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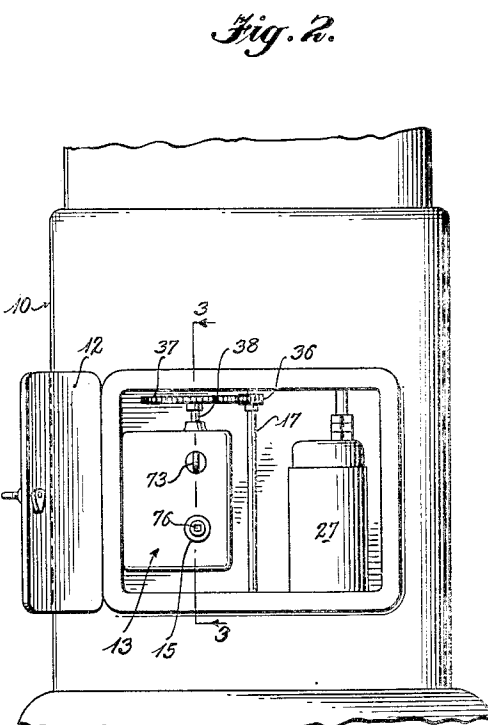
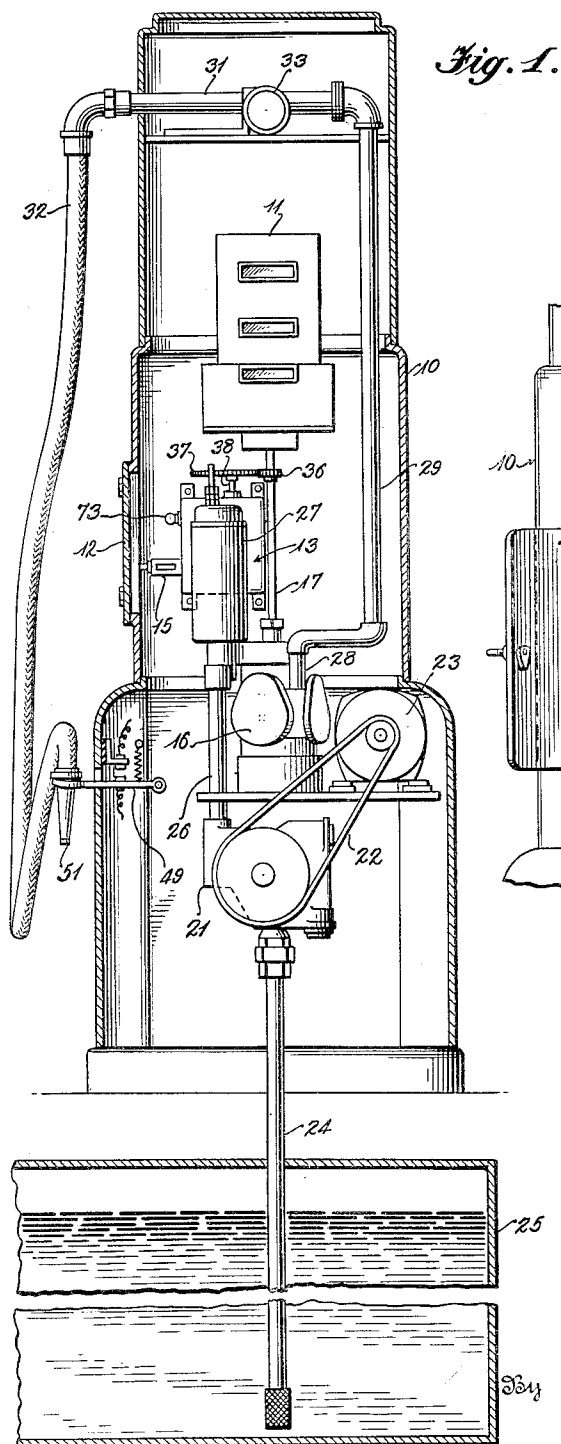
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2,577,115

