Jan. 7, 1936. E. H. BRADLEY 2,026,959

LIQUID DISPENSING APPARATUS

Original Filed Feb. 23, 1932 4 Sheets-Sheet 1

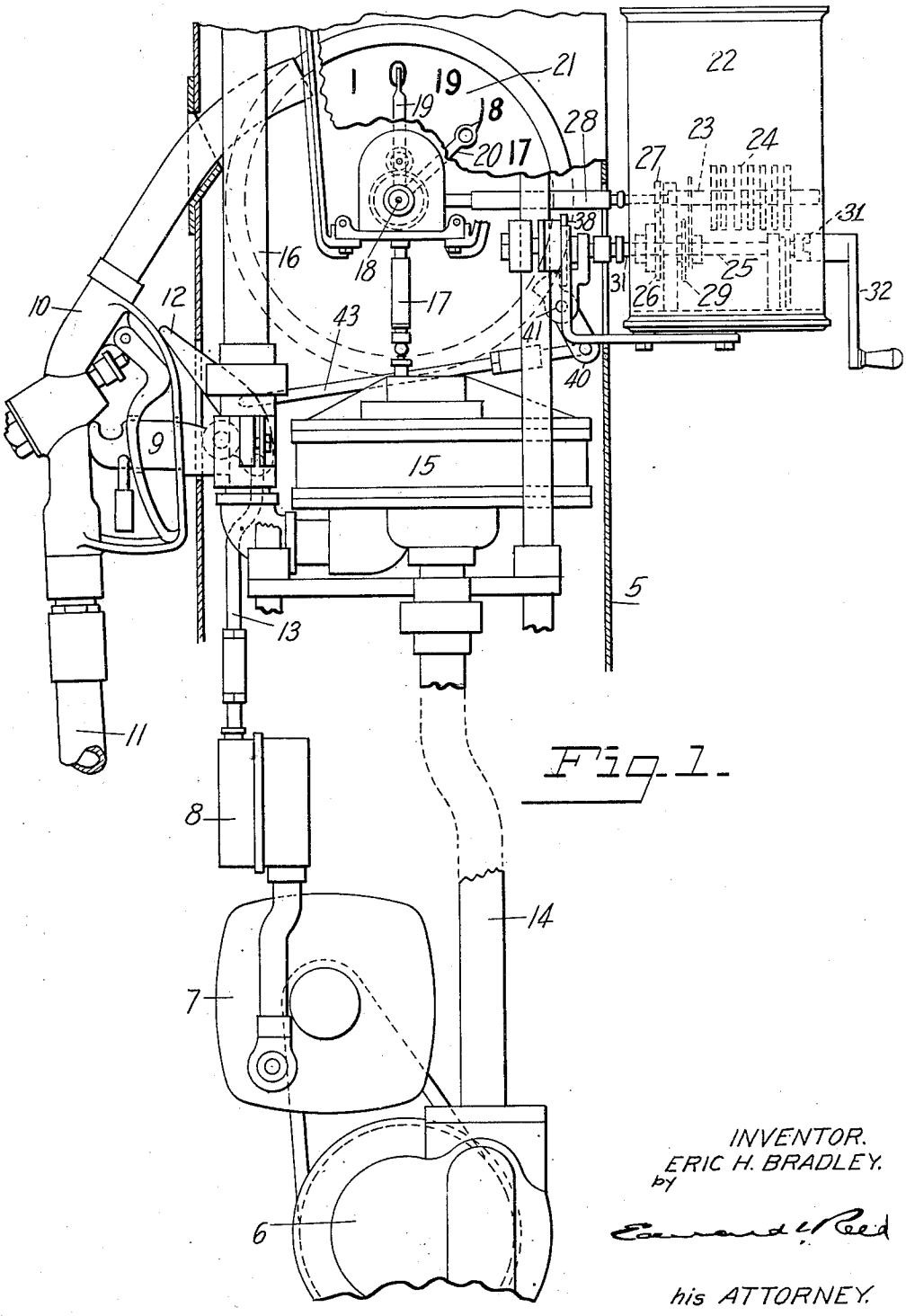


Fig. 1.

INVENTOR.
ERIC H. BRADLEY.
by
Edmund C. Reid
his ATTORNEY.

