May 10, 1927. 1,628,194

R. R. ROBINSON

VENDING APPARATUS FOR LIQUIDS

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Fig. 1.

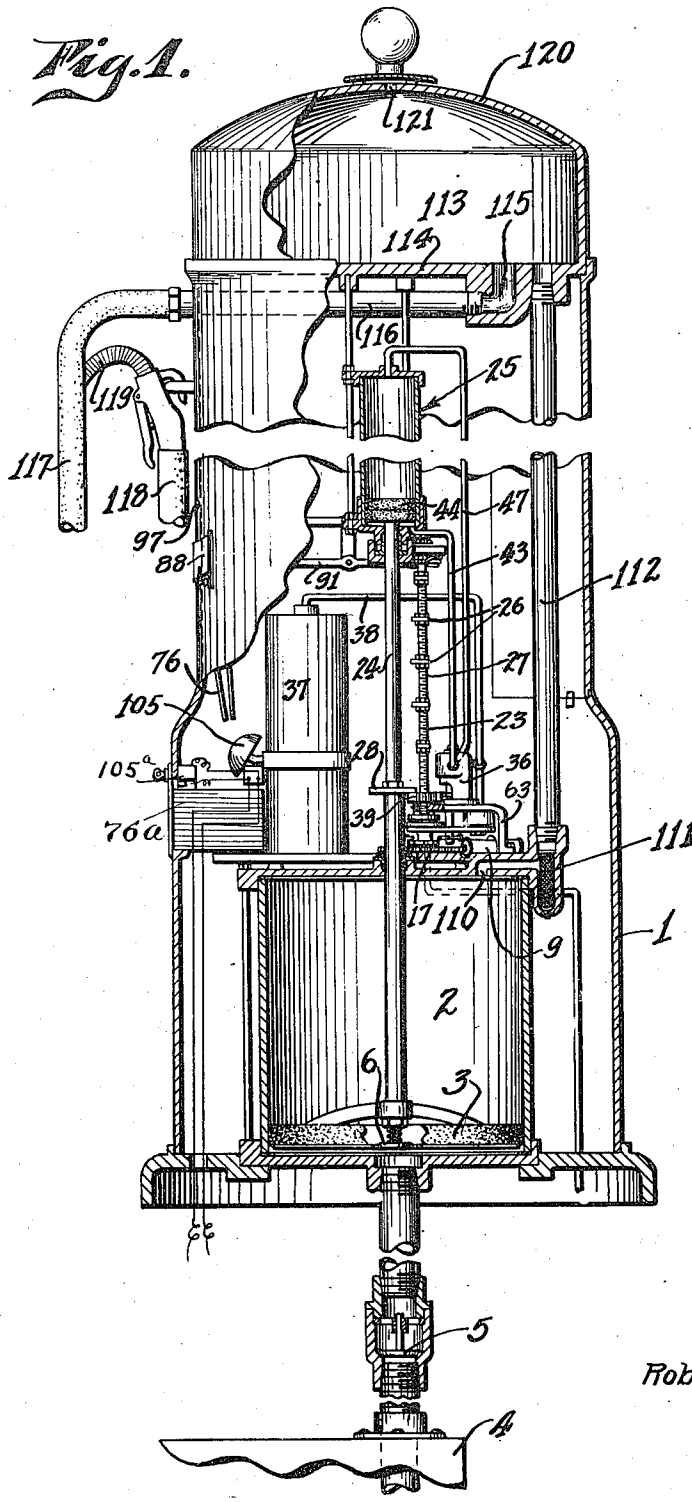


Fig. 2.