INVENTORY CONTROL DEVICE FOR FUEL DISPENSING DEVICES

Filed April 16, 1945

5 Sheets-Sheet 1



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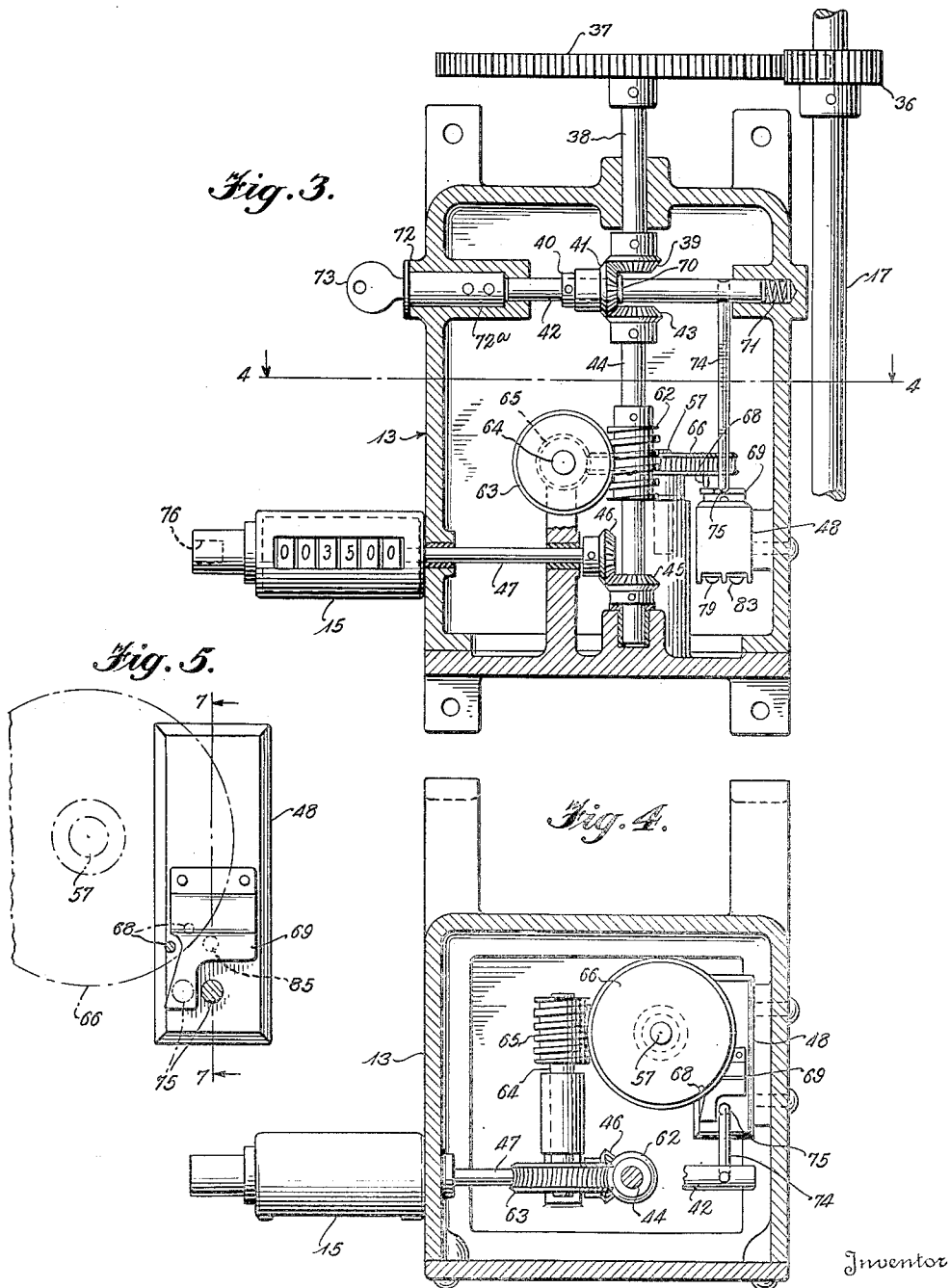
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INVENTORY CONTROL DEVICE FOR FUEL DISPENSING DEVICES

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5 Sheets-Sheet 2



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INVENTORY CONTROL DEVICE FOR FUEL DISPENSING DEVICES

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5 Sheets-Sheet 3

Fig. 6.

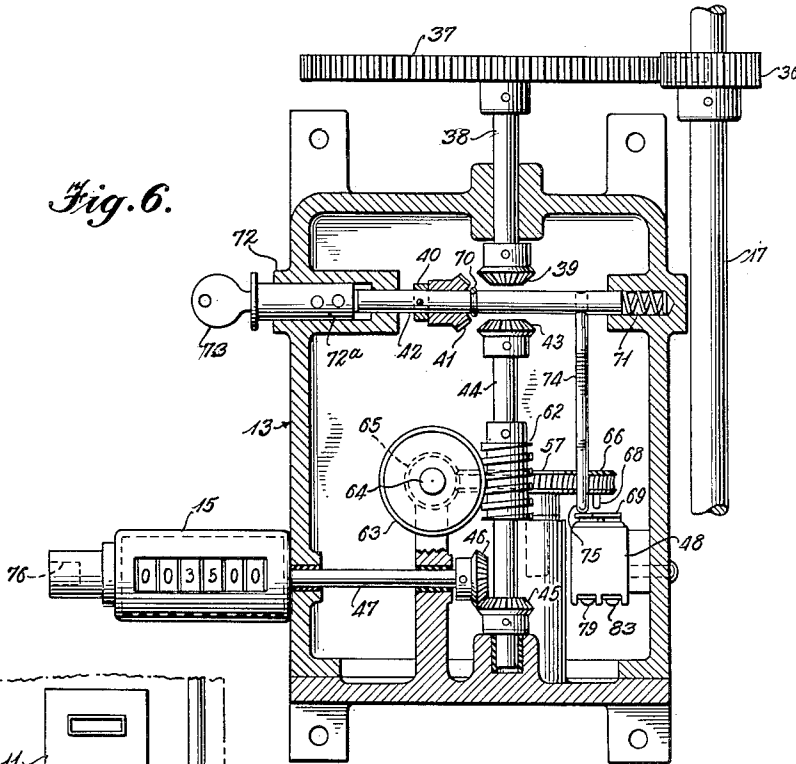


Fig. 7.