Jan. 7, 1936. E. H. BRADLEY 2,026,959

LIQUID DISPENSING APPARATUS

Original Filed Feb. 23, 1932 4 Sheets-Sheet 2

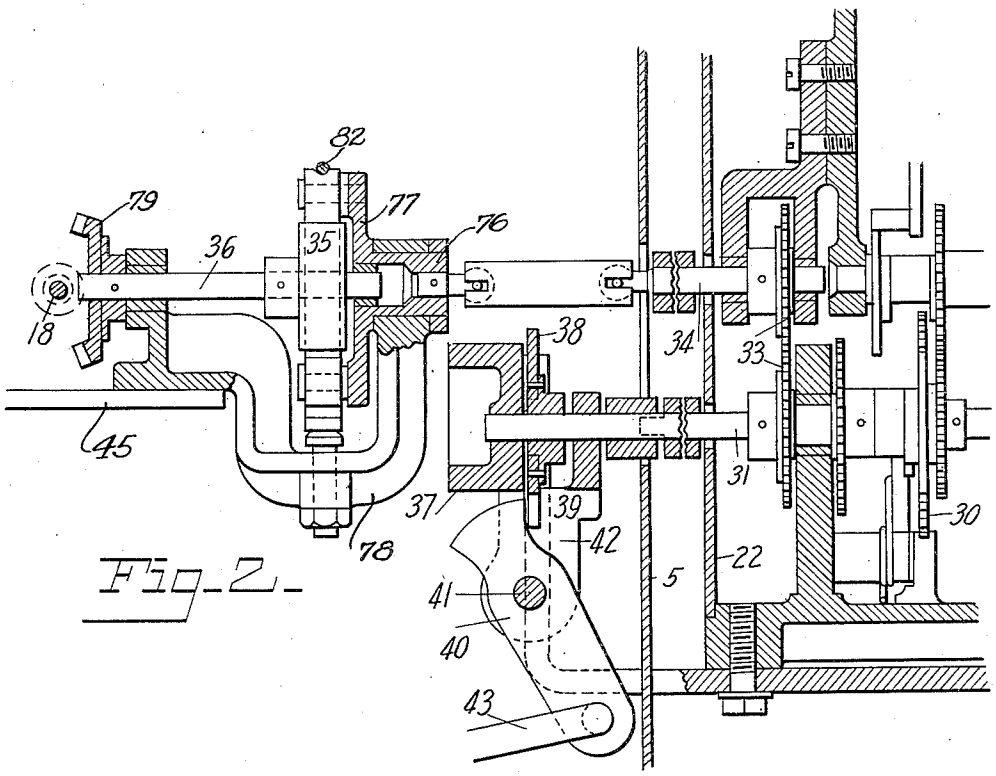
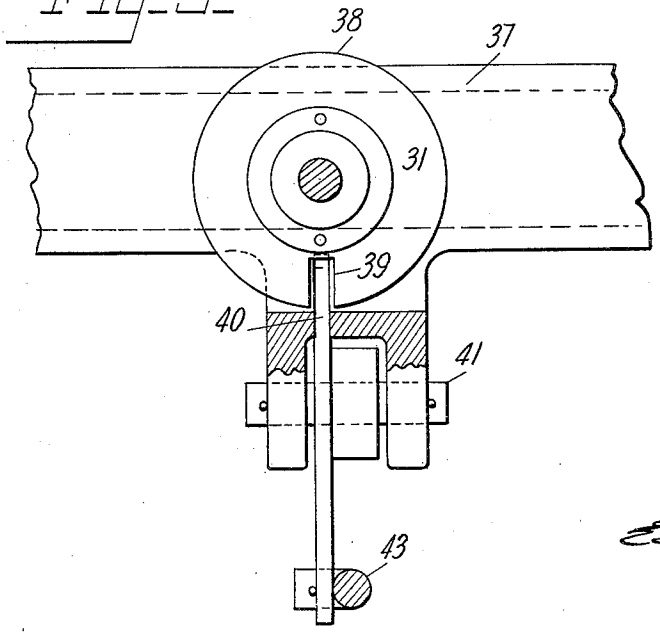


Fig. 2.

Fig. 3.



INVENTOR.
ERIC H. BRADLEY.
by
Edmund C. Reed
his ATTORNEY.