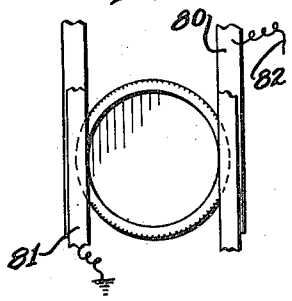
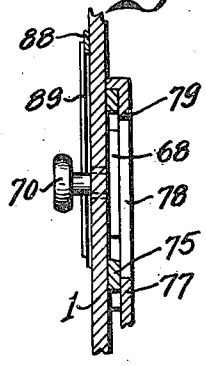


Fig. 3



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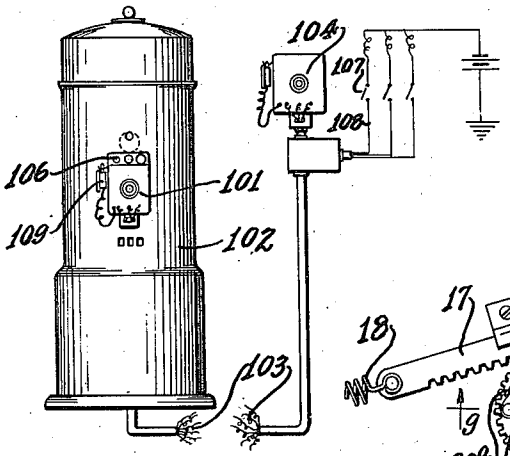


Fig. 4.

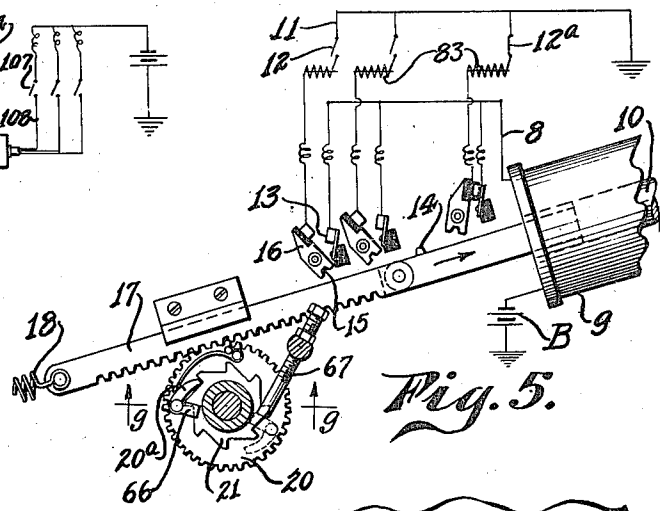


Fig. 5.

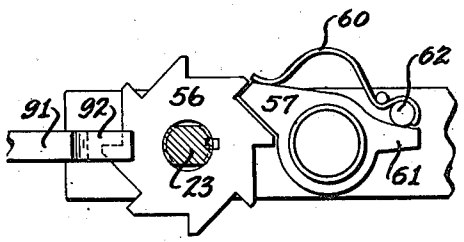


Fig. 7.

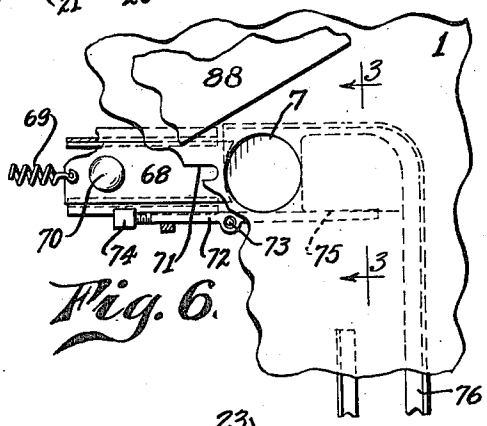


Fig. 6.

Fig. 9.

