Feb. 22, 1938. W. M. CARROLL 2,109,084

DISPENSING APPARATUS

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FIG. 1.

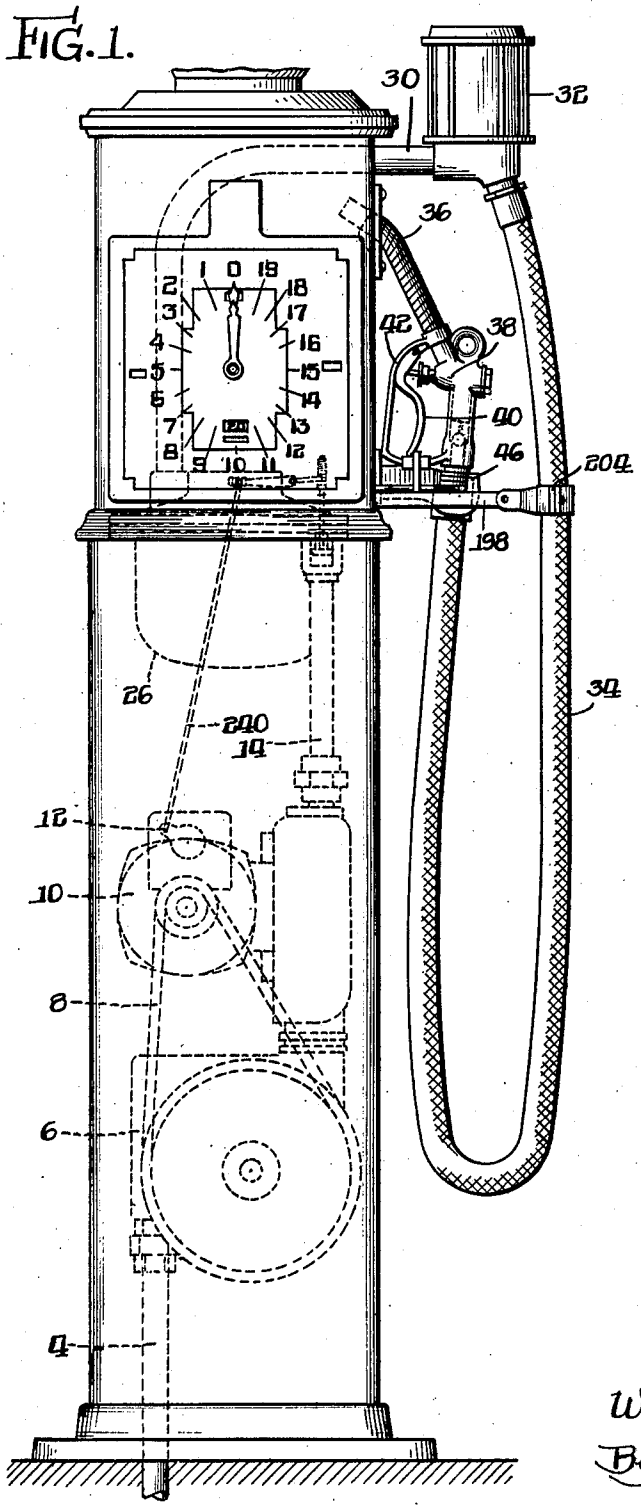

FIG. 2.

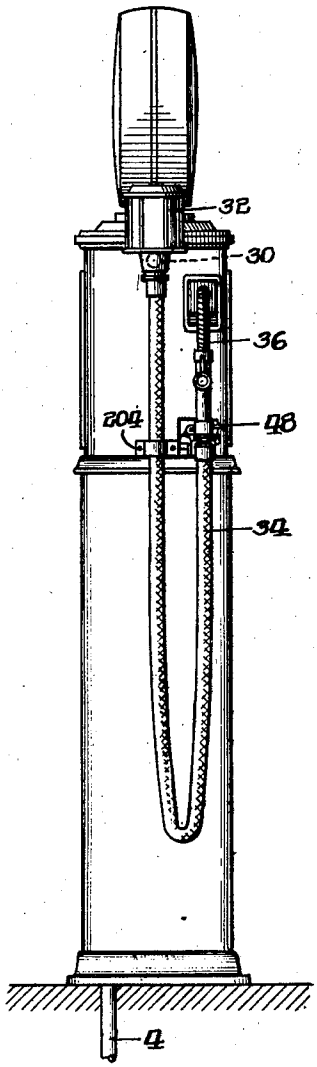

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FIG. 3.

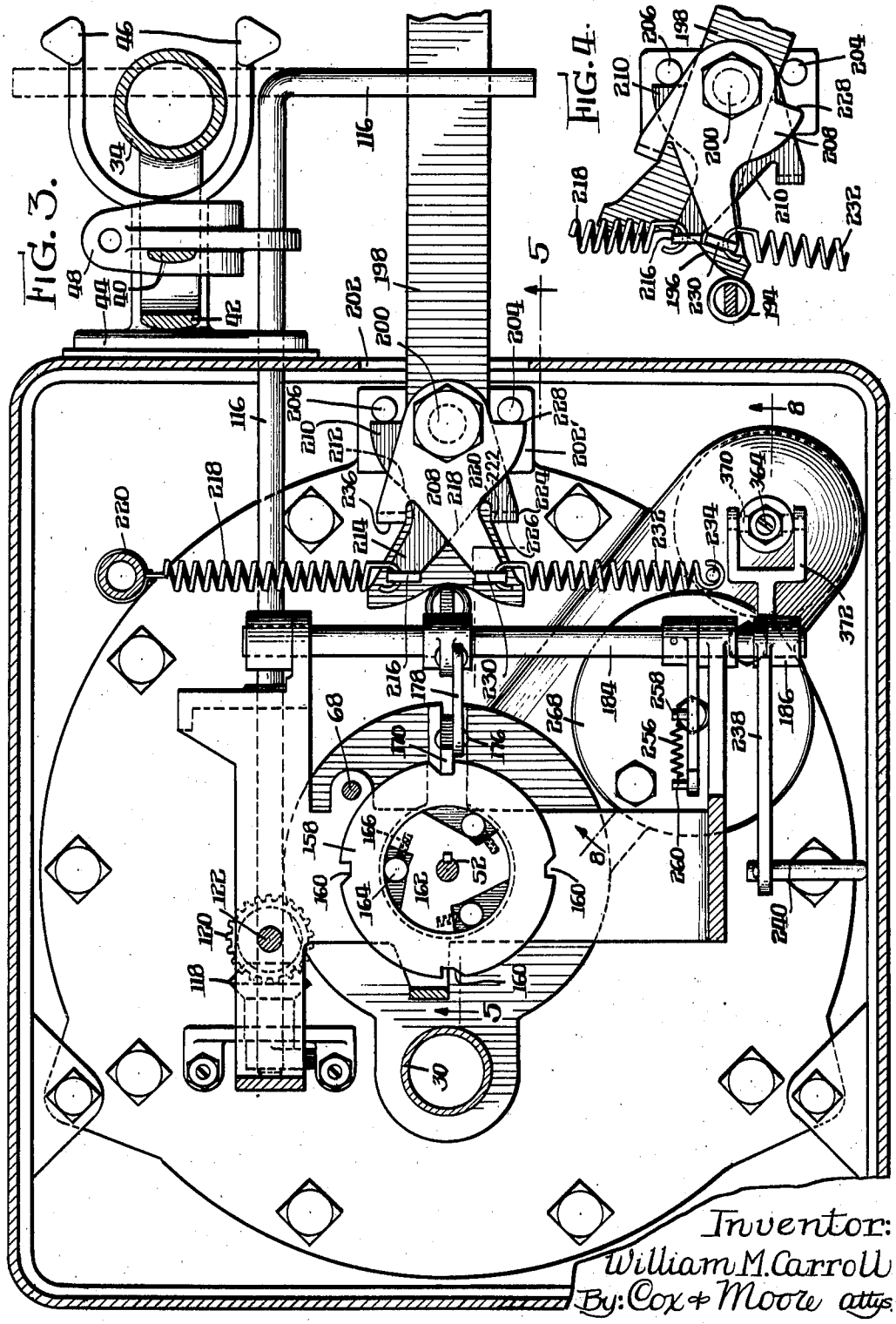

FIG. 4.

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DISPENSING APPARATUS

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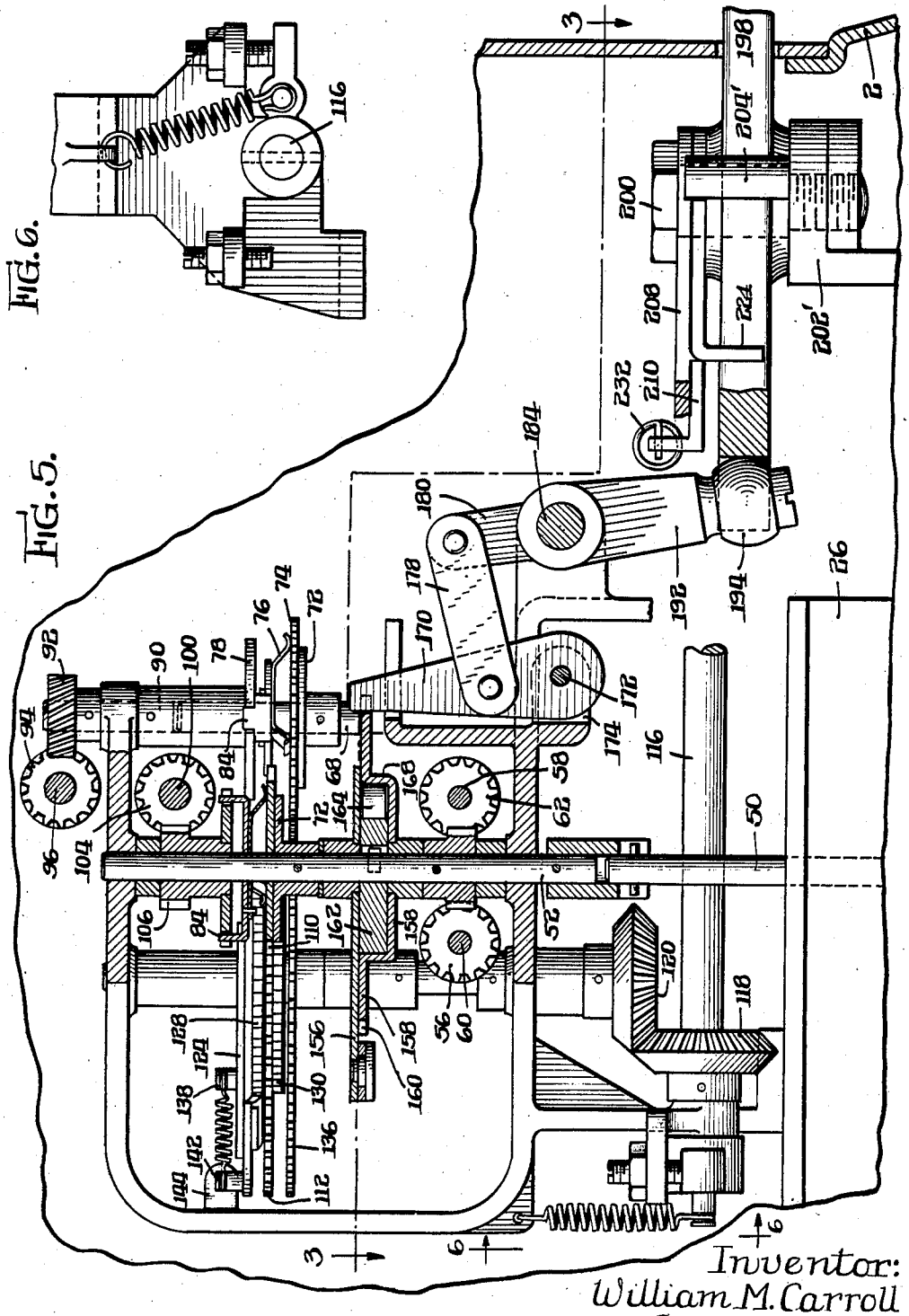
FIG. 6.

