioned switch away from said cooperating stationary contact only when the movable contact of said last mentioned switching means is moved away from said cooperating stationary contact.
4. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, a counter circuit, a switch determining the condition of said circuit in the path of said actuating means, a motor starting circuit, switching means responsive to pressure in said liquid line determining the condition of said starting circuit, and short circuiting means for said pressure responsive switching means in the path of said

actuating means, said first mentioned switch and said last mentioned switching means each having a stationary contact and a movable contact element cooperating therewith biased toward said cooperating stationary contact and said actuating means having means thereon engaging said movable contact elements to move the same away from said cooperating stationary contacts only at the same predetermined positions of said actuating means.

5. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising a rotatable switch actuating member, a constant speed motor for rotating said switch actuating member, a counter circuit, a switch determining the condition of said circuit in the path of said actuating member, a motor starting circuit including a stationary contact, a contact element movable into engagement with said stationary contact by engagement of said actuating member therewith, switching means responsive to pressure in said liquid line in said starting circuit and a stationary contact having a conductor extending therefrom to said motor in shunt with said starting circuit, said movable contact element being biased to engage said last mentioned contact upon movement of said actuating member out of engagement with said movable contact element.

6. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising a rotatable switch actuating member, a constant speed motor for rotating said switch actuating member, a counter circuit, a switch determining the condition of said circuit in the path of said actuating member, a motor starting circuit including a stationary contact, a contact element movable into engagement with said stationary contact by engagement of said actuating member therewith, switching means responsive to pressure in said liquid line in said starting circuit and a stationary contact having a conductor extending therefrom to said motor in shunt with said starting circuit, said movable contact element being biased to engage said last mentioned contact upon movement of said actuating member out of engagement with said movable contact element, said counter circuit switch comprising a stationary contact and a movable contact element biased toward said last mentioned stationary contact, said switch actuating member engaging said last mentioned movable contact to hold the same out of engagement with said last mentioned stationary contact while said first mentioned stationary and movable contacts are in engagement.

7. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, means for starting said motor and energizing said motor for an interval to rotate said switch actuating means through a predetermined arc including switching means responsive to pressure in said liquid line and short circuiting means for said pressure responsive switching means comprising switching means having a position determined by said rotatable actuating means, a counter circuit and a switch determining the condition of said circuit having a position determined by said rotatable actuating means, said counter circuit switching means including a movable contact element biased toward circuit closing position and said actuating means having means engaging said movable contact element to move the same into open circuit position only at the end of each rotation of said actuating means through said arc and hold said movable contact element in said open circuit position until after initiation of the next rotation of said actuating means through said arc.

8. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, a counter circuit, said switch actuating means

comprising a member having diametrically opposite projections thereon, a pair of movable switching elements mounted on opposite sides of said actuating means in position to be engaged by said projections, one of said switching elements being mounted for movement between a pair of stationary contacts and being biased to engage one thereof, the other of said switching elements being mounted for movement toward and away from a stationary contact in said counter circuit and being biased to engage said last mentioned stationary contact, a conductor leading to said motor from the contact of said pair toward which said switching element is biased, a switch responsive to pressure in said liquid line, a conductor leading from the other contact of said pair to one terminal of said last mentioned switch and a conductor leading from said switch to said motor, one of said projections engaging said one movable switching element to engage the same with said other contact of said pair when the other of said projections is in engagement with the other switching element to hold it spaced from said stationary contact in said counter circuit.

9. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, a counter circuit, a switch determining the condition of said circuit in the path of said actuating means, a motor starting circuit, switching means responsive to pressure in said liquid line determining the condition of said starting circuit, said switching means comprising a pivotally mounted switch operating member, a curved

tubular member sealed at one end thereof and connected at its other end with said liquid line adjacent said faucet, and means connecting said tubular member adjacent said sealed end with said switch operating member, and short circuiting means for said pressure responsive switching means comprising switching means in the path of said actuating means.

10. The combination with a faucet and a liquid line leading thereto, of a counter and means for operating said counter comprising rotatable switch actuating means, a constant speed motor for rotating said switch actuating means, a counter circuit, a switch determining the condition of said circuit in the path of said actuating means, a motor starting circuit, switching means responsive to pressure in said liquid line determining the condition of said starting circuit, said switching means comprising a pivotally mounted switch operating member, a curved tubular member sealed at one end thereof and connected at its other end with said liquid line through a restricted passage directed toward and adjacent said faucet, and means connecting said tubular member adjacent said sealed end with said switch operating member adjacent its pivot, and short circuiting means for said pressure responsive switching means comprising switching means in the path of said actuating means.

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