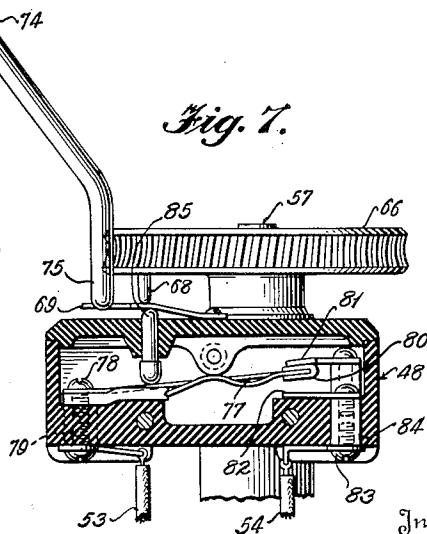
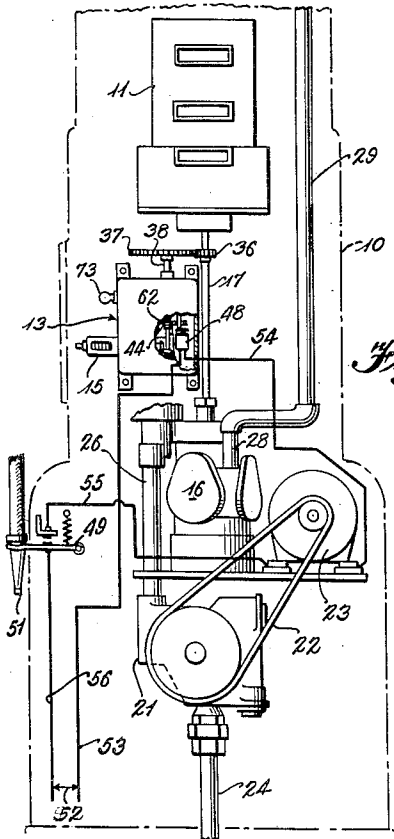


Fig. 8.



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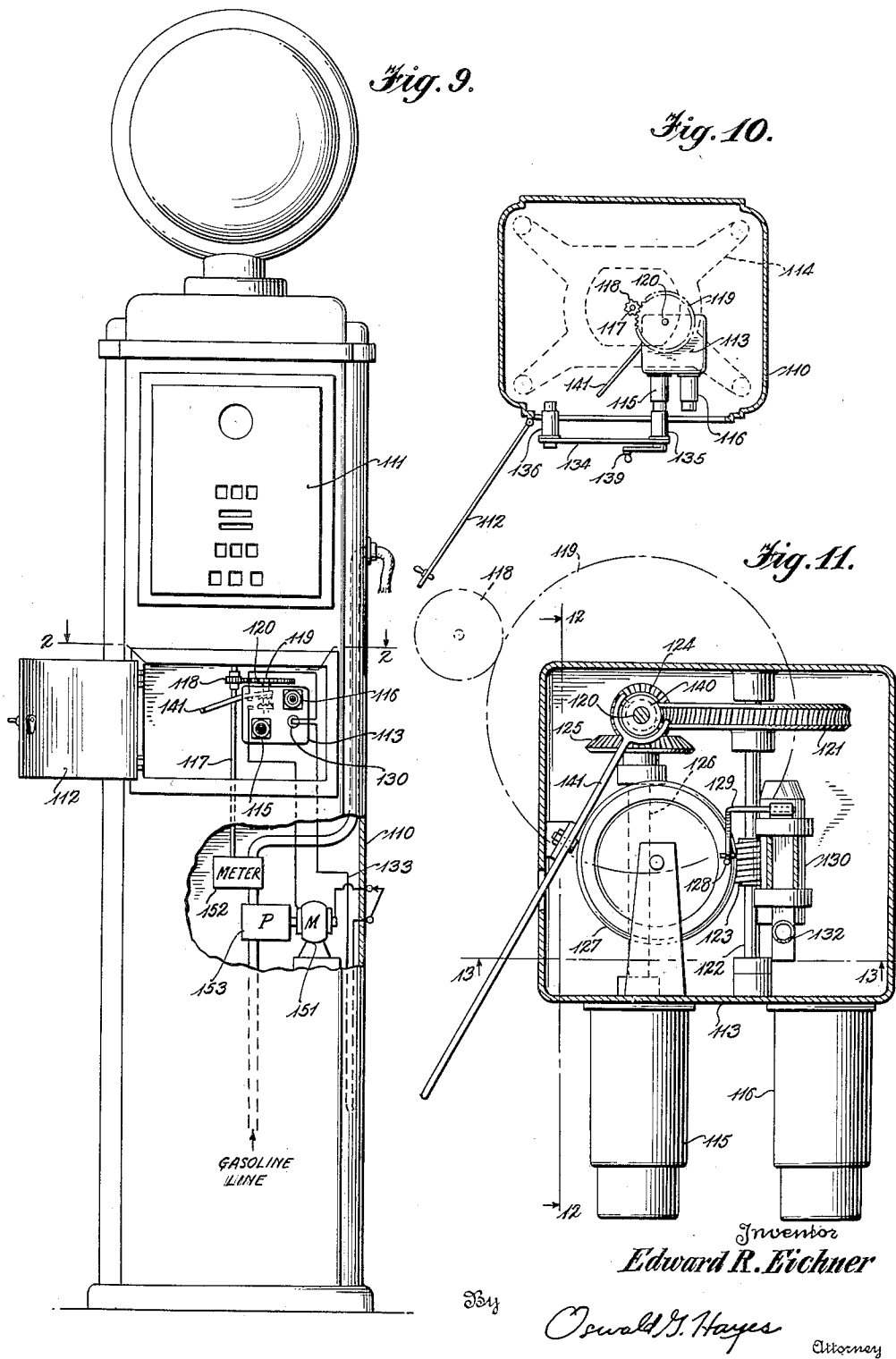
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INVENTORY CONTROL DEVICE FOR FUEL DISPENSING DEVICES