Jan. 7, 1936. E. H. BRADLEY 2,026,959

LIQUID DISPENSING APPARATUS

Original Filed Feb. 23, 1932 4 Sheets-Sheet 3

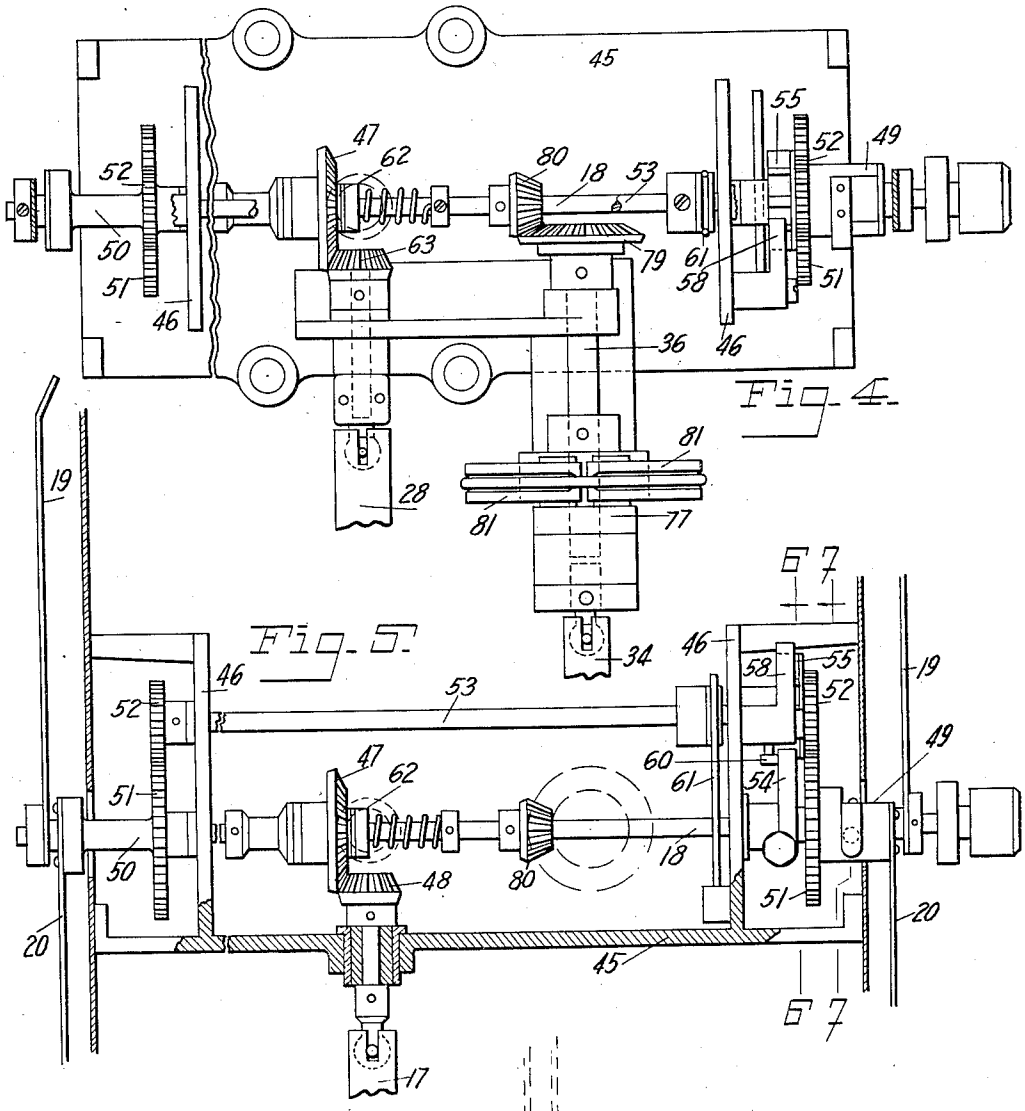


Fig. 4.

Fig. 5.

Fig. 6.

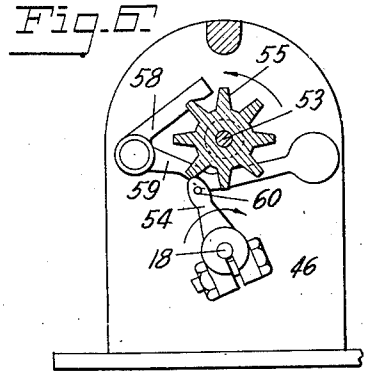
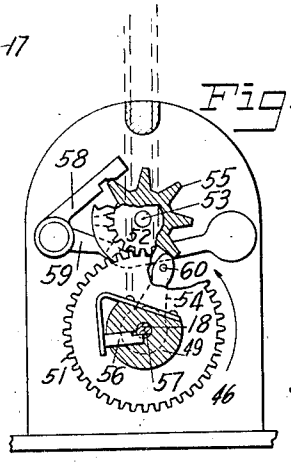


Fig. 7.



INVENTOR.
ERIC H. BRADLEY.
by
his ATTORNEY.