FIG. 5.



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DISPENSING APPARATUS

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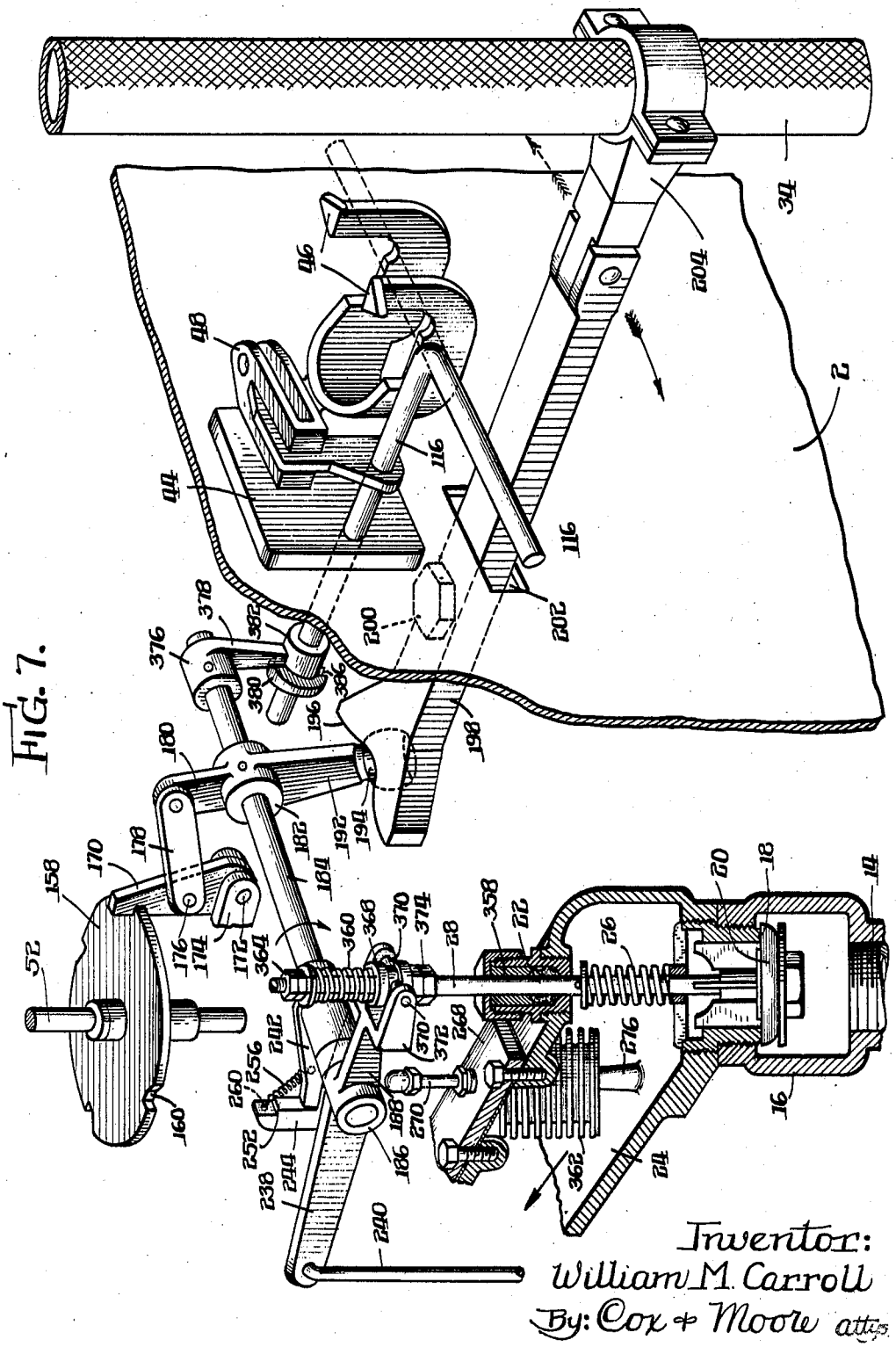
FIG. 7.



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DISPENSING APPARATUS

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FIG. 8.

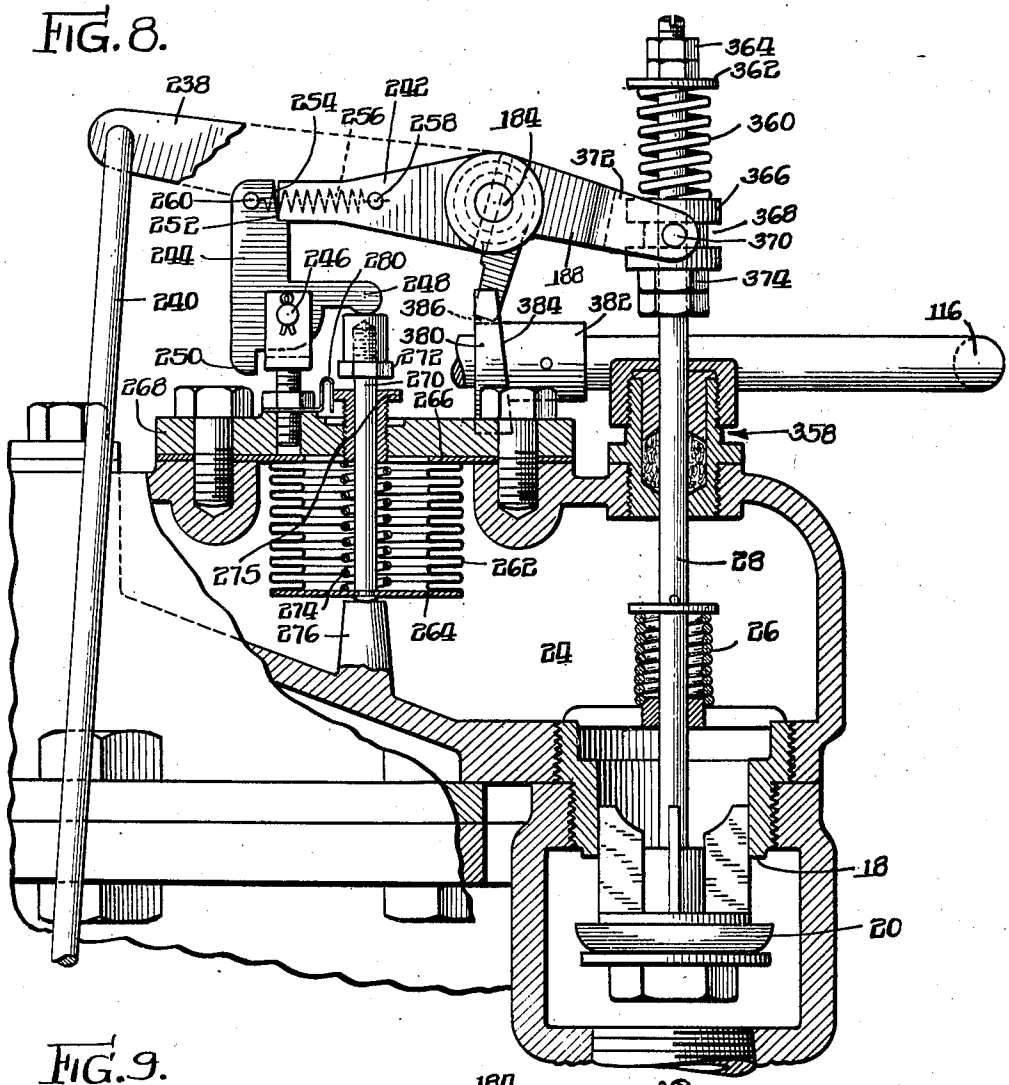
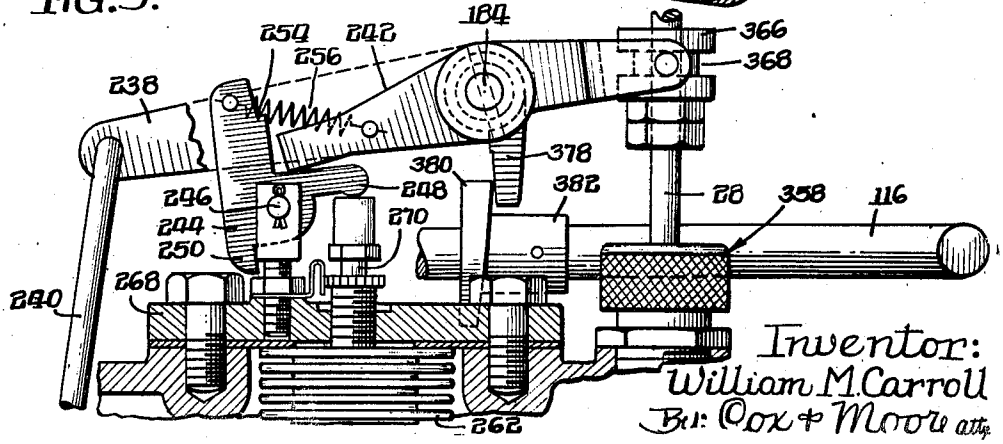


FIG. 9.