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5 Sheets-Sheet 4



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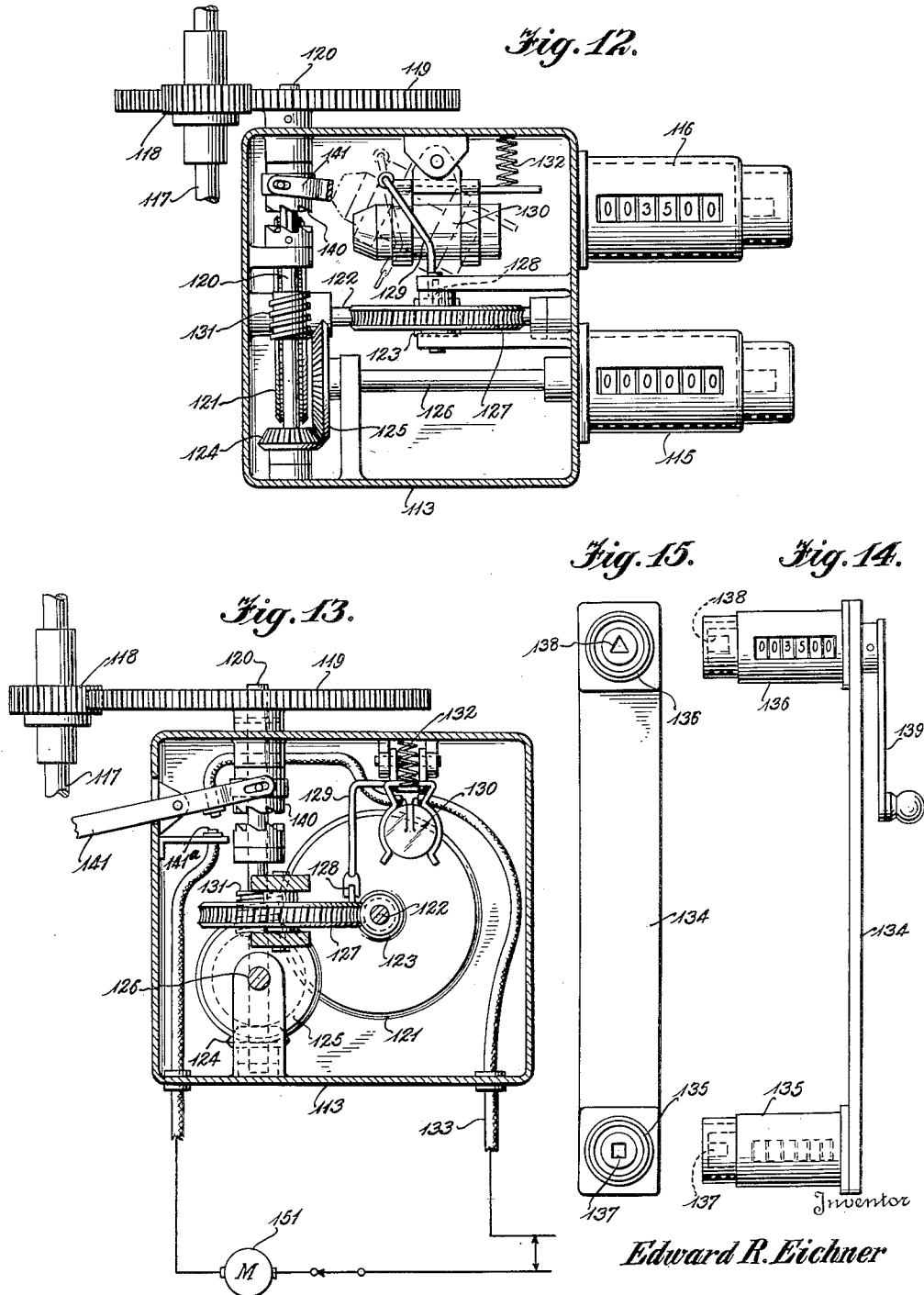
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INVENTORY CONTROL DEVICE FOR FUEL DISPENSING DEVICES

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5 Sheets-Sheet 5



UNITED STATES PATENT OFFICE

2,577,115

INVENTORY CONTROL DEVICE FOR FUEL
DISPENSING DEVICESEdward R. Eichner, Montclair, N. J., assignor to
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Application April 16, 1945, Serial No. 588,494

5 Claims. (Cl. 222-17)

1

This invention is directed to a retail dispenser of liquids of the type commonly known as "curb pumps" designed for delivery of gasoline and the like from a storage tank to the gasoline tank of an automobile or other container of small size for use by the ultimate consumer. More specifically, the invention is concerned with a novel element for use in connection with said pumps whereby wholesale deliveries to the retailer can be made on a more satisfactory basis.