Jan. 7, 1936. E. H. BRADLEY 2,026,959

LIQUID DISPENSING APPARATUS

Original Filed Feb. 23, 1932 4 Sheets-Sheet 4

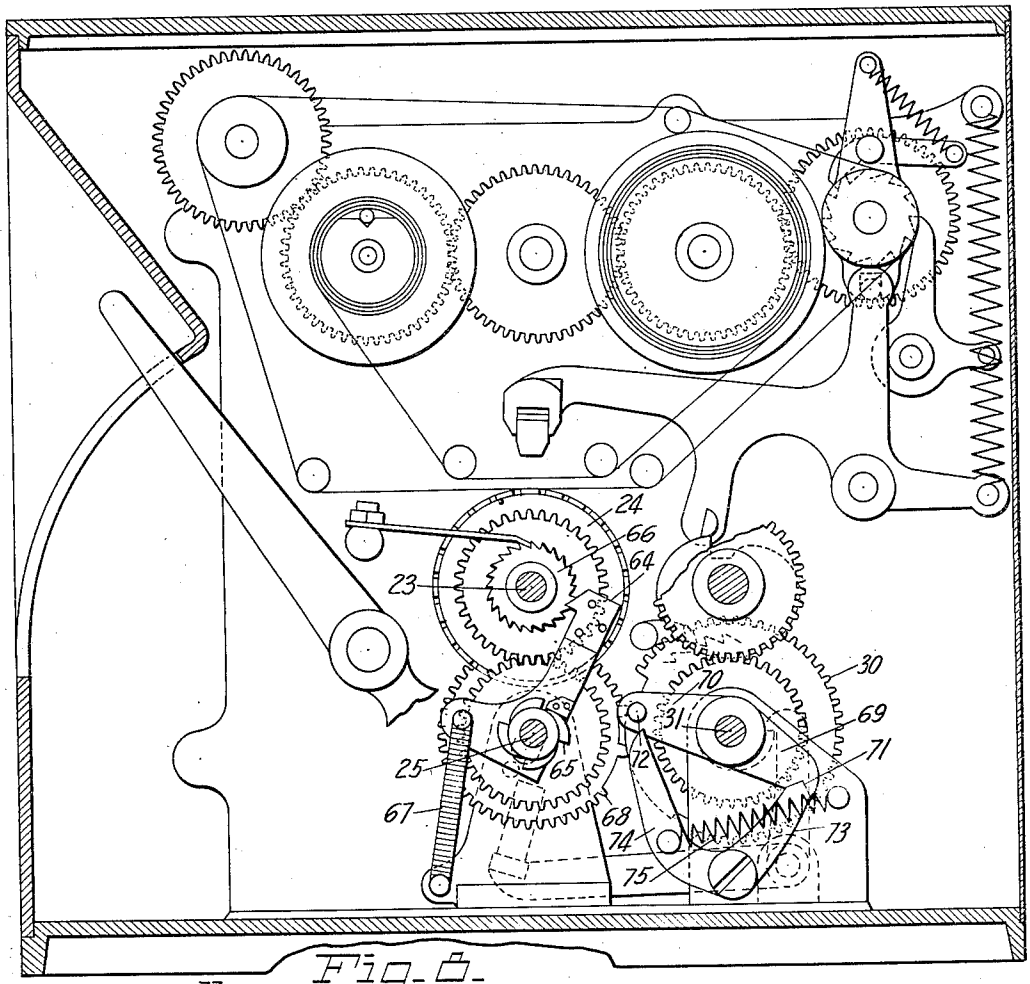


Fig. 8.

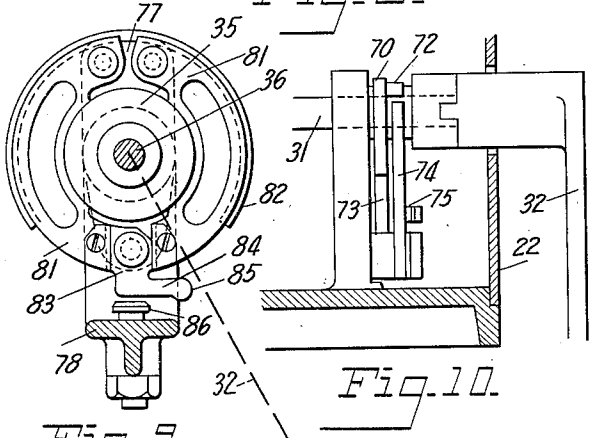


Fig. 9.

Fig. 10.

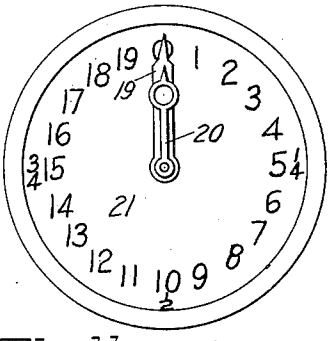


Fig. 11.

INVENTOR.
ERIC H. BRADLEY.
by
Edward C. Reed
his ATTORNEY.

Patented Jan. 7, 1936 2,026,959

UNITED STATES PATENT OFFICE

2,026,959

LIQUID DISPENSING APPARATUS

Eric H. Bradley, Cincinnati, Ohio, assignor to National Pumps Corporation, Dayton, Ohio, a corporation of Ohio

Original application February 23, 1932, Serial No. 594,530. Divided and this application January 26, 1933, Serial No. 653,567

12 Claims. (Cl. 221—95)

This invention relates to a liquid dispensing apparatus and more particularly to such an apparatus provided with a device to register the quantity of liquid delivered and having means for resetting the same to zero at the end of each delivery operation. The present application is a division of the application filed by me February 23, 1932, Serial No. 594,530.

One object of the invention is to provide such an apparatus with means for preventing the operation of the delivery mechanism during the resetting of the registering device and to prevent the operation of the resetting means during the operation of the delivery mechanism.

A further object of the invention is to provide such an apparatus with interlocking parts which are normally movable with relation one to the other but which will be brought into interlocking relation by the initial movement of either the resetting means or the device which controls the operation of the delivery mechanism.

A further object of the invention is to provide such a locking device which will be positive in its operation, simple in construction and which may be produced and installed at a low cost and which will not in any way interfere with the normal operation of the mechanism.

Other objects of the invention will appear as the device is described in detail.

In the accompanying drawings Fig. 1 is a side elevation of a gasoline pump of the meter type, partially broken away, showing my invention applied thereto; Fig. 2 is a detail view of a portion of the resetting mechanism showing the locking device; Fig. 3 is a front elevation of the locking device; Fig. 4 is a plan view of the indicating mechanism; Fig. 5 is a side elevation of the indicating mechanism, partly in section; Fig. 6 is a section taken on the line 6—6 of Fig. 5, looking in the direction of the arrows; Fig. 7 is a section taken on the line 7—7 of Fig. 5, looking in the direction of the arrows; Fig. 8 is a vertical sectional view of the registering and resetting mechanism; Fig. 9 is a detail view of the clutch connection between the mechanism for resetting the register and the resetting means for the indicating device; Fig. 10 is a side elevation of the stop device for the mechanism that operates the resetting means; and Fig. 11 is a detail view of one of the indicating devices.