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DISPENSING APPARATUS

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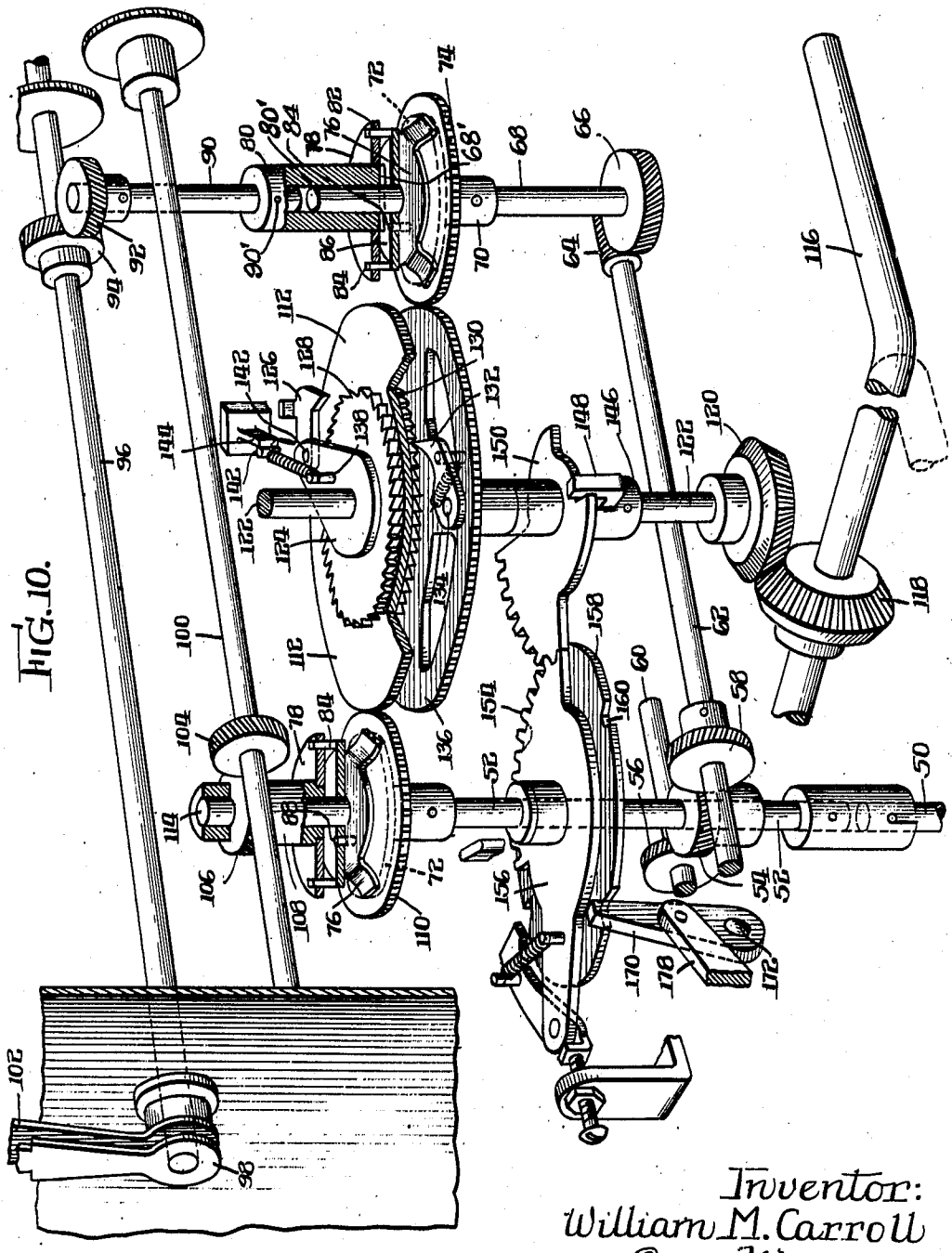

FIG. 10.

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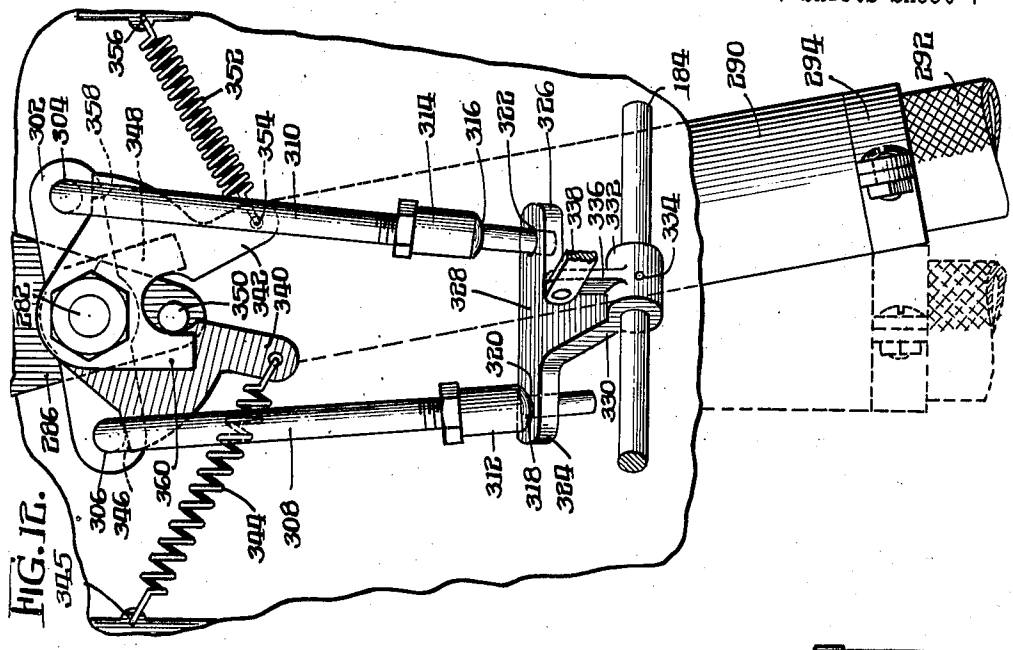

FIG. 10.

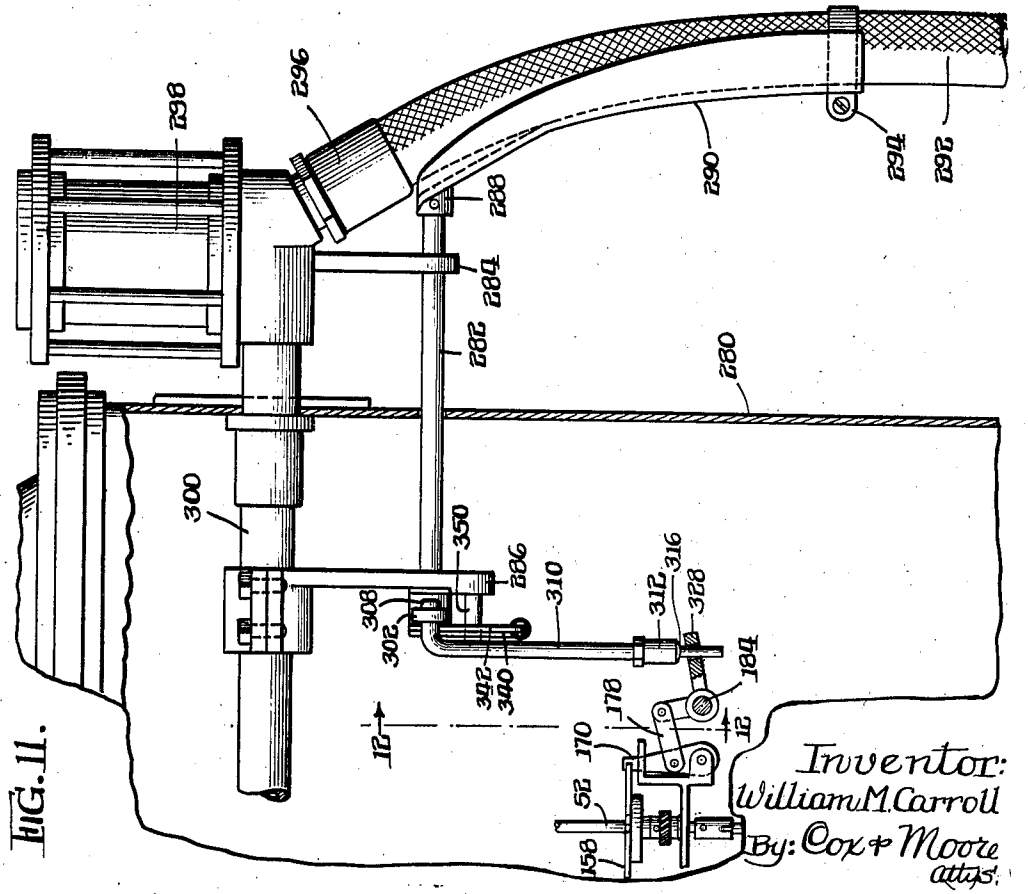

FIG. 11.

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Patented Feb. 22, 1938 2,109,084

UNITED STATES PATENT OFFICE

2,109,084

DISPENSING APPARATUS

William M. Carroll, Fort Wayne, Ind., assignor to S. F. Bowser & Company, Inc., Fort Wayne, Ind., a corporation of Indiana

Application February 2, 1935, Serial No. 4,675

34 Claims. (Cl. 221—95)

My invention relates to liquid dispensing devices adapted to be used for the dispensing of gasoline and similar liquids.

In general, this invention is related to an application heretofore filed by me Serial Number 4,674, filed February 2, 1935 for a control mechanism for a liquid dispensing device, specifically a dispensing device for gasoline and other liquids. In my prior application I have disclosed and claimed a construction wherein an exact and predetermined amount of liquid is adapted to be dispensed from a dispensing nozzle by an arrangement such that the dispensing operator may remove the nozzle from its support or other hook at the pump standard or housing, and walk over to the tank to be filled, generally disposed at a distance from the housing, such as an automobile tank, and whereupon by a pull upon the hose at the nozzle end of the dispensing device, start the dispensing pump and open a control valve in the dispensing line in advance of the meter. Upon the opening of the nozzle valve, the dispensing is continued by maintaining a tension upon the hose. The operator, merely by watching the liquid level in the tank, is able to fill the tank and without regarding the meter clock, know that an exact, definite quantity of liquid, such as exactly ten gallons, will be dispensed. When the level in the tank is just short of being full, say short by approximately one quart of filling the tank, upon release of the tension on the hose, mechanism will be automatically set into operation for automatically stopping the dispensing action independent of the closure of the nozzle valve, so that an exact and predetermined amount of liquid is dispensed, generally an exact unit amount such, for instance, as ten gallons, no more or no less of liquid, or ten and one-half gallons, no more or no less, of liquid. In my prior invention, as heretofore disclosed and claimed, the control from the nozzle end of the dispensing device, of the automatic means for dispensing exact and predetermined volumes of liquid, no more or no less, when operated by remote control means, is carried out by a pull hose operation wherein the pulling and maintaining of the tension on the hose starts and continues the dispensing operation, and wherein a release of the tension stops or initiates the automatic stoppage of the dispensing operation—in every case the dispensing flow is stopped automatically at an exact and predetermined unit quantity of liquid, and the initiation of the stopping mechanism may be actuated at the will of the operator at any time just before and/or just at the time the exact and predetermined amount has been delivered.

My present invention constitutes, in a specific sense as applied to the pull hose control of my prior application, an improvement on the pull hose means for actuating the automatic means for dispensing a predetermined, exact and preferably unit amount of liquid; in a broad sense, my present invention includes a new type of control means for stopping the dispensing action, at a remote control station, as from the nozzle end of the dispensing conduit, and particularly does it provide a novel construction of pressure-operated means actuated by a predetermined increase or by the creation of a predetermined sudden surge in pressure in the dispensing line and wherein particularly and specifically, this creation of pressure is occasioned by a hammer action of the dispensing liquid occasioned by momentary closing of the nozzle valve and in such a manner as not to substantially interfere with continuous flow.

