April 29, 1952 H. N. BLISS 2,594,853

INTERLOCK MECHANISM FOR LIQUID DISPENSING APPARATUS

Filed June 2, 1950 3 Sheets-Sheet 1

Fig. 1

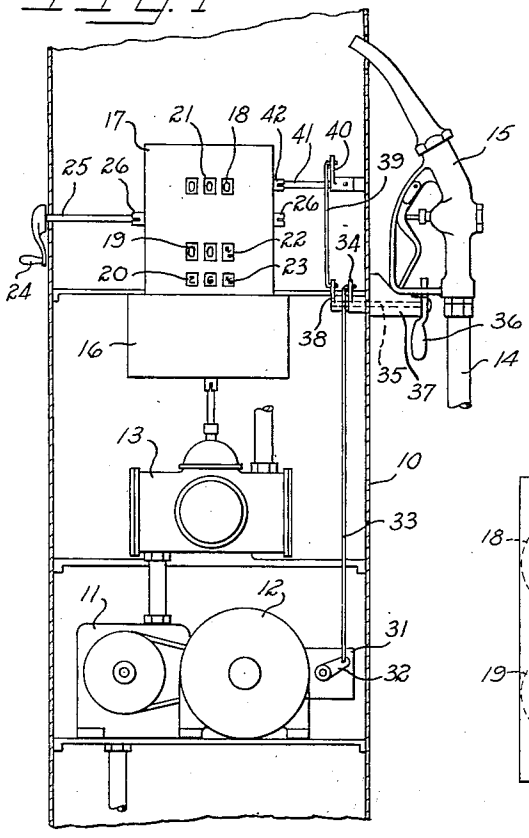
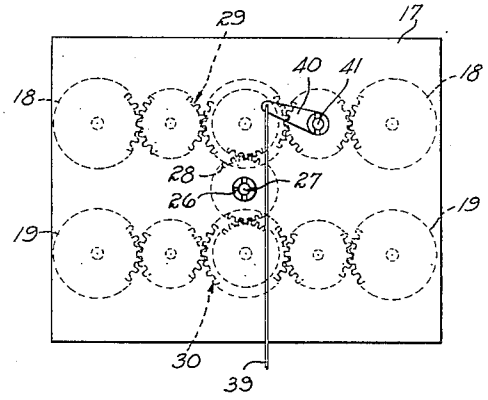


Fig. 2



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Fig. 3

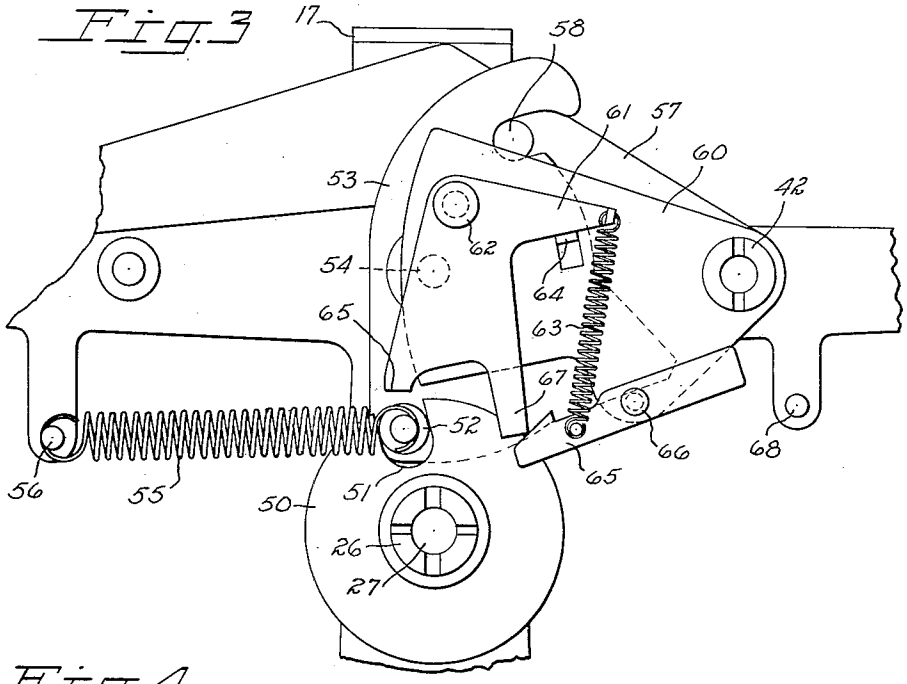
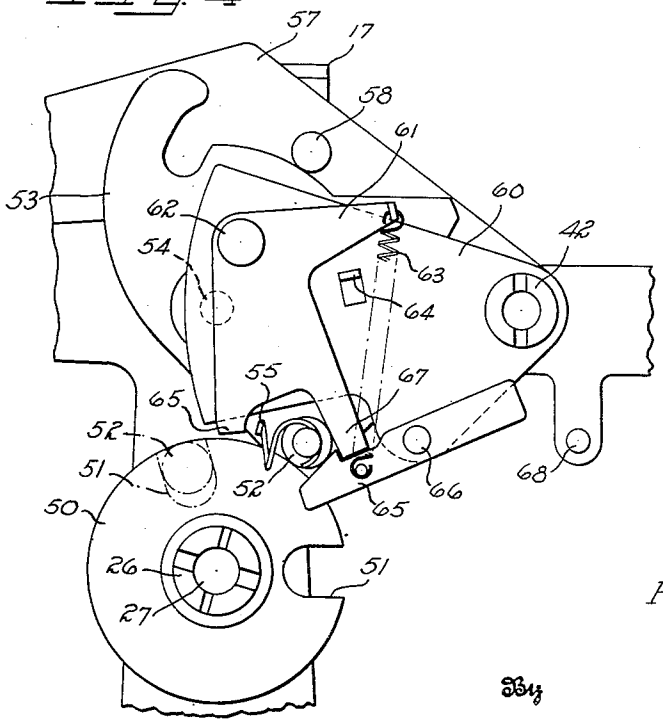