Many gasoline retailers, or service stations, handle relatively small amounts of gasoline per unit of time and have limited cash and/or credit to pay for wholesale deliveries and must of necessity take small deliveries at frequent intervals. This involves considerable expense which should be avoided if possible.

I have designed a curb pump control which enables the supplier of such small retailers to make large deliveries, with the economy attendant thereon, while avoiding unjustifiable extension of credit. Primarily, the apparatus consists of means for setting the pump, which is to make deliveries from an associated storage tank, to deliver only a predetermined quantity of liquid. After the delivery of the said quantity of liquid, it is necessary to reset the device, even though there may be large quantities of fluid in the associated storage tank, before further retail deliveries can be made.

One of the objects of my invention therefore is the provision of novel means to be associated with or used in combination with a liquid dispensing pump, for making said dispensing pump inoperative after the delivery of a predetermined amount of liquid until the mechanism is reset for further dispensing operations.

A further object of the invention is the provision in combination with a dispensing means and a meter and register therefor of an electric circuit controlling said dispensing means, a clutch normally engaged to prevent resetting of said register means and means operated either by predetermined movement of the register or by declutching movement of the clutch for breaking said electric circuit, and preventing further dispensing operations.

The nature of the invention, together with additional objects and advantages thereof, will be apparent from the following detailed description of preferred embodiments thereof illustrated in the annexed drawings, wherein:

Figure 1 is a view in elevation of a conventional curb pump showing a preferred embodiment of this invention;

Figure 2 is a fragmentary view in elevation, looking at right angles from the left to the view of Figure 1;

Figure 3 is a view in vertical section taken substantially on the line 3-3 of Figure 2, the actuating shaft and pinion being shown in elevation;

Figure 4 is a view in horizontal section looking

2

downward taken substantially on the line 4-4 of Figure 3;

Figure 5 is an enlarged top plan view looking in the same direction as the sectional view of Figure 4, but having parts broken away to show details of the switch actuating mechanism;

Figure 6 is a sectional view similar to Figure 3 but showing the reset position of various elements;

Figure 7 is a view in vertical section taken substantially on the line 7-7 of Figure 5;

Figure 8 is a diagrammatic view corresponding somewhat to Figure 1, showing the electrical connections, and having parts not forming a part of the electric circuit showing in relatively light lines;

Figure 9 is a view in elevation of a conventional curb pump illustrating another embodiment of my invention in operative position;

Figure 10 is a sectional view on the line 10-10 of Figure 9;

Figure 11 is a plan view of the control device of the embodiment of Figure 9, the clutch-operated interlock being omitted in the interest of convenience of illustration;

Figure 12 is a view in section taken substantially on the line 12-12 of Figure 11, the clutch-operated interlock being omitted in the interest of convenience of illustration;

Figure 13 is a view in section taken substantially on the line 13-13 of Figure 11, including a circuit diagram showing schematically a clutch-operated circuit control switch;

Figure 14 is a side elevation of a reset key mechanism used in connection with the control device of the embodiment shown in Figure 9; and

Figure 15 is an end view of the reset keys shown in Figure 14 for use with the embodiment of my invention shown in Figure 9.

The curb pump shown somewhat diagrammatically in Figure 1 is of generally conventional design for the dispensing of gasoline and includes a casing 10, and a register indicated generally at 11 and having a door 12 arranged to permit access to the interior of the casing. Adjacent to the door within the casing is a control box 13 secured to the rear wall of the casing. The box 13 carries a totalizer 15. Below the box 13 is a liquid meter 16 which is connected through gearing later to be described, with the totalizer 15. The connection between the meter 16 and the totalizer 15 includes the shaft 17 of the meter, which shaft may be designed for eight revolutions per gallon delivered.

Positioned below the meter 16 is a gasoline pump 21 driven through a belt 22 by an electric motor 23 and adapted to draw gasoline through a pipe 24 from an underground storage tank 25 and deliver the gasoline through a pipe 26 to an air separator 27 and thence into the meter 16. From the meter 16 the gasoline is forced through pipes 28, 29 and 31 and is dispensed through a

hose 32. Interposed in the pipe 31 is a liquid flow indicator 33. Flow of gasoline through the meter 16 causes rotation of the shaft 17 and thus operates the register 11 which preferably may be capable of indicating the price per gallon, gallons dispensed and total price of the liquid dispensed.

As stated above, the totalizer 15 is also driven from the meter 16. This drive is through a series of gears and shafts shown most clearly in Figures 1, 2, 3 and 4. The shaft 17 carries, keyed to it, a pinion 36 which meshes with a gear 37 secured to and carried by a shaft 38 passing through and carried by the control box 13. The shaft 38 drives a bevel gear 39 keyed thereto and normally meshing with a bevel gear 41 carried by but rotatable on a sliding shaft 42 supported in keyways in the control box 13. The bevel gear 41 normally meshes with a bevel gear 43 carried on the upper end of and keyed to a shaft 44 also journaled in the control box 13. At its opposite lower end the shaft 44 carries keyed to it another bevel gear 45 which meshes with still another bevel gear 46 carried on and keyed to a shaft 47. The shaft 47 is also journaled in the control box and extends into and operates the numerals of the totalizer 15. Thus, with the parts in position as shown, the pumping of gasoline operates the meter, which causes rotation of the shaft 17 and through the gears and shafts above enumerated operates the totalizer 15 to show the total number of gallons remaining to be dispensed before the totalizer has to be reset. The above described mechanism and especially the totalizer 15 comprises indicating means movable responsive to movement of the meter shaft.