Among the objects of my invention are to provide a liquid dispensing device including a liquid dispensing line through which liquid is adapted to flow under pressure and wherein means is provided for controlling the dispensing operation from the nozzle end of the line by the creation of a sudden and relatively marked increase in pressure in the dispensing line for actuating the liquid control means.

Another object of my invention is to provide a dispensing device wherein means is provided in cooperation with a liquid dispensing line so that operation of the manually operable control means for the nozzle valve serves to actuate the liquid control means by means of so-called "hammer action" set up in the liquid in the dispensing line.

Yet another object of my invention resides in providing a liquid dispensing device with means operably controlled by the passage of fluid through the dispensing line for dispensing an exact and predetermined unit quantity of liquid, and pressure operated means is associated with the dispensing line and adapted to be operated from the nozzle end thereof at the will of the operator for controlling the operation of the aforesaid dispensing means.

Another one of my objects is to provide a pull hose mechanism for a liquid dispensing device wherein control of the dispensing operation may be accomplished by pulling upon the hose without the necessity of maintaining the tension on the hose and wherein despite the fact that the

operator releases his tension upon the hose after the same has been pulled to start dispensing, the termination of the dispensing operation can be still accomplished from the dispensing or nozzle end of the hose.

Yet another object of my invention resides in providing a remote control device for a liquid dispensing mechanism wherein a pressure operated device such as a collapsible bellows is associated with the dispensing line and actuated by a predetermined pressure therein created at the will of the operator for actuating the dispensing mechanism.

Yet another object of my invention resides in providing a control mechanism for a liquid dispensing device wherein a collapsible pressure operated device is utilized in cooperation with that portion of the liquid dispensing line disposed between the meter and the valve-controlled nozzle wherein after dispensing is started, when the valve of the nozzle is closed momentarily, a predetermined back pressure will be built up in said dispensing line to cause the operation of the collapsible pressure-operated device to actuate control mechanism for effecting the dispensing operation.

Yet another object of my invention resides in providing a control device for the dispensing operation, which device is operable due to the creation of a sudden, perceptible increase in pressure in the dispensing line, yet which device is not operated by a gradual increase in pressure in the dispensing line, such as occurs when the nozzle valve is gradually closed.

Yet another object of my invention resides in providing a pressure-operated control device for controlling and/or stopping the dispensing flow, and which is operable by closing the nozzle valve in a predetermined manner, but which is not operable when the nozzle valve is actuated in the normal manner.

Yet another object of my invention resides in providing a control valve for a liquid dispensing device which is adapted to be closed by a momentary and sudden closure of the nozzle valve, but which will not be affected by a gradual closure of the nozzle valve.

Yet another object of my invention resides in providing, in a liquid dispensing system, through which liquid is adapted to be forced by a pump, a control valve for stopping the liquid flow therein, and providing associated mechanism for operating the same, which control valve and associated mechanism is constructed and arranged to cause the valve to close by quickly snapping or momentarily closing the nozzle valve.

Yet another object of my invention resides in providing a liquid dispensing system through which liquid is adapted to be forced by a pump or equivalent device, including gravity head, and wherein a control is provided for controlling liquid flow, and specifically for stopping liquid flow and wherein means is provided, operable from the nozzle end of the flexible hose, whereby the control means is adapted to be closed at a predetermined time without the intervention of any operating devices extending along or within the length of hose. In short, one of the objects of my invention is to provide a liquid control device operable from the nozzle valve without the use of the usual type of interconnecting Bowden wires, hydraulic tubes, electrical wires, or pressure tubes, or other control devices extending along the hose, whereby to encumber or restrict the free movement of the hose.

Yet another object of my invention resides in transforming the kinetic energy of a body of liquid flowing through a dispensing line into pressure which is of substantially equal intensity throughout the line by manipulating a device connected to one end of the line to in turn operate a pressure responsive device located at a point in the dispensing line remote from the first mentioned device, preferably within the pump housing, to actuate means for controlling the dispensing operation, thus providing a remote control system for the control means without encumbering the dispensing line and particularly the flexible hose portion thereof, if such is provided, with control mechanisms.

Another object of my invention resides in providing a remote control device for a gas line dispensing mechanism which includes a collapsible device operated by a predetermined pressure created in the dispensing line and which pressure is higher than that normally created by the operation of the pump when in dispensing operation. It is also higher than the normal by-pass operating pressure of the pump when the pump is bypassing as when the nozzle valve is closed and preparatory to the usual dispensing operation.

Yet another object of my invention resides in providing a liquid dispensing device involving a dispensing line through which liquid is adapted to be forced under pressure by the desired type of pumping means having the usual by-pass and wherein a control valve is inserted in said line and adapted to be closed to stop dispensing action and wherein means is associated for closing the valve at a predetermined and exact time for dispensing an exact unit quantity of liquid and wherein the closure of said control valve is operable from the nozzle end of the dispensing line by means of a pressure-actuated device associated with said line so that when a pressure is built up in said line, due to the momentary closure of the nozzle valve, the dispensing mechanism will be controlled.

These and other objects of my invention will be apparent from a perusal of the following specification when taken in connection with the following drawings, wherein

Fig. 1 is a front elevational view of one form of my dispensing mechanism;

Fig. 2 is a side elevational view;

Fig. 3 is a plan section on line 3—3 of Fig. 5;

Fig. 4 is a changed position of the hose pull arm operating means shown in Fig. 3;

Fig. 5 is a section on line 5—5 of Fig. 3;

Fig. 6 is a view of the positive stop mechanism for the set back arm, the same being taken on line 6—6 of Fig. 5;

Fig. 7 is a perspective view of the hose pull arm and the collapsible pressure-operated means and associated parts;

Fig. 8 is a section on the line 8—8 of Fig. 3, showing the collapsible pressure-operated device with the control valve open and the pump in operation;

Fig. 9 is a changed position of the parts shown in Fig. 8 and illustrating the same after the pressure-operated device has operated;

Fig. 10 is a diagrammatic perspective view of the clock and reset mechanism therefor, and

Fig. 11 is a side view of a modified form of the hose pull control mechanism;

Fig. 12 is a section on the line 12—12 of Fig. 11.

Referring now to the drawings in detail, in the embodiment which I have illustrated for disclosing a preferred form of my invention, I have

provided the present standard type of pump housing 2 located on any desired base and adapted to house a portion of a dispensing line 4 adapted for connection to a preferably underground located tank or reservoir adapted to contain the liquid to be dispensed, such as gasoline. The line 4 is provided with the usual foot valve disposed between the pump and reservoir to hold the prime for the pump. By the utilization of the control valve hereinafter disclosed, I am enabled to omit the pressure relief valve, which is customarily located in the air relief since the control valve serves the same function. The line 4 is connected to the inlet side of any type of means for causing a flow of fluid through the line under pressure, which herein is illustrated as a pump 6, preferably of the rotary type, driven by a belt 8 from an electric motor 10 having a switch 12. The discharge side of the pump is connected to a conduit 14 terminating in a coupling 16 forming a valve seat 18 in which is located a control valve 20 having a stem 22 passing through an opening in the side of the conduit 24 which connects with the inlet side of the meter. The meter bowl is shown as at 26 in Fig. 1. This meter is preferably of any liquid displacement type such as any well known type of Bowser meter now on the market, and in general, it comprises a plurality or series of cylinders in which pistons reciprocate. The pistons are interconnected with a suitable valve mechanism whereby the liquid under pressure forces the pistons back sequentially, the valve mechanism in turn serving to discharge the measured quantity of liquid through the discharge side of the meter. The movement of the piston, in turn, is connected to a meter shaft adapted to operate suitable clock mechanism for indicating the amount of liquid dispensed at any particular instant.

The control valve 20 is adapted to be closed normally against its seat by the spring 26 and also by the pressure of the liquid. This valve, as herebefore stated, has a stem 22 passing through suitable packing and projecting outwardly as at 28 for operation as hereinafter described.

The dispensing side of the meter is connected to a dispensing conduit 30 which connects with a sight-glass 32 which, in turn, discharges through a usual dispensing conduit 34 herein shown as a flexible hose terminating in a nozzle 36. In the present instance, this nozzle is provided with a spring-pressed nozzle valve 38 and with manually operated means 40 for opening the same when desired. The spring of course, causes the instant closure of the valve when pressure is released. In addition, the nozzle is provided with a usual nozzle guard 42 adapted to be supported on a support 44 provided with two outstanding cradle-shaped arms 46 and a locking mechanism 48 hereinafter set forth.

In certain details of construction, my present invention incorporates some of the features of my previously mentioned application, and as to these parts, per se, no claim is made herein, but as to any claims in combination of this previously claimed construction with the pressure-operated means herein disclosed for the first time, for controlling and/or stopping the dispensing operation, claims are made herein.

As before stated, means is provided for dispensing, under the control of the operator, predetermined and exact quantities of liquid. To this end I have provided devices controlled by the flow of liquid through the dispensing line, specifically, the meter, for accomplishing this. In the form illustrated, the meter shaft 50 is provided with a coupled extension 52 to which is fixed a gear 54 meshing with oppositely disposed gears 56 and 58 on shafts 60 and 62 respectively. Shaft 62 carries worm 64 meshing with gear 66 on shaft 68 on which is mounted a collar 70 which carries a friction disc 72. A gear 74 is loose on the collar 70 and is interposed between the disc 72 and a spring 76 which is driven by disc 78, which is fast to the collar 80 which, in turn, is fast to shaft 90. Two pegs 82 and 84 are disposed in the slots in the disc 78 and are driven thereby. The bottom of these pegs 82, 84 are connected to a disc 86 which, in turn, carries a pin 88 which drives this spring disc 76, whereby when shaft 68 is driven it will drive collar 80, and hence shaft 90 connected thereby, but when it is desired to reset the clock mechanism, as hereinafter described, the gear 74 will turn preliminarily for resetting the hands to zero and then, when the hands are back to zero against the usual stop, the gear 74 will continue to turn without putting any further turning moment upon the shaft for turning the hands. The collar 80 is provided with an elongated bearing 80' into which extend both shafts 68 and 90. The former turns freely in the bearing while the latter is pinned to rotate with the collar 80 by a pin 90'. A pin 68' is inserted in a hole drilled through shaft 68 just above disc 86 and serves to hold the spring 76 under compression against gear 74 and collar 72 while permitting free rotation of the disc and the remainder of the clutch assembly as described above. The shaft 90 is provided at its top end with the gear 92 meshing with the worm spiral gear 94 on one of the indicator shafts 96, which is provided with a slow hand 98. The other shaft 100, for driving the fast hand 102, as is disclosed in my prior application, is driven by means of a gear 104 from a spiral gear 106 on the collar 108, and, in turn, is driven through similar mechanism including gear 110, which is driven by means of a gear 112, which is in turn adapted to be driven by certain reset mechanism hereinafter described.