In these drawings I have illustrated one embodiment of my invention and have shown the same as applied to a gasoline pump of a well known type but it will be understood that the invention may take various forms and may be applied to dispensing apparatus or other devices of various kinds.

In the particular embodiment illustrated the gasoline pump comprises a main housing or cabinet 5 in which is mounted a rotary pump 6 which is operated by an electric motor 7, the motor being controlled by a switch of any suitable character which is mounted in a casing 8. A suitable device is provided for actuating the switch and thereby controlling the operation of the delivery mechanism. This controlling device may take various forms and I have here shown a switch actuating device similar to that shown in the Hanna and Bradley application filed September 5, 1930, Serial No. 479,870. The switch actuating device of that application is associated with a device for supporting the nozzle of the delivery hose when the pump is idle. This support preferably comprises an arm 9 rigidly mounted on a fixed part of the apparatus within the cabinet 5 and projecting outwardly beyond the cabinet and having its outer end portion adapted to engage and support a nozzle 10 on the delivery hose 11, a portion only of which shown. Pivotally mounted within the cabinet, adjacent to the inner end of the supporting arm 9, is a switch actuating member 12 which also extends through the cabinet above the supporting arm 9. This actuating member or lever is pivotally mounted between its ends and its inner end is connected by a rod 13 with a switch in the casing 8. The outer portion of the actuating lever is so arranged with relation to the supporting arm that when it is moved to a position to open the switch the outer end thereof will be spaced above and some distance from the supporting arm, in which position it will be engaged by the guard of the hose nozzle, when the latter is mounted on the supporting arm, and the actuating lever thereby held against movement toward the supporting arm, thus preventing the closing of the switch. When the nozzle is removed from the supporting arm the actuating lever may be moved to a position adjacent to and substantially parallel with the supporting arm and this movement will close the switch and cause the operation of the pump to deliver gasoline. The gasoline from the pump passes upwardly through a pipe 14 to a meter 15 from which it is discharged through an upwardly extending pipe 16 which is connected at its upper end with the hose 11.

Mounted above the meter 15 is a device to indicate the quantities of liquid delivered, this device being of such a character that it will indicate

gallons, or other units of measurement, and fractions thereof, and it is driven from the meter. As here shown, see Figs. 1, 4 and 5, a supplemental frame or supporting bracket 45 is mounted in the housing above the meter and provided with uprights 46 in which is journaled a shaft 18 having secured thereto a gear 47 which meshes with a pinion 48 carried by the meter driven shaft 17, the gear ratio being such that the shaft 18 will make one complete rotation for each gallon, or other unit, of liquid delivered. The shaft extends beyond the housing and has secured thereto a pointer 19 which travels over a dial 21 mounted on the outer side of the housing 5 and graduated in gallons, or other units of measurement, and in fractions thereof. In the present instance, the indication is made on both sides of the housing and the shaft therefor extends beyond both sides of the housing and is provided at each end with a pointer 19. These pointers make one complete rotation for each gallon delivered and the reading is upon the fractional graduations on the dial, that is, the graduations ¼, ½ and ¾. Rotatably mounted on the shaft 18 near each end thereof are sleeves 49 and 50 which extend through the respective walls of the housing and have secured to their outer ends pointers 20 adapted also to travel over the faces of the dials and to indicate thereon the gallons of liquid delivered. Each sleeve is provided at its inner end with a gear 51 which meshes with a pinion 52 on a countershaft 53 rotatably mounted in the uprights 46 and preferably arranged above the shaft 18. The shaft 18 has secured thereto, adjacent to one of the gears 51, a trip arm or pawl 54 arranged to engage and actuate a star wheel 55 secured to the shaft 53. The trip arm 54 being rigidly secured to the shaft 18 it will be apparent that it will engage and actuate the star wheel once for each rotation of the shaft 18 and the ratio of the gears 51 and 52 is such that the indicating pointers 20 will be advanced a distance equal to one gallon on the face of the dial for each rotation of the shaft 18. The sleeve 49 is connected with the shaft 18 by a one-way clutch which will permit the shaft to rotate forwardly with relation to the sleeve and will cause the sleeve to rotate with the shaft when the latter is moved in a reverse direction. As here shown, this one-way clutch is in the form of a spring pressed pin 56 slidably mounted in the sleeve 49 and adapted to enter a recess 57 in the shaft 18, this recess having an abrupt forward wall and a tapered rear wall so that when the shaft is rotated forwardly the pin will ride out of the recess and when the shaft is reversed the abrupt wall of the recess will engage the pin and cause the sleeve to rotate with the shaft. The clutch is so arranged that when the shaft picks up the sleeve the pointers 19 and 20 will be in alinement and will move together toward their initial or zero positions. The rotation of the shaft 18 and sleeve 49 in a reverse direction so changes the relative positions of the star wheel and the trip arm 54, that, when the pointers reach their initial positions, the trip arm will engage the end of a tooth of the star wheel and the movement of the trip arm and the shaft will be positively stopped. A detent pawl 58 is held normally in position by a weighted arm 59 to prevent forward movement or overthrow of the star wheel 55 when the latter is moved forward one step by the trip arm 54 and, further, to prevent forward movement of the star wheel when the trip arm is in disengaged relation to the star wheel. The trip arm 54 is provided with a laterally extending pin 60 to engage and lift the arm 59 immediately preceding contact of the trip arm with a tooth of the star wheel 55, thus lifting the detent pawl 58 out of engagement with the star wheel and permitting the trip arm to move the star wheel forward only one step. Just prior to disengagement of the trip arm 54 from the start wheel 55 during normal continuance of the forward movement, the pin 60 will permit the arm 59 to drop and the detent pawl 58 to re-engage the star wheel 55 to prevent further forward or overthrow movement of the star wheel until the trip arm has again reached a point immediately preceding engagement with the star wheel. A frictional retarding device 61 affords additional resistance to the overflow of the star wheel. Reverse movement is imparted to the shaft 18, for resetting the indicating devices, in a manner to be hereinafter described. It is desirable that the shaft 18 shall rotate in a reverse direction independently of the meter driven shaft 17. For this purpose the gear 47 may be connected with the shaft 18 by a suitable clutch 62 which is here shown as a friction clutch which will cause the shaft to be rotated by the gear when the latter is actuated but will slip and permit the shaft to rotate in the gear when the shaft is rotated and the gear held against movement.