Liquid dispensing means are provided as above described whereby with the parts in their normal operative position, gasoline may be dispensed from the device as desired. There is also provided an electric circuit controlling operation of the dispensing means. Referring particularly to Figure 8, it may be seen that provided the switch in the switch box 48 is closed (its normal condition) closing of the switch 49 (which is arranged to be operated manually as by lifting the nozzle 51 attached to the hose 32 from its hook and/or by operating a switch on the nozzle itself) completes an electric circuit from the power source 52 through electric wires 53, 54, 55 and 56, switch box 48, motor 23, and switch 49 and causes operation of the electric motor 23. This operates the pump 21 (Figure 1) and forces gasoline through the path previously described and the hose 32 so that it may be dispensed from the nozzle 51.

Means are also provided whereby the dispensing of a predetermined amount of gasoline will interrupt the further pumping of gasoline until the mechanism is reset. This constitutes means responsive to dispensing operations to interrupt the circuit and make the dispensing means inoperative after a predetermined movement of the indicating means. This is best shown in Figures 3, 4 and 5. The shaft 44 carries a worm 62 which meshes with a worm wheel 63 carried by a shaft 64 and in turn drives a worm 65 carried by said shaft 64. The worm 65 drives a worm wheel 66 carried on a shaft 57. The worm wheel 66 carries a limit pin 68 which is adapted at times to ride upon an actuator leaf 69 mounted on the switch box 48. The switch in the switch box 48 is normally closed but when the actuator leaf 69 is depressed either by the limit pin 68 or by the safety cut out means hereinafter to be described, the switch is opened and prevents completion of the electric circuit to operate the motor 23. As will be presently described, the action of the limit

pin 68 upon the actuator leaf 69 causes an interruption of the electrical circuit and prevents further operation of the motor to drive the gasoline pump.

Means are provided to set the apparatus to make possible the delivery of any desired amount of gasoline before the circuit is interrupted. Referring now to Figures 3 and 6 it may be seen that the bevel gear 41 although mounted for rotation on the shaft 42 may not move longitudinally relative to the shaft 42 being restrained by collars 40 and 70 and that the shaft 42 normally holds the bevel gear 41 in mesh with the gears 39 and 43 (as shown in Figure 6), the shaft being positioned between a spring 71 and the bolt 72a of the lock 72. By means of the key 73, a representative of the wholesaler may withdraw the dowels of the lock 72 from their slots and the bolt allowed to move to the left to the position shown in Figure 6. Thereupon the shaft or rod 42 (urged by the spring 71) moves to the left and the bevel gear 41 moves out of mesh with the bevel gears 39 and 43. The bevel gear 41 thus constitutes a clutch means for connecting the indicating means to the dispensing means. As the shaft 42 moves to the left it carries with it to the left a rod 74 so that the lower end 75 of said rod 74 rides on the actuator leaf 69 mounted on the switch box 48. Thereupon the electric circuit is broken. At such time the representative of the wholesaler may (by means of a key fitted into the keyway 76 (see Figure 2) of the totalizer 15) rotate the shaft 47 to reset the totalizer and the associated gearing at any desired point. This rotation turns the shaft 44 and the bevel gears 45 and 43 and the worm 62 thereon and rotates the worm wheel 66 carrying the limit pin 68 but (assuming that the bevel gear 41 has moved to the left) does not affect the bevel wheels 41 and 39 or the shaft 38, the shaft 17 or any of the intermediate gears or shafts. The totalizer is set to show the number of gallons which may be dispensed. When the pump is again operated each gallon dispensed subtracts from the total shown on the totalizer and moves the limit pin 68 closer to the actuator leaf 69 so that when the last allowable gallon is dispensed the totalizer reaches zero and the limit pin 68 rides upon the actuator leaf 69 to depress the leaf 69 and open the electric circuit. Thus the rod 74, together with its associated parts, constitute a safety cut out means, operated by disconnecting movement of the clutch means (the bevel gear 41) to interrupt the circuit and make the dispensing means inoperative. The shaft 47 carrying the keyway 76 constitutes means operable only when the clutch means is disconnected for resetting said indicating means and for returning said additional switch means to a position in which it does not interrupt said electric circuit.

As has been pointed out above, means are provided to permit resetting the limit mechanism so that additional gasoline may be dispensed and means are also provided whereby while the limit mechanism is being reset, gasoline may not be dispensed.

The structure of the switch included in the switch box 48 is best shown in Figure 7. As may be seen the box 48 houses a spring leaf 77 secured by screws 78 to an inlet pole 79 and carrying at its opposite end a contact element 80 adapted to move with a snap action between contacts 81 and 82 secured in the box by screws such as screws 83. However inasmuch as contact 82 is insulated from all electrical connections, it is only when the element 79 is in contact with the con-

tact 81 that a circuit is formed. The contact 81 is secured by the screws 83 and is connected with the outlet pole 84. The element 80 is normally maintained in contact with the contact 81 but is moved out of contact so that the electric circuit is broken whenever said element 80 is depressed by a pin 85 bearing at its lower end on the element 77 but having its upper end extending through the switch casing and contacted by the actuator leaf 69.