Fig. 4



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INTERLOCK MECHANISM FOR LIQUID DISPENSING APPARATUS

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Fig. 5

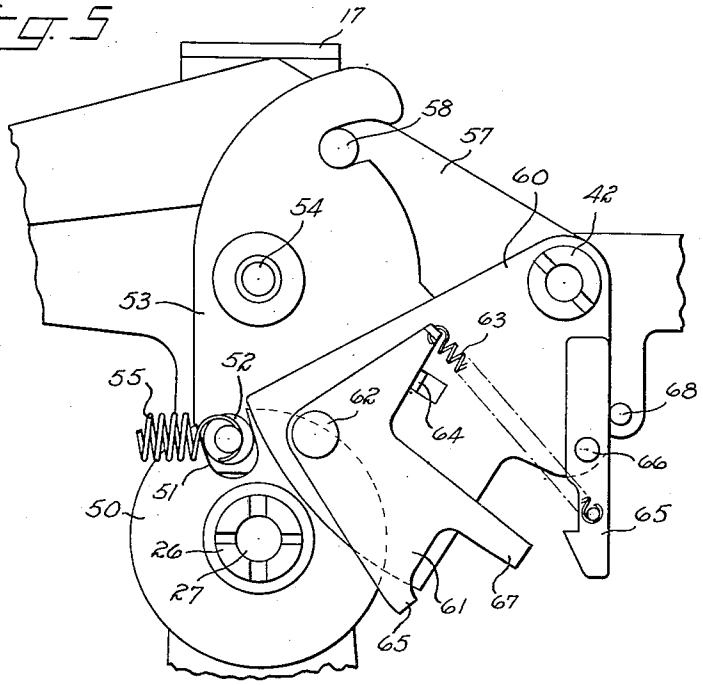
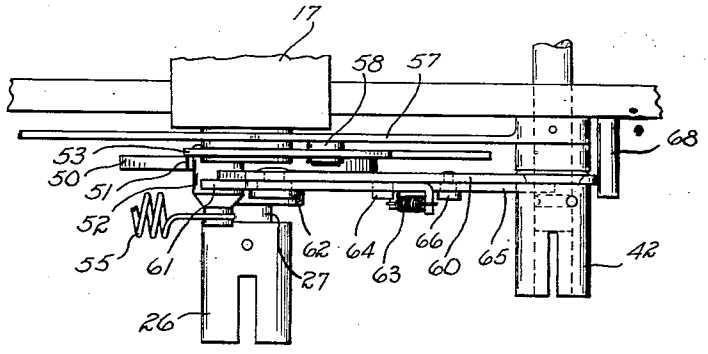


Fig. 6



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UNITED STATES PATENT OFFICE

2,594,853

INTERLOCK MECHANISM FOR LIQUID DISPENSING APPARATUS

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9 Claims. (Cl. 222—34)

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The present invention relates to liquid dispensing apparatus and more particularly to interlocking means for controlling the operation of the pump motor and the reset mechanism of the register.