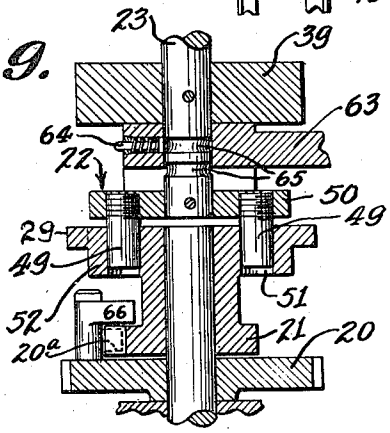
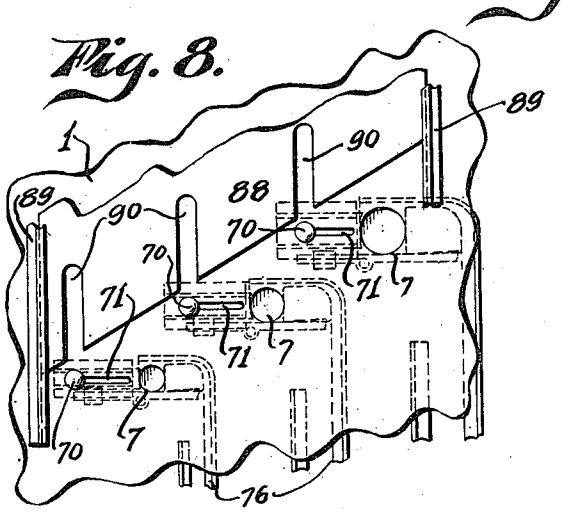


Fig. 8.



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Fig. 11.

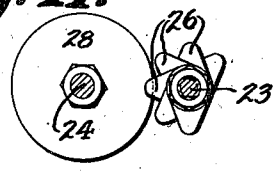


Fig. 12.

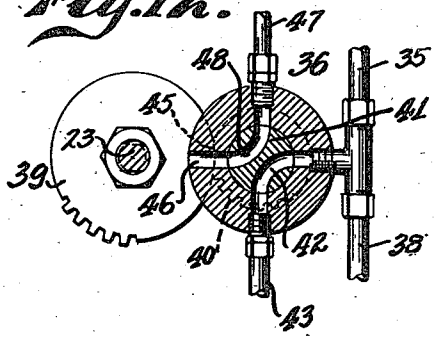


Fig. 10.

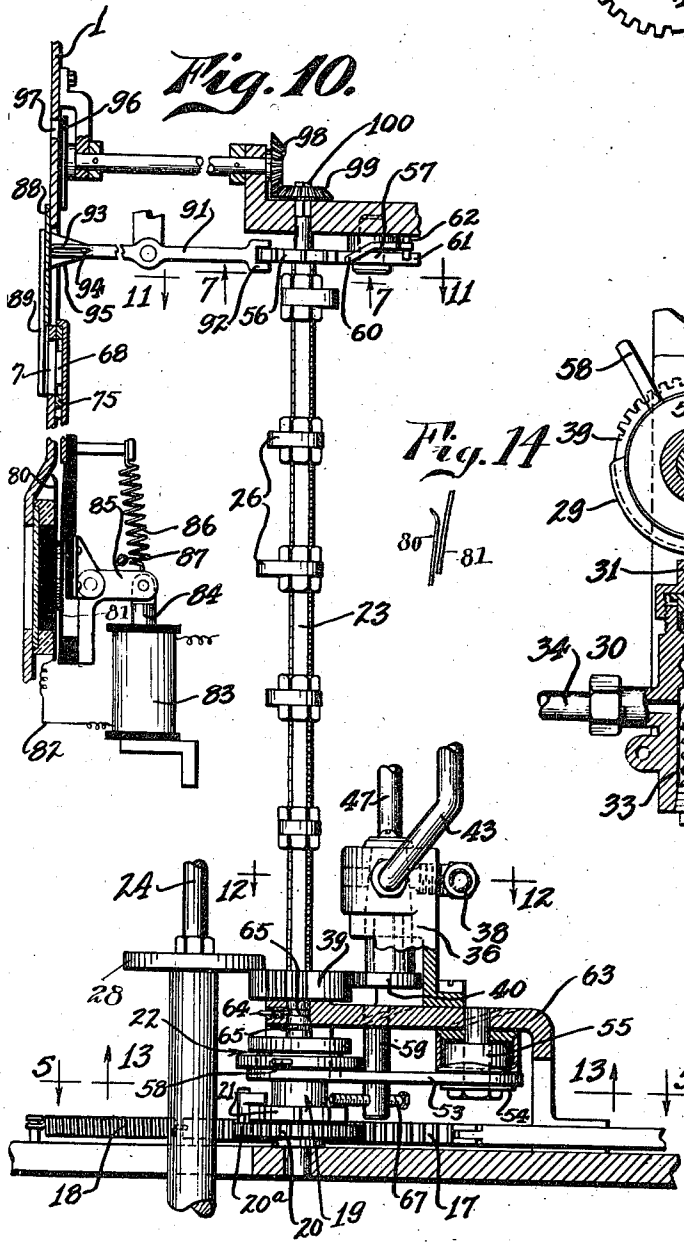
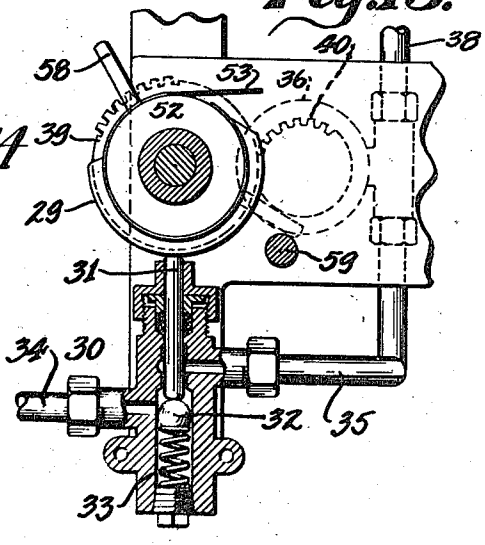