It is believed that the operation of the above described embodiment will be readily understood. Upon initial installation the control mechanism will be set so that the pin 68 depresses the leaf 69 and the switch 80—81 is open and no gasoline may be dispensed. Thereafter the representative of the wholesaler may fill the storage tank 25 partially or completely. Upon payment by the retailer for any specified gallonage, the bolt 72a of the lock 72 is withdrawn disengaging the bevel wheel (or clutch) 41. The shaft 47 is then rotated to set the indicator 15 to show the gallonage paid for. This rotates the pin 68 away from the leaf 69 but the rod 74 (which was moved over the leaf 69 when the shaft 42 with withdrawn) prevents the completion of the circuit through the contacts 80—81. Then the representative pushes the bolt of the lock 72 in, moving the bevel wheel 41 into mesh with the wheels 39 and 43 and moving the rod 74 off of the leaf 69. This allows the contacts 80—81 to close. Upon closing of the manual switch 49 gasoline may be dispensed. The flow of gasoline through the meter 16 rotates the shaft 17 driving the register 11 and the worm wheel 66. Movement of the wheel 66 eventually (when the indicator 15 reaches zero) moves the pin 68 onto the leaf 69 and again prevents further operation of the pump. Another payment or arrangement for credit must be made by the retailer and the mechanism must be reset before more gasoline may be dispensed.

The curb pump shown somewhat diagrammatically in Figure 9 is of generally conventional design, including a casing 110 and a register panel indicated generally at 111. In the wall of the casing 110 is the usual door 112 to permit access to the interior of the pump and immediately behind said door is a control box 113 mounted in any suitable manner, as from the spider 114 (not shown in Figure 9). The box 113 carries two totalizers 115 and 116, the former being connected with the meter forming part of the operative pump mechanism in a manner more fully discussed below while the latter is independent of the pump except for the support it receives from the main structure. Connection between the meter 152 and the totalizer 115 is by means of the shaft 117 of the pump meter 152, which shaft usually is designed for 8 revolutions per gallon delivered. A pinion 118 is keyed to the meter shaft 117.

The pinion 118 meshes with a gear 119 rotatable about a shaft 120 passing through and carried by the control box 113, which shaft drives a bevel gear 124 keyed thereto and meshing with a bevel gear 125 on the shaft 126 of totalizer 115. Shaft 120 is driven from gear 119 through a jaw clutch 140, operated by clutch lever 141, the purpose of which will appear hereinafter. The elements are so arranged that rotation of the meter shaft 117 will cause reverse motion of the register in totalizer 115, reducing the number thereon by one for each eight rotations of shaft 117, indicating one gallon dispensed.

Also carried by and keyed to shaft 120 is a

worm 131 in driving relation with a worm wheel 121 on shaft 122. A second worm 123 on shaft 122 is in driving relationship with a worm wheel 127 carried in bearings on brackets from the wall of the control box. This latter worm wheel is adapted, when a predetermined position is reached, to operate a relay opening the pump circuit or to otherwise render the pump inoperative. In the embodiment shown, a pin 128 on the worm wheel 127 engages an arm 129 carried by the mounting of a mercury switch 130 which is normally biased to closed position by a spring 132. The gear trains driving totalizer 115 and worm wheel 127 from shaft 120 are so related that mercury switch 130 will be opened when the reading on totalizer 115 is zero. The switch 130 is in series with the pump motor by line 133, and it will thus be seen that no deliveries may be made from the curb pump after totalizer 115 reaches the zero position.

Resetting of totalizer 115 and operation of totalizer 116 is by means of a key mechanism shown in Figures 14 and 15. This consists of a bar 134 carrying two combined totalizer keys 135 and 136 corresponding to the totalizers 115 and 116 of the curb pump. The totalizer keys 135 and 136 each have shafts adapted at one end to engage and drive the shafts of totalizers 115 and 116 as by the keys 137 and 138, shown here as square and triangular in cross-section, respectively. At their opposite ends, the shafts of totalizers 135 and 136 are adapted to receive a keyed handle 139 in driving relationship. Thus, the totalizers 115 and 116 can only be operated by means of the keys 137 and 138 driven by shafts of totalizers 135 and 136, respectively, thus maintaining a record of the extent to which the totalizing key mechanism has been used.

Let it be assumed that a delivery of 3000 gallons of gasoline is made to a retailer who can pay for only 500 gallons. The driver of the delivery tank truck disengages clutch 140 and advances totalizer 116 by 3000 units after delivering that amount, takes pay for 500 gallons and advances totalizer 115 by 500 units, after which the jaw clutch is again engaged. As the retailer dispenses gasoline, the reading on totalizer 115 decreases until the operator deems it expedient to pay for additional gasoline and have the totalizer 115 reset. Payment may be accepted by a special agent or by a tank driver who happens to be in the neighborhood and the totalizer 115 is correspondingly reset. If, however, the retailer fails to pay for all the gasoline in his storage tank, he will be unable to dispense an amount in excess of that for which he has paid. An interlock is provided to prevent pumping when the clutch 140 is disengaged. Such an interlock is diagrammatically illustrated in Figures 9 and 13. The switch 141a in the circuit including mercury switch 130 and the driving motor 151 for the pump 153 closes said circuit when the clutch is engaged, while if the clutch is disengaged the motor 151 may not be operated. This arrangement serves to prevent frauds on the part of retail service station attendants since the amount of gasoline dispensable is entirely dependent upon the pre-set condition of register 115. If an attempt were made to operate the pump 153 without the register, it would be necessary to disengage clutch 140 which would automatically open the motor circuit.