The registering mechanism as a whole includes, in addition to the visual registering, or indicating, device, a second device for registering the quantities of liquid delivered so that a printed record may be taken therefrom and this second registering device is in the present instance contained in a supplemental housing 22 mounted on a bracket 62 arranged at one side of the cabinet or housing 5. The registering device comprises a countershaft 23 on which are mounted counterwheels 24. These counterwheels are actuated by mechanism mounted on an operating shaft 25 arranged in the housing 22 and connected by gears 26 and 27 with a shaft 28 which extends into the cabinet 5 and has secured thereto a pinion 63 which meshes with the gear 47 on the shaft 18 of the indicating device. The means for operating the counterwheels 24 on the shaft 25 forms no part of the present invention. Preferably it comprises cam operated pawls, one of which is shown in Fig. 8 at 64, and is rotatably and slidably mounted on the shaft 25 and is operated by a cam 65 on that shaft. The nose of the pawl engages a ratchet wheel 66 connected with one of the counterwheels 24 and is held in engagement therewith by a spring 67 which also actuates the pawl when it is released by the cam 65. The operating shaft 25 also actuates mechanism for resetting the counterwheels 24 and the cams 65 at the end of each registering operation. This mechanism is not shown in detail but it comprises a gear 68 mounted on the shaft 25 and arranged to be actuated by a mutilated gear 30 mounted on a resetting shaft 31 which, in the present instance, is mounted in the rear of the shaft 25. The ratio of the gears 30 and 68 is such that one complete rotation of the shaft 31 will impart a single rotation to the gear 68. The resetting shaft 31 may be operated in any suitable manner but preferably is provided with a manually actuated device such as a crank 32, as shown in Fig. 1. In order to limit the movement of the shaft 31 and gear 30 to a single rotation upon each operation thereof the shaft 31 has rigidly secured thereto a pair of oppositely extending arms 69 and

70. The arm 69 has in its lower edge a recess 71 and the arm 70 has a laterally extending stud 72. Pivotally mounted below the arms is a pair of rigidly connected dogs 73 and 74. The dog 73 has a tapered nose adapted to enter the recess 71 in the arm 69 and to positively stop the movement of the shaft 31. A spring 75 connected with the dog 74 tends to move the two dogs about their axes and to carry the dog 73 out of line with the arm 69. When the parts are in their normal positions the end of the dog 73 is seated in the recess and is thus held against movement by the spring. When the shaft 31 is to be operated a short movement is imparted to the crank 32 in a reverse direction, thus moving the arm 69 out of engagement with the dog 73 and permitting the latter to be retracted by the spring, thereby releasing the shaft for rotation, which is imparted thereto by rotating the crank 32 in a forward direction. As the shaft approaches the end of one complete rotation the stud 72 on the arm 70 will engage the dog 74 and move the dog 73 into line with the recess in the arm 69. The dog 74 is of such a length that the stud 72 will clear the same just before the arm 69 contacts with the dog 73 but the tapered end of the dog 73 will have entered the recess 71 before the stud clears the dog 74 and the dog 73 is thus prevented from moving out of line with the arm and the shaft is positively stopped.