The main purpose of the present invention is to provide for liquid dispensing apparatus, particularly of the type widely used today, a simple yet effective interlocking means which will automatically prevent (1) operation of the pump motor and hence dispensing during a resetting operation; (2) operation of the resetting mechanism during a dispensing operation, and (3) a subsequent dispensing operation until the indicators of the register showing the amount and/or cost of the previous dispensing operation have been reset to zero.

It is an object of the invention to reduce such an interlocking means to its most simple form having a minimum of parts, and to particularly adapt the means for use with commercial liquid dispensing apparatus of the type now widely used, so that it can be installed without difficulty and at low cost and without modifying the existing dispensing apparatus in any substantial way.

It is an aim, at the same time, to provide an interlocking means which is entirely effective for the intended purpose, easy and simple to operate, fool-proof in operation, and sufficiently rugged and resistant to wear and abuse so as to be dependable and reliable in service over long periods of time.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Figure 1 is a fragmentary side view of a liquid dispensing apparatus with the housing cut away to show the operating parts, the latter being shown merely diagrammatically;

Figure 2 is a diagrammatic side view of the register mechanism;

Figure 3 is an enlarged fragmentary side view of the register showing the interlocking means of the present invention, the device being in position prior to resetting with the pump motor switch in "off" position.

Figure 4 is a view similar to Figure 3 showing the mechanism partially through a resetting operation;

Figure 5 is a similar view showing the mechanism when the pump motor switch is in "on" position;

Figure 6 is a plan view corresponding to Figure 3.

Referring first to Figure 1 of the drawings, there is shown a conventional type of liquid dispensing apparatus which includes within a suitable housing 10, a pump 11 operated by a pump motor 12 which draws liquid from a reservoir (not shown) and delivers it through a meter 13 to a flexible hose 14 provided with a dispensing nozzle 15. The meter 13 is connected to a speed change mechanism or "variator" 16 which in turn is connected to a register 17.

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The end of the register 17, which can be seen in Figure 1 of the drawings, includes three sets of number wheels 18, 19 and 20 which are viewed at windows 21, 22 and 23, respectively. Similar number wheels and windows are present at the opposite end of the register although not shown in the drawings. The number wheels 18 indicate the cost of the liquid dispensed; number wheels 19 indicate the volume of the liquid dispensed and number wheels 20 indicate the price per gallon at which the device is set to register. The details of construction of the register 17 are not shown in the drawings, since the specific construction of the register forms no part of the present invention. The manner of constructing the register may be found, if desired, in the patent to Slye No. 2,264,557, granted December 2, 1941.

There is shown diagrammatically in Figure 2 of the drawings, two gear trains denoted generally at 29 and 30 by means of which the supporting shafts for number wheels 18 and 19 may be simultaneously turned to reset the number wheels to zero. The means for operating the resetting mechanism comprises a crank 24 having a stub shaft 25 which is connectable to a coupling 26 at either end of the shaft 27 on which is mounted a gear 28 for operating the gear trains 29 and 30. For simplicity and brevity of presentation, the present description does not include the means whereby the number wheels are returned to zero upon rotation of the supporting shafts, such means being well-known in the art and being shown, for example, in the Slye patent, supra.

The pump motor 12 is provided with a usual control switch 31 having an actuating arm 32 which is connected by connecting rod 33 to an arm 34 fixed to a jack shaft 35 on the outer end of which is a handle 36. In the arrangement shown in the drawings the nozzle 15 when not in use is adapted to be hung on a support hook 37. In the exemplary arrangement shown in the drawings the nozzle 15 cannot be placed on the support hook 37 unless the handle 36 is turned to an "off" position, and conversely the handle 36 cannot be operated to turn on the pump motor until the nozzle 15 is removed from the support hook 37. This arrangement is conventional and forms no part of the present invention.

A second arm 38 in side by side relationship with arm 34 is connected by a connecting rod 39 to an arm 40 fixed to shaft 41. The shaft 41 is received in a coupling 42 which is mounted for free rotation at the side of the register. As will

be apparent, manual operation of the handle 36 and consequently the pump motor switch 31 will result in rotation of the shaft 41 and coupling 42 and conversely if turning of the coupling 42 and shaft 41 is prevented then the operator cannot actuate the pump motor switch 31.