The reset mechanism comprises a reset actuator 116 carrying thereon a bevel gear 118 driving another bevel gear 120 on a shaft 122. Shaft 122 drives an arm 124 which carries a pawl 126 adapted to engage a ratchet 128, which is integral with gear 112 and integral with ratchet 130 formed on the underside of the gear 112. The teeth of this ratchet engage a pawl 132 pivoted as at 134 to a disc gear 136 which is adapted to mesh with the disc gear 74. The disc gear 112 is adapted to mesh with the disc gear 110 previously mentioned. When the shaft 122 is turned clockwise, Figure 10, the pawl 126 being in engagement with ratchet 128, revolves ratchet 128 in a clockwise direction, whereby the ratchet teeth 130 engage the pawl 132 to move the gear disc 136 clockwise, whereby to revolve the disc gear 74 in a counterclockwise direction. Gear 112, being rotated in a clockwise direction, will revolve disc gear 110 in a counterclockwise direction. A pin 138 on the arm 124 is connected to a spring 140, the other end of which is connected to a pin 142 on the pawl 126, the center portion of which is pivoted as at 142 to the arm 124. When the indicators are reset to zero, as hereinbefore described, through the action of pawl 126, the pawl 126 is cammed out of engagement with the teeth of the ratchet wheel 128 by reason of

the engagement of the pawl 126 with stop 144. After resetting this pawl remains out of engagement with the gear 126 so that there is no interference between this pawl and the teeth of this ratchet wheel when the ratchet wheel is subsequently rotated in a counterclockwise direction during dispensing. The complete details of construction of this resetting mechanism are fully disclosed and claimed in my prior-mentioned application.

The shaft 122 carries a collar 146 having an arm 148 adapted to operate in a cut-out portion of a segment 150 which is provided with teeth meshing with teeth 154 on a sector 156 loosely mounted on shaft 52 (see Figs. 5 and 10). This sector, in turn, overlies a roller clutch arranged in a cup-shaped disc 158 (see Fig. 3). This cup-shaped disc 158 is provided with peripheral notches disposed in predetermined spaced relation to correspond with certain angular turning movements of the meter shaft 50. For instance, if the meter shaft 50 is mounted to turn once for every gallon of liquid dispensed, there will be provided four notches 160 on the disc 158, which notches will be arranged to correspond with quart volumes of liquid dispensed by the meter. Any suitable arrangement of notches and any variation may be selected, either in accordance with volume, or price, as may be desired.

Meter shaft 52 has keyed thereto a clutch member 162 provided with three peripherally disposed ports in which are located the pawls or rollers 164 urged by means of springs 166, as shown particularly in Fig. 3. These pawls cooperate in conjunction with the inner wall of the surrounding and enclosing housing 168 of the cup-shaped disc 158 whereby when the meter shaft 52 is driven in a clockwise direction, the rollers 54 will form the clutch traction for driving the cup-shaped disc 158.

Liquid control means is associated with the notched disc 158 comprising an arm 170, Figs. 3 and 7, pivoted as at 172 to a stationary part 174 of the device. This control mechanism has pivoted thereto, as at 176, a link 178 in turn pivoted to an arm 180 on a collar 182 fixed to shaft 184. This shaft is provided on its end with an additional collar 186 carrying an arm 188 adapted to operate the valve stem 28 of the control valve by means of a yoke 372 which is provided with pins 370 which ride in a groove 368 of a collar 366. The collar is slidably mounted on the valve stem and held against a set of jam nuts 374 by a relief spring 360 which is confined on the valve stem by means of a washer 362 and a second set of jam nuts 364. On a clockwise rotation of shaft 184, Fig. 7, the arm 188 will push the operating stem downwardly against the tension of its spring 26. Means is provided for operating the shaft remotely and preferably from the nozzle or dispensing end of the dispensing line. As disclosed in my prior application, the shaft 184 is provided with an arm 192 having a substantially roller-shaped head 194 thereon adapted to cooperate with a substantially Y-shaped cam surface 196 on a lever 198 pivoted as at 200 in a stationary part of the dispensing device. This arm 198 passes through a slot 202 in the housing 2 and terminates in a yoke 204 adapted to embrace the dispensing line, i. e., the hose portion 34 thereof.

As described in my previously mentioned application, the inner end of the lever 198 beyond the pivotal point 200 thereof, has means thereon to bring the lever to a constantly centralized position. This means comprises two superimposed levers, Figs. 3 and 4, which are pivotally mounted on the common pivotal pin 200 and superimposed upon a stationary bracket 202', which bracket is provided with oppositely disposed upstanding pins 204' and 206 on opposite sides of the pivotal pin 200. These levers are identical in construction, but have their parts oppositely or reversely arranged. The lowermost lever is provided with a rearwardly extending stop 210 (see Figs. 3 and 4) on its upper side, adapted to engage the uppermost pin 206. From this stop 210 the lever projects forwardly in a downward curve, as shown at 212, and then flares outwardly and somewhat upwardly as at 214, where it is provided with an upstanding ear 216, perforated to receive therethrough one end of a tension spring 218, the inside end of which is fixed to an upstanding base 220. From the vertical ear 216, the arm 214 curves diagonally downwardly as at 218 to the point 220 where it projects forwardly again as at 222, and at which point it is provided with an ear extending downwardly in a substantially vertical plane as at 224 to engage the outer edge of the Y-shaped cam portion of the lever 198. From the ear 224 the lever extends directly rearwardly as at 226 where it curves concentrically about the pivotal pin 200. Immediately above this arm lies the lever 208 which has a stop 228 to cooperate with the lowermost vertical pin 204, and is provided with a forwardly projecting arm 230 connecting with a spring 232 fixed to a stationary pin 234 at its opposite end. In addition, the upper arm 208 is provided with an arm 236 adapted to engage the opposite side of the Y-shaped cam of the lever 198 in exactly a similar manner as the lowermost lever does. By referring to Fig. 4, it will be seen that when the lever 198 is pivoted about its point 200, resiliently held arms will be put under tension and will tend to move the Y-shaped cam portion of the lever 198 back to central position so that the Y-shaped cam thereof will be centralized with respect to the roller 194. It is to be observed that spring 26 on the valve stem control valve will tend to push the arm 188 upwardly to rotate shaft 184 counterclockwise to hold the arm 192 against the Y-shaped cam.

The outer end of the lever 198, because of its connection to the hose, is so operated that a pull in any direction on the hose will tend to move the arm on its pivot and hence, through the Y-shaped cam, will actuate the control arm 192 to turn shaft 184 and hence to pull the arm 188 downwardly to open the valve against the tension of its spring. When this happens, the arm 180 on shaft 184 will likewise be moved in a clockwise direction to pull the control 170 out of the slot in the notched disc 158 so that the disc will be free to turn if operated. By clockwise operation of the shaft 184, Fig. 7, the release for movement of the notched disc 158 is accomplished, and likewise the control valve 20 has been opened. If the pump is now put into operation, as by means of an arm 238 on the extreme end of shaft 184, connecting with a rod 240 to the pump switch 12, and if the nozzle valve is then opened, liquid will be forced by the pump through the dispensing line to cause actuation of the meter, which, in turn, will operate the meter shaft and through the operation of the hereinbefore described mechanism (see Fig. 10) the notched disc shaft 158 will be rotated and will continue to rotate as the dispensing continues, thereby accumulating

on the clock mechanism units of volume dispensed.

In my present invention I have provided a pressure-operated control device for controlling the liquid dispensing operation and particularly for controlling the stopping of a dispensing operation. From the broad aspect, my control device is operable by a sudden surge of pressure in the dispensing line, due to preferably a hammer action caused by sudden stopping of the current flow, and mechanism is operable by this precipitate rise in pressure to a predetermined degree to actuate certain mechanism for controlling the dispensing particularly stopping of the dispensing. In the present instance I have provided means in the form of a control valve, which is adapted to close when actuated by this sudden rise in pressure to stop the liquid flow independent of the nozzle valve control. In the specific adaptation of my control means to the present invention, I have utilized the same preferably in the form of a remote control, particularly operative from the dispensing end of the unit, and specifically from the nozzle valve. In the preferred form, I have utilized the manually operable member which actuates the nozzle valve, as a means for causing the sudden rise. In short, by creating a hammer action of the liquid in the dispensing line, and particularly the flexible hose, whereby this rapid rise in pressure upon the momentary closing of the nozzle valve and re-opening thereof will cause a rise in pressure to approximately 25 pounds, which will immediately actuate a pressure-operated device such as a collapsible or expansible bellows in the flow line, which, in turn, will actuate certain control devices. By this arrangement I have found that when the nozzle valve is gradually closed, the gradual build up in pressure in the flow line does not operate the pressure device, however, when the so-called hammer action is created, the sudden rise in pressure will accomplish the operation of the control device, therefore I am able to provide a remote control device for controlling the dispensing action from the nozzle end of my dispenser and particularly by the manually operable member for the nozzle valve, whereby a momentary closure of the same will actuate the control, but whereby the customary gradual closing of the nozzle valve as in reducing to a finely metered flow, or lessened flow, will not operate the control device. Furthermore, by the provision of such a type of device, I am enabled to utilize a remote control which is exact in operation, but wherein I am enabled to eliminate the utilization of objectionable Bowden wire controls, air-pressure controls, hydraulic tube controls, electrical controls, heretofore suggested, and which have been placed along the flexible hose of the dispenser, either on the outside thereof, or within the same, and whereby irrespective of any increase in length of the hose due to well-known stretching action after some use, my device will actually and instantly, when desired, control the dispensing action. Furthermore, by the use of my device, I am enabled to accomplish a remote control initiation of a dispensing operation which will then set in motion a mechanism which may subsequently be conditioned for automatically stopping the dispensing action at a predetermined time, and/or to dispense a predetermined exact unit quantity, volume or amount of liquid.

In my present invention, and as distinguished from the disclosure of my previous application, as soon as the dispensing is started, the tension on the hose may be released, and when so released will not stop the dispensing operation, and in conjunction with the mechanism for permitting the continuance of the dispensing operation upon release of the hose, I have provided means operable from the nozzle end or from the dispensing end of my device for thereafter stopping the dispensation at the will of the operator, herein shown as means to initiate automatic stopping at the will of the operator and at any time to produce automatically the dispensation of an exact and predetermined quantity of liquid. In other words, I have provided means preferably, but not necessarily at the nozzle end of the device and operable by the dispenser for actuating the control finger **170**, and irrespective of any tension or pull on the hose, whereby the stop will be moved into contact with the periphery of the control device **158** so that when one of the control notches moves into registration with the control **170**, the latter will move thereinto and will immediately cause further movement of the shaft **184** as to permit the control valve **20** under the tension of its spring **26** to close, and if desired, to permit the pump actuating link **240** to stop the pump. This mechanism also includes means for preliminarily causing a slight closing of the valve for slow dispensing and this is accomplished due to the fact that the control **170**, upon preliminary actuation, will move up into contact with the peripheral edge of the disc **158** without entering the slot, concurrently the shaft **184** will turn slightly, which will permit the valve stem **28** to rise slightly, which will permit a limited closure of the valve, but not a complete closing thereof. Ultimately, when a notch registers with the control **170**, a complete closing of the valve will be effected.