The resetting shaft 31 also actuates the shaft 18 to reset the indicating pointers. As here shown, the shaft 31 is connected by gears 33 with a shaft 34 which is rotatably mounted in the housing 22 and extends into the cabinet 5 and is there connected with the shaft 18. Inasmuch as a complete rotation of the shaft 31 is necessary to reset the counterwheels and the indicating pointers may be returned to their initial positions with less movement of the shaft 31 it is desirable that the connection between the shaft 31 and the shaft 18 should be of such a character as to permit the shaft 31 to continue its rotation after the pointers are in their initial positions, that is, after the reverse movement of the shaft 18 has been stopped by contact of the trip arm 54 with the star wheel 55, which, as has been explained takes place when the pointers have been returned to their initial positions. For this purpose I have interposed between the shafts 31 and 18 a slip connection. As here shown, the shaft 34, which is geared to the shaft 31 and which is preferably provided with universal joints, is connected with the hub 76 of a plate or supporting member 77, which hub is rotatably mounted in a bracket 78 carried by the frame 45. Arranged in line with the shaft 34 is a shaft 36 forming in effect an extension of the shaft 34 and having secured thereto a gear 79 which meshes with a pinion 80 on the shaft 18, as shown in Fig. 4. Rigidly secured to the shaft 18, adjacent to the supporting member 77, is a friction drum 35 with which cooperate friction members, such as friction shoes 81 which extend about the periphery of the drum 55 and which are pressed into frictional engagement therewith by a spring 82. The frictional contact between the shoes and the drum is sufficient to cause the shaft 18 and its associated parts to rotate with the shaft 31 but when the movement of the shaft 18 has been positively stopped with the pointers in their initial positions the shoes 81 will slip on the drum and permit the further movement of the shaft 31, when such further movement is necessary to complete the resetting of the counterwheels. It is desirable, however, that the connection between the shafts 18 and 31 should be interrupted during the delivery operation to permit the free rotation of the shaft 18 by the meter. I have therefore provided means for automatically separating the friction members and thereby disconnecting the shaft 36 from the shaft 34. In the construction shown an expanding device 83 is pivotally mounted on the supporting member or plate 77 between the free ends of the friction shoes 81 and is provided with a laterally extending arm 84 having at its outer end a head 85. A fixed actuating device is arranged to be engaged by the head 85 of the arm 84 and to cause the latter to actuate the expanding device to move the shoes out of engagement with the drum when the resetting shaft 31 is restored to its initial position. This actuating device is shown as a stud 86 mounted on the bracket 78 beneath the friction driving element and so arranged that the last portion of the movement of the friction driving element by the shaft 31 will move the head 85 onto the stud 86 and leave the same there when the movement of the shaft 31 is stopped. The expanding device is thus caused to move the shoes out of frictional contact with the drum. The first portion of the next movement of the shaft 31 will carry the head 85 of the expanding device out of engagement with the stud and permit the shoes to again grip the drum, thus connecting the shaft 18 with the shaft 31.

For the purpose of preventing the operation of the resetting mechanism while the delivery mechanism is in operation and for preventing the operation of the delivery mechanism while the resetting mechanism is in operation I have provided an automatic locking mechanism, as shown in Figs. 1, 2 and 3. As shown in Fig. 2 the resetting shaft 31 extends from the supplemental casing 22 into the cabinet 5 and is rotatably supported at its inner end by a frame member 37. Rigidly secured to the shaft, within the cabinet 5, is a locking member, here shown in the form of a disk 38 having a peripheral notch 39. A second locking member is mounted adjacent to the locking member 38 and is movable into and out of locking relation thereto. In the present construction this second locking member comprises a lever 40 pivotally mounted at 41 on a bracket 42 depending from the frame member 37. The lower end of the locking member 40 is connected by a rod 43 with the switch actuating or controlling member 12, so that the locking member 40 will move with the switch actuating member whenever that member is operated. The connection between the locking member 40 and the switch actuating member is such that when the switch actuating member is in its inoperative position, in which position the switch is open, and the resetting device is in its normal or zero position, the upper end of the locking lever 40 will be located alongside of the disk 38 and in line with the notch 39 therein. The two members being out of line one with the other each member is free to rotate with relation to the other. If the resetting device is moved from its normal or zero position the disk 38 will be rotated to move the notch out of line with the locking lever, thereby bringing a solid portion of the disk into line with that lever and locking the same against movement by the switch actuating member 12 and thereby positively preventing the switch from being closed and the delivery mechanism operated until the resetting device has been returned to its normal or zero position. If the switch actuating mem-

ber is moved to its operative position to close the switch, while the resetting mechanism is in its normal position, the upper end of the actuating lever 40 will enter the notch 39 in the disk 38 and thereby lock the resetting mechanism against movement so long as the switch is closed.

It will be apparent therefore that I have provided a very simple and efficient device which is operated automatically to positively prevent the operation of the resetting device while the delivery mechanism is in operation and to positively prevent the delivery mechanism from being started into operation while the resetting mechanism is in operation or has been moved from its normal position.

While I have shown and described one embodiment of my invention I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a liquid dispensing apparatus comprising mechanism for delivering measured quantities of liquid, a device to register the quantities of liquid delivered, means for resetting said registering device, and a device to control the operation of said delivery mechanism, cooperating locking members connected respectively with said resetting means and said controlling device, each locking member being movable with relation to the other locking member when said resetting device is in its normal position and said controlling device is in a position to prevent the operation of said delivering mechanism, said locking members having parts arranged to be brought into interlocking relation by the initial movement of either said resetting means or said controlling device.