It will be further apparent that both the retail operator and the truck driver have accurate records of net transactions. The driver, and his

employer, can readily determine both the amount delivered and the amount for which payment was accepted; and the retailer has a record of total deliveries and of the amount he can dispense without making additional payment.

It is to be understood that the above described embodiments are for the purpose of illustration only and various changes may be made without departing from the spirit and scope of my invention.

This application is a continuation-in-part of applicant's copending application Serial No. 444,655, filed May 27, 1942, now Patent No. 2,414,031. The embodiment of applicant's invention illustrated in Figures 9 to 15, inclusive, of this application was disclosed in the copending application, and the embodiment illustrated in Figures 1 to 8, inclusive, of this application represents an improvement thereover.

What is claimed is:

1. In a dispensing apparatus including a dispensing outlet, a supply tank, a mechanized pump for conveying fluid from said tank to said outlet, an electric circuit controlling the operation of said pump, switch means in said circuit and registering means controlled by fluid flow from said tank, a meter and gear train between said pump and registering means, and said fluid flow acting upon said meter and said gear train, the improvement comprising clutch means constituting a part of said gear train, lock means for rendering said clutch engaged or disengaged with said gear train, an additional switch means in said circuit, automatic means actuated by said gear train to open said additional switch means at a predetermined period of operation, means operable upon disengagement of said clutch to open said additional switch means and means operable only when said clutch is disengaged to reset said automatic means.

2. In a dispensing apparatus including a dispensing outlet, a supply tank, a mechanized pump for conveying fluid from said tank to said outlet, an electric circuit controlling the operation of said pump, switch means in said circuit and registering means controlled by fluid flow from said tank, said fluid flow acting upon a meter and gear train between said pump and registering means, the improvement comprising a disengageable gear in said gear train, lock means for maintaining said gear in and out of mesh with said gear train, an additional switch means in said circuit, a gear in said gear train having a projection thereon operable to open said additional switch at a predetermined point of operation, means operable upon disengagement of said disengageable gear to open said additional switch means and means operable only when said disengageable gear is disengaged to reset said gear having a projection thereon.

3. In a dispensing apparatus including a dispensing outlet, a supply tank, a mechanized pump for conveying fluid from said tank to said outlet, an electric circuit controlling the operation of said pump, switch means in said circuit and registering means controlled by fluid flow from said tank, said fluid flow acting upon a meter and gear train between said pump and registering means, the improvement comprising a disengageable gear in said gear train, a shaft carrying said disengageable gear, said gear being mounted for rotation but fixed longitudinally with respect to said shaft, a rod rigidly carried by said shaft, lock means for said shaft maintaining said gear en-

gaged or disengaged with said gear train, at least one additional switch means in said circuit, a worm gear in said train, a pin fixed with and carried by said worm gear, means actuated by said pin to interrupt said circuit, said rod operative to interrupt said circuit upon disengagement of said disengageable gear, means operative when said disengageable gear is disengaged to set said registering means and said worm gear whereby said pin will interrupt said circuit at a predetermined interval of dispensing operation which dispensing operation is made possible only upon re-engaging said disengageable gear.

4. In a dispensing apparatus, a fluid pumping means, an indicating means therefor, an electric circuit controlling the operation of said pumping means, a gear train between said pumping means and said indicating means, clutch means in said gear train for connecting said indicating means to said pumping means whereby said indicating means is operated by operation of said pumping means, switch means interposed in said circuit, means operated by disconnecting movement of said clutch means to operate said switch to interrupt said circuit and render said dispensing means inoperative comprising an actuating leaf element in connecting relation with said switch means and a projecting rider adapted to operate said leaf element when moved by movement of said clutch means, additional switch operating means movable responsive to movement of said indicating means during dispensing operations to open said switch and render said dispensing means inoperative after a predetermined movement of said indicating means comprising a worm wheel in said gear train, a pin secured to said worm wheel, and arranged at times to ride upon said leaf, and means operable only when said clutch means are disconnected for resetting said indicating means and for returning said additional switch operating means to a position in which the switch does not interrupt said electric circuit.

5. In combination, a dispensing apparatus comprising a pump, an electric motor driving said pump, an electric circuit supplying electric energy to said motor, a meter having a member moving proportionately to the flow of fluid through said meter, means to conduct fluid from said pump to said meter, means to conduct fluid from said meter, a control device driven from said moving meter member, a register operative responsive to movement of said control device, a rotatable element driven responsive to movement of said control device, a pin carried by said rotatable element, a normally closed switch in said circuit, means engageable by said pin to open said switch, means to disengage said control device, means operative upon disengagement of said control device to open said switch, means to reset said register and said rotatable element independently of said meter operative when said control device is disengaged.

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