In the invention herein described, and in contradistinction to my aforementioned application, the means for accomplishing the foregoing comprises an arm **242** rigidly mounted on the shaft **184** near the end thereof, adapted to rotate with the shaft. Cooperating with this arm **242** is a trigger or latch **244** pivotally mounted as at **246** to a stationary bracket on the meter housing. This latch **244** has an arm **248** and another arm **250**, the latter constituting a limiting stop. The upper portion of the latch **244** is provided with a shoulder seat **252** upon which is adapted to rest the end **254** of the arm **242**. A spring **256** connected as at **258** to arm **242** and as at **260** to latch **244** as shown clearly in Fig. 9, to hold the latch **244** in latching engagement with the arm **242** as shown in Fig. 8. Thus, when the shaft **184** is turned in a clockwise direction, the arm carried thereby will likewise be moved clockwise, will move upwardly and will finally come to rest upon the latching seat **254** and held in such latching engagement by means of this spring **256** so that irrespective of the release of tension on the hose **34**, the arm **242** will be held in latched position which means that the arm **188**, which is depressing the grooved collar **366** and valve stem **28**, will be held in such position to hold the control valve **20** in open position against the tension of its spring **26**. This will mean that dispensing will continue with the parts in this position.

In conjunction with this mechanism, means is provided for releasing the latch at will and to bring about the automatic closure of the valve **20** at a desired time so that the control device **170** will engage a slot to stop the dispensing at an exact time and when and so that an exact

volume of liquid will be dispensed—no more and no less. The means I have provided for this is operable preferably from the nozzle end of the device so that it will not be necessary for the operator to approach the housing standard 2 to accomplish this, and particularly in conjunction with my pull hose means for starting, so that should the person purchasing the liquid desire an additional quantity, the device may again be re-started by pulling upon the hose and releasing the same. In the present instance I accomplish this remote control of the dispensing by means of a pressure-actuated device operating in conjunction with the dispensing line so that upon the creation of a predetermined pressure in the dispensing line, and particularly at the nozzle end of the dispensing line, the stop mechanism will be operated. In my present invention I prefer to have this pressure-operated device operable by means of the manual actuator for controlling the nozzle valve, in short, the lever 40. By reference to Figs. 7, 8 and 9, it will be seen that I have provided that part of the conduit which leads into the meter and in which conduit the control valve 20 is located, with a passage 24 of sufficient capacity to house a pressure-operated device in the form of a bellows of any desired material, 262, preferably comprising a flat disc-like head 264 and an expansible body sealingly connected by means of a disc 266 with the underside of a cover-plate 268 covering the upper portion of the meter bowl housing. The disc 264 has riveted thereto a central operating pin 270, the outer end of which is threaded and provided with a head 272 adapted to underlie the latch arm 248. A spring 274 encircles the pin 270 within the bellows 262 for normally maintaining the bellows and disc 264 in expanded position. Spring 274 may be adjusted by means of a threaded bushing 275 normally held in adjusted position by means of a spring stop 280. A suitable stop 276 is formed, preferably on the inner wall of the meter housing, forming the passage 24, which acts as an outward stop for the bellows disc 264 and its pin 270. The action of this device is such that when the nozzle valve is open, and the pump is operating, the working pressure will be approximately thirteen (13) pounds. If the nozzle valve has remained closed, it is well known that in pumps of this type, the by-pass around the pump will be in operation and this by-pass is regulated to operate at a higher pressure—say seventeen (17) pounds pressure, however, when the device is in operation and the nozzle valve open, if the nozzle valve is closed momentarily and immediately opened so as not to substantially interfere with the dispensing operation, the pressure will quickly jump to substantially twenty-five (25) pounds. The screw bushing 275 provides an adjustment for spring 274 to suit various conditions of working by-pass pressure and since the adjustment of the collapsible bellows is arranged so that this sudden increase in pressure will operate the bellows to push the pin 270 upwardly to push the latch 244 upwardly to release the latch so that pressure of the spring 26 of the valve will push the stem 28 upwardly sufficiently to turn the shaft 184 sufficiently to permit arm 242 to drop out of its latched seat under the tension also of the spring 256, and simultaneously therewith the control 170 will move into contact with the peripheral edge of the slotted disc 158, which continues to rotate until the next slot therein registers with the stop, at which time stop 170 will drop therein and will permit the valve wholly to close. It will be understood that the operation of the bellows by means of the nozzle valve lever will take place, and should take place immediately prior to the registration of a notch with the stop 170, which, in turn, is predetermined by the position of the indicator mechanism such as the indicator means 102 on the dial of the clock so that the dispenser by watching the dial, will always know just when to operate the nozzle valve to cause operation of the sylphon or bellows to cause the automatic release of the stop mechanism to initiate automatic stopping. It is obvious that other types of bellows may be used and also other locations of the bellows. Obviously, in lieu of the sylphon or bellows, an equivalent device such as a cylinder and piston could be used to react to the impact pressure in a manner that the bellows does.

In Figs. 3 and 7, I have illustrated the manner of providing an interlock between the resetting mechanism for returning the indicators such as the indicating hands 102 to zero and the nozzle support is the same as shown in my prior mentioned application, which shows the resetting arm 116 which carries the bevel gear 118 as shown in Fig. 10 as constructed and arranged so that the bent portion thereof will swing into a dotted line position as shown in Fig. 7, from a full line position likewise shown in Fig. 7. In the dotted line position, the arm 116 will block or prevent the nozzle being placed on its support, whereas when swung to a position free thereof, it would permit the nozzle being placed upon its support and locked therein by means of the locking device 48. The resetting shaft 116 is provided with a collar carrying a locking groove having a sharp shoulder adapted to engage a stop on the shaft 184 as described in my prior application. In addition, the reset shaft 116 is provided with an arm which cooperates with one or the other of the two stops which are mounted on the clock frame as shown in Fig. 6, and a spring is provided for holding the reset arm in whichever position it has been shifted to, whereby it requires a manual shift to move it from the dotted line position to the full line position.

While in a general way, the slotted disc mechanism and associated mechanism and/or its equivalent for causing the closing of the dispensing line at an exact instant, calculated with reference to the displacement of the meter to dispense exact quantities of liquid and no more and no less, is used with any type of clock mechanism, it is especially adaptable for use with a clock mechanism in which the indicating means comprises mechanism for indicating only exact volumes of liquid dispensed corresponding with the quantum stop calibrations of the slotted disc 158, or its equivalent. In other words, since the slotted disc is adapted to operate the closing mechanism for the control valve at exactly complete quantums or units of liquid measure, such as pints, quarts, gallons or the like, or any quantums of price measure such as 25¢, 50¢, $1.00 or $5.00, it is preferable to provide a clock mechanism that will correspondingly indicate only the exact quantum of units of volume and/or price, and which will not indicate any intermediate values. I have illustrated in Fig. 1 the type of clock mechanism which is shown in detail and claimed in my prior mentioned application, reference being made to a full disclosure of said application thereto.

From a perusal of the foregoing, it will be evident that I have provided a novel and useful type

of dispensing apparatus wherein in order to dispense liquid after having removed the nozzle from its support, the attendant must first shift the resetting arm 116 from the full line position to the dotted line position as shown in Fig. 3, at which time resetting, as hereinbefore described in connection with the mechanism shown in Fig. 10, will take place. The attendant then will carry the nozzle over to the automobile tank, generally located at a distance from the pump pedestal 2. If the purchaser desires to have his tank filled, the attendant will pull upon the hose, thereby through the lever 198 operating the shaft 184 in a clockwise direction to remove the control 170 from its slot in the slotted disc 158 and which movement of the shaft 184 opens the control valve and thereafter starts the pump. Obviously any type of means may be used to provide a delayed action for opening the control valve before or after the starting of the pump, or simultaneously therewith, if desired, so as hereinbefore stated, the pump may have an independent switch control operable from a manually actuated lever on the housing, but I prefer to interconnect the pump switch with the operation of the shaft 184 whereby the pump is in operation only during the actual dispensing period, thereby saving electrical energy as the pump will not need to be by-passing when the dispensing is not in operation. The control valve being open before the pump is operated, the pump will by-pass until the dispenser actually opens the nozzle valve. It will be understood that when the attendant then pulls upon the hose, the latch mechanism shown in Figs. 8 and 9 will operate to hold the trigger or latch 242 shown in Fig. 8 in horizontal position, thereby locking the shaft 184 and holding the control valve open so that tension can be released on the hose and dispensing by the operator can take place in the normal way without the inconvenience of maintaining his pull upon the hose, which has always been one of the disadvantages of a hose pull type of device, whereby complete attention can be directed to filling the tank. Or, if it is not desirable to completely fill the tank, but instead a definite amount of gasoline as, for instance, five gallons is desired, when the indicator clock has moved around to a position wherein four and three quarters (4¾) gallons have been indicated, the operator will then snap the nozzle valve shut, even momentarily, which will immediately build up the requisite pressure in the liquid dispensing passage 24 which will operate the sylphon bellows to release the latch mechanism whereby permitting the cooperative latch to drop slightly, whereby the spring 26 of the control valve will move the nozzle valve slightly to a somewhat closed position and thereby metering down the discharge from a full discharge to a smaller discharge and whereby at the same time the control 170 will move into engagement with the imperforate periphery of the slotted disc 158 which is turning under the influence of the meter shaft as the liquid passes through the meter. Just as soon as one of the control notches in the slotted disc 158 registers with the control 170, the latter will drop into such registered notch, thereby permitting further movement of the control 170 which in turn will permit further movement of shaft 158 and the complete closing of the valve 20 for stopping the flow and consequently in the absence of flow, holding the meter shaft from turning. This same movement of shaft 184 by reason of its connection with arm 238 and rod 240 running to the pump motor switch will stop the operation of the pump.

In the event that the purchaser should desire another quart of liquid or another gallon of liquid, the operator will pull upon the hose from his remote position which will again start the pump, again open the control valve, again unlock the slotted disc by pulling away the control 170 and upon opening the nozzle valve, liquid will be dispensed until the indicator has approached the one-quart or one gallon indicated position, at which time the operator will repeat the process of snapping the nozzle valve to effect the closing operation as hereinbefore described.

It is to be understood that the nozzle valve control lever can likewise be snapped in the event that a tank is overflowing, thereby immediately stopping the dispensing operation.

The control valve, it will be noted, remains partly open because the pawl 170 is in engagement with the periphery of the disc but is not seated in a notch; and the motor and pump are still in operation. When the operator proceeds to return the nozzle to the hook 46 he must first swing the lever 116 from the dotted to the full line position in Figure 3 because the lever prevents return of the nozzle to the hook.