2. In a liquid dispensing apparatus comprising mechanism for delivering measured quantities of liquid, a device to register the quantities of liquid delivered, means for resetting said registering device, and a device to control the operation of said delivery mechanism, a locking member connected with said resetting device for rotation thereby and having a notch therein, a second locking member mounted adjacent to said rotatable locking member and connected with said controlling device for movement therewith, said locking members being so arranged that when said resetting device is in its normal position and said controlling device is in a position to prevent the operation of said delivering mechanism said second locking member will be located at one side of said rotatable locking member and in line with the notch therein, whereby either locking member may be moved with relation to the other and the initial movement of said resetting device will rotate said rotatable locking member to bring a solid portion thereof into line with said second locking member or the movement of said controlling device in a direction to cause the operation of said delivery mechanism will cause said second locking member to enter said notch in said rotatable locking member.

3. In a mechanism of the character described comprising a registering device, means to reset said registering device, a controlling device movable to an operative position to cause the operation of said registering device and to an inoperative position to prevent the operation of said registering device, a locking member connected with said resetting means for movement thereby and having a notch in an edge thereof, and a second locking member movable into and out of the notch in the first mentioned locking member and connected with said controlling device for movement therewith, said locking members being so arranged that when said resetting means is in its normal position and said controlling device is in its inoperative position said second locking member will be located at one side of said first mentioned locking member and in line with said notch and each locking member will be movable with relation to the other locking member, and the movement of said resetting means from its normal position will move said first mentioned locking member to bring a solid portion thereof into line with said second locking member, or the movement of said controlling device from its inoperative position will cause said second locking member to enter the notch in the first locking member.

4. In a mechanism of the character described, comprising a registering device, means to reset said registering device, a controlling device movable to an operative position to cause the operation of said registering device and to an inoperative position to prevent the operation of said registering device, a locking disk connected with said resetting means for rotation thereby and having a peripheral notch, a locking lever pivotally mounted adjacent to said disk and having a part adapted to enter the notch in said disk, said locking member being connected with said controlling device for movement therewith, said locking disk and said locking member being so arranged that said part of said lever will normally be located in line with the notch in said locking disk but out of engagement therewith, and the rotation of said disk by said resetting means will move said notch out of line with said locking member or the movement of said controlling device out of its inoperative position will move said part of said locking member into the notch in said disk.

5. In a liquid dispensing apparatus comprising motor operated mechanism to deliver measured quantities of liquid, a device to register the quantities of liquid delivered, means to reset said registering device, and a switch operating device to start and stop said motor operated mechanism, a locking device comprising a movable part connected with said switch actuating device for movement thereby into a position to prevent the operation of said resetting means when said switch actuating device is in its starting position.

6. In a liquid dispensing apparatus comprising motor operated mechanism to deliver measured quantities of liquid, a device to register the quantities of liquid delivered, means to reset said registering device, and a switch actuating device to start and stop said motor operated mechanism, cooperating locking members connected, respectively, with said resetting means and said switch actuating device for movement thereby and so arranged that the initial movement of said resetting means will move that locking member which is connected therewith into a position to prevent the movement of the other locking member and said switch actuating device.

7. In a liquid dispensing apparatus comprising motor operated mechanism to deliver measured quantities of liquid, a device to register the quantities of liquid delivered, means to reset said registering device, and a switch actuating device to start and stop said motor operated mechanism, a locking member connected with said resetting

means for movement therewith, and a second locking member connected with said switch actuating device for movement thereby into locking relation to the first mentioned locking member to hold said resetting means against movement when said switch actuating device is in its starting position, said first mentioned locking member being movable by said resetting means into locking relation to said second locking member to hold said switch actuating device against movement to its starting position after initial movement has been imparted to said resetting means.

8. In a liquid dispensing apparatus comprising motor operated mechanism to deliver measured quantities of liquid, a device to register the quantities of liquid delivered, means to reset said registering device, and a switch actuating device to start and stop said motor operated mechanism, a locking disk connected with said resetting means for rotation thereby and having the peripheral notch, a locking member connected with said switch actuating device for movement thereby and having a part arranged adjacent to said disk and adapted to enter the notch therein, said disk and said locking member being so arranged that when said resetting means is in its normal position said notch will be in line with said part of said locking member and when said resetting means has been moved from its normal position an unnotched portion of said disk will be in the path of movement of said locking member

9. A liquid dispensing system including a pump and driving means therefor, a liquid meter for measuring the dispensed liquid, an indicator driven by the meter, and means for preventing the resetting of said indicator while the said driving means is driving said pump.

10. A liquid dispensing system including a pump and an electric motor for driving the same, a switch through which the motor may be energized, a liquid meter for measuring the liquid dispensed, a resettable indicator driven by said meter having a predetermined initial position, and means operated with said switch for preventing the resetting of said indicator while said switch is closed.

11. A liquid dispensing system including a pump and an electric motor for driving the same, a switch through which the motor may be energized, a liquid meter for measuring the liquid dispensed, a resettable indicator driven by said meter having a predetermined initial position, means for preventing the resetting of said indicator, and a device moved with said switch to render said means inoperative while said switch is in open position.

12. A liquid dispensing system including a pump and driving means therefor, control means through which when in one position said driving means may be energized and in another position said driving means is not energized, a liquid meter for measuring the dispensed liquid, an indicator driven by the meter, and means for preventing the resetting of said indicator while said control means is in said one position and operated by said control means upon movement of the latter into said other position whereby to permit the resetting of said indicator.

ERIC H. BRADLEY.