As best shown in Figures 3, 4 and 5 of the drawings, the shaft 27 which is turned during a resetting operation by means of the crank 24, as previously described, has fixed thereto a circular plate or disc 50 provided with a notch 51. The disc 50 and notch 51 cooperate with a pin 52 fixed to a cam plate 53 which is pivoted at 54 on the frame of the register. When the shaft 27 and disc 50 are turned in a clockwise direction, as viewed in the drawings, the pin 52 and hence the cam plate 53 are immediately cammed to the solid line position shown in Figure 4 of the drawings. The pin 52 then rides on the periphery of the disc 50 until the resetting operation has been completed, i. e., until the disc 50 has been turned sufficiently to again bring the notch 51 into registry with the pin 52. At this point, the number wheels 18 and 19 will have been returned to zero and the resetting operation will be halted by stop means (not shown) such as that illustrated in the Slye patent, supra. As best shown in Figure 3 of the drawings, the pin 52 is connected to a relatively heavy spring 55 which is anchored to the frame at 56 with the result that when a resetting operation has been completed and the pin 52 is again received in the notch 51 the spring 55 through the pin 52 will drive the disc 50 in a reverse direction through a pre-determined small angle of rotation. As set forth in the Slye patent referred to above, the purpose of this reverse rotation of the disc 50 is to make it necessary in a subsequent resetting operation to rotate the shaft 27 through more than one complete turn in order to return the number wheels to zero position, thus insuring that all of the number wheels will be picked up and accurately reset. The action of the spring 55 also returns the cam plate 53 to its original position as shown in Figure 3 of the drawings.

In the type of register shown in the drawings the cam plate 53 is utilized to operate a shutter mechanism (not shown) and also a brake mechanism in the register drive (not shown) all as set forth in the Slye patent previously referred to. A portion of the shutter operating mechanism is shown in the drawings and comprises an arm 57 having a pin 58 fixed thereto which is engaged by the camming surfaces of the cam plate 53.

In accordance with the present invention there is fixed to the coupling 42, this being the coupling which is turned during operation of the pump motor switch, an interlocking plate 60 which is of such length and so disposed that when the pump motor switch is in "off" position and the register is being reset (causing pin 52 to be moved to the right as viewed in the drawings), movement of the plate 60 will be obstructed by the pin 52 which thus effectively prevents the operator from turning the pump motor switch to the "on" position, this being best shown in Figure 4 of the drawings. The interlock plate 60, however, will clear the pin 52 when the resetting mechanism is not in operation and pin 52 is returned to original position, as best shown in Figure 5 of the drawings.

Also in accordance with the present invention there is pivotally mounted on the interlock plate 60 an interference pawl 61, this pawl 61 being pivoted at 62 on the interlock plate 60 and being urged in a clockwise direction as viewed in the drawings by a spring 63. Pivoting movement of the interference pawl 61 in a clockwise direction is limited, however, by an abutment which in its simplest form can comprise a struck up piece 64 on the plate 60.

The shape of the interference pawl 61 is such that when it is pivoted to the fullest extent possible in a clockwise direction its nose 65 will extend outwardly from the plate 60 a sufficient distance so that it will extend over the pin 52 even when the resetting mechanism is in its "at rest" position. Accordingly, as shown in Figure 3 of the drawings, the interlock plate 60 cannot be moved and hence the pump motor switch cannot be turned on while the interference pawl 61 is in the fully pivoted position shown. However, reverse movement of the plate 60 enabling the operator to turn off the pump motor switch is permitted because the interference pawl 61 will be harmlessly cammed inwardly when it engages the pin 52 on the upstroke.

In order that the interference pawl 61 may be rendered inoperable, means is provided for latching the pawl in retracted position, i. e., pivoted counter clockwise so that the nose 65 no longer protrudes radially outwardly from the interlock plate 60. In the specific embodiment shown in the drawings this latching means comprises a latching pawl 65 which is pivoted on the interlock plate at 66 and which is urged into latching position by the spring 63 previously referred to as being connected to the pawl 61. As will be obvious, separate and independent springs could be utilized for biasing the pawls 61 and 65, if desired.

As best shown in Figures 3, 4 and 5, the interference pawl 61 is provided with a depending arm 67 which serves the dual function of being engageable by the pin 52 to permit the pin 52 to cam the interference pawl into retracted position and also provides a convenient engagement for the latching pawl 65.