As the lever is swung, a counterclockwise rotation of shaft 122, Figure 10, ensues and the dog 148 engages the right hand shoulder of gear sector 150 to impart a counterclockwise rotation to it. Due to the meshing of gear sectors 150 and 154 the latter receives a clockwise rotation which is transmitted to the pawl to move it from its stop to permit it to engage the periphery of the disc. Further rotation of lever 116 causes the pawl to pick up a notch in the disc, carry the disc to a position where the pawl 170 may engage another notch in the disc and when this occurs the shaft 184 rotates a sufficient distance to close the control valve and to open the motor switch to shut down the pump. The rotation of arm 116 also cocks the reset pawl 126 for resetting the indicators when a subsequent dispensing operation is undertaken.

Referring now to the modified construction shown in Figs. 11 and 12, I have provided a modified means for actuating the rock shaft 184, as shown in Fig. 7, which permits the elimination of the more or less unsightly lever 198, as shown in Fig. 7, and passing through a preferably round aperture in the housing. This shaft 282 is carried in a bearing 284 and 286 mounted on any stationary part of the device. The shaft 282, at its outer end, has a collar 288 provided with a downwardly depending rigid, substantially semi-cylindrical sleeve 290, which sleeve is curved in a rather graceful manner to conform with the flexible hose 292, to which it is clamped by means of the clamp 294 carried by the bottom end of the sleeve 290. The hose 292 is shown as connected as usual by means of a coupling 296 to the bottom of the sight glass 298, which, as is well known, connects with the dispensing line 300.

Any movement of the flexible hose 292 will impart a definite rocking or turn to the shaft 282. At its inner end and within the housing 280, the shaft 282 is provided therein with a double link 302, which is rigidly mounted to rock with the shaft 282. This link, at its opposite outer ends, is perforated at 304 and 306. Each perforation of the link receives the end of a control rod 308 and 310 put thereinto as shown clearly in Fig. 11. The bottom end of each one of these rods is provided with adjustable collars 312 and 314. Each

one of the collars is provided with a spherically shaped shoulder 316 and 318, which spherical shoulder is adapted to seat or contact with the walls of an opening 320 and 322 formed in the opposed ears 324 and 326 of a bracket 328 having a central arm 330 terminating in a collar 332 which is fixed, as at 334 to the rock shaft 184, which is the same rock shaft as is shown in Fig. 7 of the drawings and hereinbefore described. This collar 332 is provided with another arm 336 corresponding to arm 180 as shown in Fig. 7, which arm is provided with a pivotally mounted link 338 which corresponds to link 178. This link 178 in turn actuates the control device 170, which is shown in Fig. 7 and which is adapted to cooperate with the turnable control device 158 on the extension meter shaft 52 as hereinbefore described.

Loosely mounted on the shaft 282 are two shaft-centralizing arms 340 and 342. Arm 340 is provided with an ear having a perforation through which passes one end of a coil spring 344, the opposite end of which is connected with any stationary part of the machine, as at 345. This arm 340 likewise is provided with a flattened surface 346 adapted to engage the uppermost end of rod 308. Arm 340 is loosely pivoted at 282 and has an extension 348 to engage a stop pin 350 mounted on the bracket 286. The other lever 342 is provided with a spring 352 fastened to the arm 342 at 354, and its opposite end is fastened to a stationary part of the machine at 356. Lever 342 has a flattened surface 358 adapted to engage the arm 310. This lever 342 is also pivoted on the same shaft as lever 340. Lever 342 has an extension 360 adapted to engage the stop pin 350. These two levers 340 and 342 being under the tension of their respective springs 344 and 352, tend to keep the double link 302 in a centralized position.

When the hose 292 is pulled either to the right or left, it revolves a shaft 282, which has fastened to it the double link 302, which depresses either arm 308 or 310 which, in turn, rocks the shaft 184 by the engagement of the head 312 or 314 against the surfaces 320 and 322 of the bracket 328.

I have provided resilient means associated with the control valve 20 for effecting the easy operation and particularly closure of this control valve, and particularly so that it may be quickly and easily closed or controlled from a remote point, and through the exertion of a minimum of energy from the remote point. At the same time I have also provided resilient means for maintaining this valve closed on its seat once it is closed, with a sufficient tension or force which is of sufficient degree to maintain a considerable pressure in the dispensing line, particularly in the hose and sight glass whereby to prevent vaporization of the gasoline or other liquid therein, at relatively high temperatures, as for instance, during the summer time. So also this same means, particularly the spring mechanism, is constructed and arranged to permit the control valve to yield when inordinately high pressures are created in the dispensing line, particularly in the hose and in the sight glass whereby to relieve such pressures. In the present instance I have provided automatic means whereby a spring of greater tension is operatively brought into association with the control valve after the control valve has been closed, whereby to accomplish the foregoing, and I have preferably included mechanism for accomplishing this in connection with the reset mechanism of the pump and/or with the nozzle support and its accompanying shiftable device, which heretofore was utilized to insure the on or off position of the pump or liquid dispensing control in association with the placing or removal of the nozzle from its support on the housing. Inasmuch as the foregoing mechanism has been disclosed and claimed in my prior application, I shall make no claim broadly thereto, other than any possible new arrangement of elements thereof in association with the remote control device operated by the hammer action of the liquid or the liquid column in the hose for closing the control valve. However, for purposes of exemplification, I desire to point out that in the preferred form illustrated in Figs. 7, 8 and 9, the spring 26 may be of sufficient tension to just overcome the friction of the stuffing box 358, through which the stem is adapted to move, and in addition the spring may have some slight further action in assisting the liquid column being forced through the meter by the pump, quickly to close control valve 20, whereby by providing a relatively weak spring such as 26, the same may be opened by remote control action, specifically by a relatively easy pull upon the hose. In association with this resilient means 26, I have provided additional spring means 360 of relatively stronger tension adapted to have one end abut a washer 362 adjusted in position on the stem 28 by means of the lock nuts 364. The opposite end of this spring 360 abuts against a collar or yoke 366 having an annular opening 368 in which operate opposed pins 370 on a bifurcated arm 372 on the end of arm 186. The yoke or collar 366 is capable of sliding on the stem 28 but is opposed by means of the spring 360 against the adjustable lock nuts 374. By adjusting the lock nuts 364 and 374, the tension of the spring 360 may be regulated. Cooperating with this mechanism, and on the opposite end of the shaft 184 is a collar 376 pinned thereto. This collar is provided with an operating arm 378 adapted operatively to be associated with a cam 380 on a collar 382 affixed to the control actuator 116. Reset cam 380 is provided with a cam surface 384 arranged so that when the delivery is completed and the operator desires to reset the clock mechanism, he must turn the reset control 116 a distance of 180 degrees before hanging up the hose. In doing so, the cam surface 384 of the cam 380 contacts the finger 378 and imparts a slight counter clockwise rotation to the shaft 184 thereby bringing spring 360 into action to maintain the control valve 20 tightly against its seat, and with a greater force than could be exerted by the spring 26. This spring 360 is designed and adjusted to relieve pressure resulting from excessive summer temperatures at a desired pressure release.

In order to permit opening of the valve 20 to start the flow, the cam 380 is provided with an opening therethrough, 386, which is adapted to register with the plane of movement of the finger 378 when the reset control 116 is shifted to dotted line position as shown in Fig. 7. Manifestly, when shifted to full line position shown in Fig. 7, the slot 386 is out of registration with the control finger 378, whereby said finger is held from clockwise movement so that the valve 20 is prevented from being opened by the remote control actuating mechanism.

Having thus described my invention, what I claim as new and desire to obtain by Letters Patent of the United States is:

1. A liquid dispensing apparatus comprising means forming a delivery conduit having a freely suspended portion, means for delivering liquid through said conduit, said means including an electric pump and a switch for starting and stopping the pump, a member secured to said conduit below its point of suspension, means operatively connecting said member with said switch so that by pulling said conduit the switch will be moved to starting position, means for maintaining the switch in such starting position on release of the pulling action on said conduit, and manually shiftable means actuatable from the delivery end of said conduit for restoring the switch to stopping position without pulling action on said conduit.

2. A liquid dispensing apparatus comprising means forming a delivery conduit having a freely suspended portion, means for delivering liquid through said conduit, said means including a motor driven pump and switch mechanism for starting and stopping the motor thereof, means operatively connecting with said member and shiftable by pulling on said hose for operating said switch mechanism, means for retaining said switch mechanism in motor running position, means for releasing retaining members, and manually operable means disposed at each end of said conduit for actuating said releasing means.

3. A liquid dispensing apparatus comprising a pump stand, a delivery conduit freely suspended exteriorly to the stand, means within the stand for delivering liquid to said conduit, said means including an electric pump, and a switch for starting and stopping the pump, a member secured to said conduit below its point of suspension and extending into the stand, means operatively connecting the said member to said switch so that by pulling said conduit relative to said stand the switch will be moved to starting position, and a manually releasable means for maintaining the switch in starting position when the pull on the conduit is released.

4. A liquid dispensing apparatus comprising a delivery line having a fixed portion and a relatively movable portion, an electric pump for supplying liquid to the line, a controller for said pump, said relatively movable portion terminating in a dispensing nozzle, and connecting means from the controller to said relatively movable portion whereby the pump may be controlled by shifting said relatively movable portion away from a predetermined normal position, and means operative subsequently to the movement of said relatively movable portion back to its normal position forming a second control for said controller.

5. A liquid dispensing apparatus comprising a delivery line having a fixed portion and a dependent flexible portion suspended therefrom, an electric pump for supplying liquid to the line, a controller for said pump, connecting means from the controller to said dependent portion below its point of suspension whereby the pump may be started by swinging said flexible portion from its normal position, and means conditioned by movement of the flexible portion away from its pump starting position and manually actuated means for actuating said conditioned means for stopping said pump.

6. A liquid dispensing apparatus comprising a delivery line having a fixed portion and a depending flexible portion suspended therefrom, means connected to said depending portion below its point of suspension and actuated by swinging said flexible portion from its normal depending position for initiating the flow of liquid through said depending portion, and means conditioned by release of said flexible portion from its initiating position and thereafter manually operable without moving the depending portion of said flow line for stopping the flow of liquid through said depending portion.

7. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit including a valve and mechanism for actuating the fluid controlling means by movement of the conduit and also by movement of the nozzle valve.

8. In a dispensing system, a conduit or fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit, and mechanism for actuating the fluid controlling means by movement of the conduit from the nozzle end thereof and means for actuating the fluid controlling means from the nozzle end of the conduit without moving the conduit.

9. In a dispensing system, a conduit for fluid, control means for starting the flow of fluid through the conduit, a nozzle assembly for the conduit including an actuatable member, means controlled by the movement of the conduit for actuating said control means to start the flow, and means preventing a subsequent actuation of said control means for starting the flow by movement of the conduit, without an intervening actuation of the actuatable member of the nozzle assembly.

10. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit including an actuatable member, means adapted to be actuated by the movement of the conduit for controlling the fluid controlling means, and pressure-actuated means operated by movement of the actuatable member of the nozzle assembly for controlling the fluid controlling means.

11. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit including a valve, means adapted to be actuated by the movement of the conduit for controlling the fluid controlling means, and means adapted to be actuated by movement of the nozzle valve for controlling the fluid controlling means.

12. In a dispensing system, means forming a dispensing conduit, a meter in said conduit, a control valve for said conduit, said conduit terminating in a nozzle assembly having a manually actuatable valve, and means automatically actuated by the operation of said nozzle valve for partially closing said control valve.

13. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit including an actuable member, means adapted to be actuated by movement of the actuatable member for gradually decreasing the flow of fluid through the conduit.

14. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit, means adapted to be actuated by movement of the conduit for operating the fluid control means, and means for maintaining the condition of said first mentioned means when once operated by movement of the conduit.

15. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, means operable upon movement of said conduit for starting the fluid flow, means

for automatically latching the starting means in fluid flow position, and means for thereafter releasing said latching means to stop said fluid flow.

16. In a fluid dispensing system, means forming a dispensing conduit, a member for controlling the flow of fluid through the conduit, a pressure device connected to said conduit and adapted to be moved by a predetermined pressure of liquid in said conduit, mechanism actuated by movement of the conduit for actuating the flow control means to start the dispensing operation, means for automatically latching said mechanism in fluid flow position, and means actuated by movement of the pressure-operated means for releasing said latching mechanism for terminating the dispensing operation.

17. In a dispensing system, a conduit for fluid, a control valve in said conduit, a spring normally adapted to close said valve, said valve having an actuatable portion, a shiftable device in said conduit and adapted to be actuated by a predetermined pressure of liquid in said conduit, a member adapted to open said valve, connections from said member to the conduit including means operative by movement of said conduit for actuating said connections to open said valve, means for holding said connections in position for maintaining said valve open, connections between said device to said holding means, and means operated from the nozzle end of said conduit for actuating said device whereby to release said holding means to permit said valve to close.

18. In a dispensing system, a conduit for fluid, a pump for forcing liquid through the conduit, a nozzle assembly for the conduit including an actuatable member, means adapted to be actuated by the movement of the conduit for starting the pump, said means including devices for maintaining said pump in operation irrespective of further movement of said conduit, and actuatable from the dispensing end of said conduit for stopping said pump.

19. In a liquid dispensing device, the combination of means forming a liquid dispensing line, a meter in said line including a meter shaft, meter driven register, means adapted to rotate in synchronism with the meter shaft including a plurality of operating devices, associated operating devices, means operative by movement of a portion of the dispensing line for moving the associated operating device out of contact with said first-mentioned operating devices to permit movement of the first-mentioned operating device by the meter during dispensing, means for maintaining said associated operating device in removed position while permitting free movement of said portion of the dispensing line, and means operable from the dispensing end of the conduit and operated by the pressure of liquid in said conduit for releasing said associated locking device for engagement with one of said operating devices whereby to cause termination of the dispensing operation when a predetermined and exact quantity of liquid has been dispensed.

20. In a liquid dispensing device, the combination with means forming a liquid dispensing line, a meter in said line including a meter shaft, meter indicating mechanism, means adapted to rotate in synchronism with the meter shaft, including a plurality of operating devices, an associated operating device, means operative by movement of the dispensing line for moving the associated operating device out of contact with said first-mentioned operating device to permit movement of the first-mentioned operating device by the meter during dispensing, means for maintaining said associated operating device in removed position irrespective of movement of the conduit, a pump for forcing fluid through said conduit, and means actuated with the movement of said associated operating device into operating position for stopping the operation of the pump.

21. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit, and manually operated means adapted to be actuated through the intermediary of the column of fluid in said conduit for progressively actuating said flow controlling means.

22. In a dispensing system, a conduit for fluid, means for controlling the flow of fluid through the conduit, a nozzle assembly for the conduit, and mechanism utilizing the column of liquid in said conduit for actuating the flow control means, said mechanism including means to cause the actuating of said flow control means in successive operations with a predetermined interval between each operation.

23. In a dispensing system, a conduit through which liquid to be dispensed is adapted to flow, means for stopping the flow of fluid through the conduit, a nozzle assembly for the conduit including an actuatable member, and pressure-actuated means operable by movement of the actuatable member for stopping the liquid flow, said pressure operated means including mechanism for preliminary and partially stopping the flow and thereafter for completely stopping the flow.

24. In a liquid dispensing device the combination of a means forming a liquid dispensing line including a pump for forcing liquid through the line, a meter in the flow line, said flow line terminating in a flexible hose, a manually operable control valve for said hose, a second control valve in the flow line, a collapsible device in said flow line, hose pull mechanism connected to the hose for opening the control valve when the hose is put under tension, means for maintaining the valve in open position upon release of tension on the hose, said collapsible device including means for closing the control valve upon the creation of an abnormal pressure in the dispensing line occasioned by momentary closing of the nozzle valve.

25. In a liquid dispensing device a combination means including a flow line, including a meter therein, a pump for forcing liquid through the meter, said flow line terminating in a manually operable control valve, a second control valve in said flow line, a collapsible bellows operating at a pressure in excess of the normal dispensing pressure and disposed in said flow line, including a member extending outside of said flow line, means for adjusting said member to adjustably change the tension of said bellows, means rotatable upon operation of said meter, a shiftable member cooperating with said rotatable means, pull hose mechanism for operating said shiftable member for opening one of said control valves, latching mechanism shiftable to latch said shiftable member into the position shifted by said pull hose mechanism, and means operable by said bellows for actuating said latching mechanism to release the same to permit the closure of said opened control valve, said last named means being conditioned by cooperation of said shiftable member with said rotatable member.

26. In a liquid dispensing device a combination of means forming a liquid dispensing line includ-

ing a pump, a motor operating said pump, a switch for the motor, a meter in the flow line, said flow line terminating in a manually operative control valve, a second control valve in the flow line, pull hose means for opening the control valve, means for latching the control valve in open position, means operable upon the actuation of the pull hose mechanism for actuating the pump switch, a pressure operating device in the dispensing line, an adjustment for said pressure operating device whereby said device is shiftable upon the creation of a pressure in the dispensing line caused by momentary closing of the manually operable terminal valve of said dispensing line which is in excess of the normal operation of the pump pressure or of the pressure of the bypass for the pump.

27. In a liquid dispensing system through which liquid is forced under pressure, a displacement meter in said system, said system terminating in a flexible hose provided with a valve control nozzle, a control valve in the flow line of said system for stopping the flow therethrough, pull hose mechanism connected to the hose and connected to said control valve for opening the same, and a pressure operative device actuated by a pressure created in the flow line and connected to said control valve for causing the closure of said control valve.

28. In a liquid dispensing system a combination of means forming a flow line through which liquid is adapted to be forced under pressure, a displacement meter in said line, said line terminating in a flexible hose provided with a manually operable control valve, a second control valve in said line, a pressure operable device adapted to be actuated by the creation of a predetermined pressure in said line, pull hose mechanism and means connecting said pull hose mechanism with said second control valve for causing only the opening of said valve upon operation of said pull hose mechanism and means for causing solely the closing of said control valve upon the actuation of said pressure device.

29. In a liquid dispensing device of pull hose type a combination of an upstanding housing, a liquid flow line having a portion thereof passing through said housing and having a portion extending outside of said housing, means for causing the flow of liquids through said line, a control mechanism for controlling the flow of liquids through said line, a bracket extending outside of said housing including an elongated sleeve attachable to a portion of said flexible hose, a portion of said sleeve having an inwardly extending rigid member passing through the wall of said housing, mechanism on the inner portion of said member for actuating control mechanism, the lower portion of said sleeve having means for connecting with the hose.

30. A liquid dispensing apparatus comprising means forming a delivery line having a fixed portion and a depending flexible portion suspended therefrom and terminating in a dispensing nozzle, means for controlling the liquid flow through said line, controlling means for said liquid supply means, connecting means from the controlling means to said dependent portion whereby the flow may be started by swinging said flexible portion from its normal position, mechanism additional to said connecting means for stopping said liquid flow, and manually controllable means mounted on the dispensing end of said flow line for actuating said mechanism.

31. In a fluid dispensing apparatus, a conduit, a meter connected to said conduit, means for supplying a flow of fluid through said meter and said conduit, means for disabling the flow supplying means, means for preventing operation of said disabling means except when the meter indicates that an exact unit quantity of fluid has been dispensed, means for maintaining the disabling means and the preventing means inoperative, a pressure responsive device in said conduit, a closure in said conduit adapted, when operated, to prevent the flow of fluid therethrough, said pressure responsive device being operated only when the closure is suddenly operated, to render said maintaining means inoperative and to thus condition the disabling means for operation under control of the preventing means, additional means, operable to condition said preventing means to permit operation of the disabling means in case the closure is maintained in its operated condition with the meter indicating other than an exact unit quantity.

32. In a fluid dispensing apparatus, a conduit, a meter connected to said conduit, means for supplying a flow of fluid to said conduit and meter, a hose pull apparatus for initiating operation of the flow supplying means, means for disabling the flow supplying means, a device for closing and opening said conduit at will, an element driven under control of the meter, a pawl pivoted for cooperation with formations on said element which are so arranged with respect to the pawl that registration of the pawl and a formation is effected each time a unit quantity of fluid has been dispensed through the meter, means for holding said pawl out of contact with said element, a pressure device connected to said conduit and responsive to sudden closure thereof for releasing said holding means whereby permitting cooperation of the pawl with said element, so that when the conduit is again opened, they will permit operation of the disabling mechanism when the dispensing of the then partially dispensed unit quantity of fluid is completed, and means enabling rotation of said element and the pawl relative to each other to effect registration of the pawl and a formation on said element in the event that such registration is not effected under control of the meter.

33. In a fluid dispensing apparatus, a conduit terminating in a dispensing hose, a meter connected with said conduit, means for supplying a flow of fluid through said meter, conduit and hose, a control valve in said conduit, means for opening said valve and initiating operation of the flow supplying means, means for maintaining said control valve open and said flow supplying means in operation, a disc driven by the meter and formed to cooperate with a pawl to permit closing of the control valve and stopping of the flow supplying means when any exact unit quantity of fluid has been dispensed, means to maintain the disc and pawl out of operative relation, means responsive to the creation of a predetermined pressure in the conduit for rendering the latter maintaining means inoperative, and means enabling the setting of the disc, and pawl relative to each other to permit closing of the control valve and stopping of said flow supplying means when this is not accomplished under control of the meter.

34. In a liquid dispensing system, means forming a liquid flow line through which liquid is adapted to flow under pressure, means for con-

trolling the flow of liquid through said line, and a plurality of means disposed in said line remotely one from the other, one of said means including devices for transforming the kinetic energy of the liquid flowing through said line into pressure which is of substantially equal intensity throughout the portion of the line between said devices whereby to cause the operation of the other device, and means operated by the actuation of the other device for actuating the flow control means in the line.

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