As best shown in Figure 4 of the drawings, the initiation of a resetting operation which causes the pin 52 to be moved from the dash and dot line position to the full line position shown in Figure 4 retracts the interference pawl 61 sufficiently so that it becomes latched in retracted position by the latching pawl 65. At this point, of course, the pivoting movement of the interlock plate 60 to allow the pump motor switch to be turned to "on" position is no longer prevented by the interference pawl 61, but this is of no moment because the interlock plate 60 itself cannot move past the pin 52 which is now in a resetting position. Accordingly, as described above, it is impossible to turn on the pump motor and hence carry out a dispensing operation while a resetting operation is in progress. When the resetting operation has been completed and the pin 52 is retracted to the "at rest" position shown in dash and dot lines in Figure 4 of the drawings, the interlock plate 60 is free to be moved and the pump motor can be turned on to permit a dispensing operation.

In accordance with the invention means are provided to unlatch the interference pawl 61 whenever the pump motor switch is turned on. In the specific embodiment shown in the drawings this comprises merely a pin 68 mounted on the frame of the register in such position that it engages the tail of the latching pawl 65 and cams the pawl to unlatching position when the interlock plate 60 is pivoted to such position at

which the pump motor switch is on, this being best shown in Figure 5 of the drawings.

As will be apparent, the unlatching of the interference pawl **61** when the pump motor switch is turned on will not interfere in any way with the subsequent turning off of the pump motor switch in the completion of a dispensing operation, this for the reason that the interference pawl **61** merely wipes over the pin **52** on the up stroke, as previously described. However, the unlatching of the interference pawl **61** does insure that once the pump motor switch is turned off at the end of a dispensing operation it cannot be again turned on to carry out a second dispensing operation until the register is reset which, as previously described, relatches the interference pawl **61** in retracted unobstructing position.

As best shown in Figure 5 of the drawings, the interlock plate **60** is so formed that its free end practically abuts against the pin **52** when the interlock plate **60** is in the pivoted position occurring when the pump motor switch is on. Accordingly, if it should be attempted to reset the register while a dispensing operation is in progress movement of the pin **52** will be prevented and, therefore, the crank **24** cannot be turned. As a result, the register cannot be reset until the interlock plate **60** is returned to the position at which the pump motor switch is off, in which position it is clear of the path of movement of the pin **52**, as best shown in Figures 3 and 4 of the drawings.

It thus will be seen that there has been provided in accordance with the invention a simple mechanism which accomplishes all of the desired functions of an interlock in a convenient, easily operable and fool-proof manner, the same being inexpensive and easy to manufacture and install.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with resetting means, said mechanism comprising a first movable member, means connecting the member to the power control switch whereby the member is moved to a first position when the switch is open and to a second position when the switch is closed; a second movable member, means for moving the second movable member to a first position at completion of a resetting operation and to a second position during resetting, means for mounting said movable members whereby movement of either to its said second position will obstruct movement of the other to its second position, a retractable member pivotally mounted on said first movable member adjacent the resetting means and normally engageable with the second movable member when the latter is in its said first position to prevent movement of the first movable member to its said second position, means for latching the retractable member in retracted position, means for pivoting the retractable member to latching position at the start of a resetting operation, and means for unlatching the latching means when the power control switch is closed.

2. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with resetting means, said mechanism comprising a first movable member, means connecting the member to the power control switch whereby the member is moved to a first position when the switch is open and to a second position when the switch is closed, a second movable member, means for moving the second movable member to a first position at completion of a resetting operation and to a second position during resetting, means for mounting said movable members whereby movement of either to its said second position will obstruct movement of the other to its second position, a retractable member on said first movable member normally engageable with the second movable member when the latter is in its said first position to prevent movement of the first movable member to its said second position, means for latching the retractable member in retracted position, said retractable member being movable to latching position by movement of the second movable member to its said second position, and means for unlatching the latching means operable when the first movable member is moved to its said second position.

3. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with resetting means, said mechanism comprising a first member mounted for pivoting movement and operably connected to the power control switch for movement therewith between an open and closed position, a movable member biased into a first position removed from the path of movement of the first member, means for moving the movable member into the path of movement of the first member during operation of said resetting means, a retractable extension on the first member normally engageable with the said movable member when the latter member is in its said first position and movable by the latter member to retracted position during a resetting operation, means for latching the extension in retracted position, and means for unlatching the latching means when the first member is pivoted to said closed position.

4. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with resetting means, said mechanism comprising a plate mounted for pivoting movement and operably connected to the power control switch for movement therewith between an open and closed position, a movable member biased into a first position removed from the path of movement of the plate, means for moving the movable member into the path of movement of the plate responsive to operation of said resetting means, said movement of the movable member being obstructed by the plate when the latter is in closed position, an interference pawl pivotally mounted on the plate and biased into position for preventing movement of the plate from open position, said pawl being pivoted to retracted non-engaging position by movement of the movable member during a resetting operation, means for latching

the pawl in non-engaging position, and means for releasing the latching means when the plate is moved to closed position.

5. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with resetting means, said mechanism comprising a plate mounted for pivoting movement and operably connected to the power control switch for movement therewith between an open and closed position, a movable member biased into a first position removed from the path of movement of the plate, means for moving the movable member into the path of movement of the plate responsive to operation of said resetting means, said movement of the movable member being obstructed by the plate when the latter is in closed position, an interference pawl pivotally mounted on the plate and biased into a position extending outwardly from the plate for engagement with the movable member when the latter is in its first position to prevent pivoting movement of the plate to closed position, said pawl being moved to non-extending position by the movable member when the latter is moved during a resetting operation, means operable when the pawl is moved to non-extending position for latching the pawl in said position, and means for releasing the latching means effective when the plate is moved to closed position.

6. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with resetting means, said mechanism comprising a plate mounted for pivoting movement and operably connected to the power control switch for movement therewith between an open and closed position, a movable member biased into a first position removed from the path of movement of the plate, means for moving the movable member into the path of movement of the plate responsive to operation of said resetting means, said movement of the movable member being obstructed by the plate when the latter is in closed position, an interference pawl pivotally mounted on the plate and biased into position for preventing movement of the plate from open position, said pawl being pivoted to retracted non-engaging position by movement of the movable member during a resetting operation, a latching pawl biased into engagement with the interference pawl and effective when the interference pawl is moved to said retracted position to retain the interference pawl in said position, and means for camming the latching pawl out of engagement with the interference pawl effective when the plate is moved to closed position.

7. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with a resetting shaft, said mechanism comprising a member movably mounted on the register and biased into a first position, a cam disc mounted for rotation with the resetting shaft and arranged to cam the movable member into a second position during a resetting operation, a plate pivotally mounted on the register and operably connected to the power control switch for pivoting movement therewith between an open first position and a closed second position, said plate being constructed and arranged to avoid the movable member when the latter is in its said first position but to engage with said member when either is moved to its second position, a retractable extension on the plate engageable with the movable member when the latter is in its said first position to prevent movement of the plate to closed position, means for camming the extension to retracted position upon operation of the resetting shaft, means for latching the extension in retracted position, and means for unlatching the last named means when the plate is moved to closed position.

8. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with a resetting shaft, said mechanism comprising a member movably mounted on the register and biased into a first position, a cam disc mounted for rotation with the resetting shaft and arranged to cam the movable member into a second position during a resetting operation, a plate pivotally mounted on the register and operably connected to the power control switch for pivoting movement therewith between an open first position and a closed second position, said plate being constructed and arranged to avoid the movable member when the latter is in its said first position but to engage with said member when either is moved to its said second position, an interference pawl mounted for limited pivoting movement on the plate and normally extending outwardly from the plate sufficiently to engage with the movable member when the latter is in its said first position to prevent movement of the plate to closed position, said pawl having a surface extending into the path of movement of the movable member to permit the movable member to cam the pawl to non-engaging position when actuated by the cam disc, a latch biased into engagement with the pawl to retain same in non-engaging position, and means for camming the latch into disengagement when the plate is moved to closed position.

9. An interlock mechanism for a liquid dispensing apparatus of the type having a power control switch and a register provided with a resetting shaft, said mechanism comprising a cam disc on the resetting shaft having a notch in its periphery, a member movably mounted on the register and biased into engagement with the periphery of the cam disc, a plate pivotally mounted on the register and of such length that it is engageable with the movable member except when the latter is received in the notch of the cam disc, said plate being connectible to the power control switch for movement therewith, an interference pawl pivotally mounted on the plate having a nose portion which is biased radially outwardly from the plate for engagement with the movable member when the latter is received in the notch of the cam disc, said pawl being cammed inwardly by the movable member when the latter is actuated by the cam disc, a latch effective when the pawl is cammed inwardly for retaining the pawl in the latter position, and means effective when the plate is moved to switch closed position for releasing the latch.

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