Fig. 14

Fig. 13.



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Patented May 10, 1927. 1,628,194

UNITED STATES PATENT OFFICE.

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VENDING APPARATUS FOR LIQUIDS.

Application filed March 2, 1925. Serial No. 12,574.

This invention relates to vending apparatus for vending liquids, and while the invention is capable of use for vending liquids of any kind, in the present specification it is described as vending apparatus for gasoline. The invention is particularly useful in this connection for the reason that persons operating motor cars at night frequently require gasoline when they pass gasoline stations that have been closed by reason of the late hour. The invention is also capable of installation as an automatic gasoline station which will not require the services of an attendant except occasionally to see that the apparatus is operating properly. The general object of the invention is to provide means for effecting the sale of liquids, and particularly gasoline in an automatic or semi-automatic manner without necessitating the presence of an attendant at the station. In one embodiment of the invention, the mechanism is coin controlled and is, therefore, substantially automatic in its operation. In another embodiment of the invention, the apparatus may be controlled from a central station.

Other objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient vending apparatus for liquids.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevation broken away and partially in section, illustrating an embodiment of the invention in which the apparatus is coin controlled.

Fig. 2 is a detail illustrating a portion of a coin chute.

Fig. 3 is a vertical section taken through the coin slide about on the line 3—3 of Fig. 6.

Fig. 4 is a diagrammatic view, illustrating the invention as embodied with a telephone apparatus for completing the partial control, which is effected by the coins inserted in the coin slots.

Fig. 5 is a section with parts broken away, and taken about on line 5—5 of Figure 10, illustrating the details of the electrical apparatus which is a feature of the invention when the control is entirely automatic through the agency of the inserted coin; this view may be regarded as a section on the line 5—5 of Fig. 10, but with parts of the mechanism omitted.

Fig. 6 is a side elevation partially broken away and shown in section, illustrating one of the coin slides and its contiguous parts.

Fig. 7 is a horizontal cross section taken on the line 7—7 of Fig. 10, looking upwardly and illustrating details of a detent ratchet wheel and detent pawl which cooperates with it; this is a detail of the automatic stop device which determines the amount of gasoline which is delivered.

Fig. 8 is a side elevation further illustrating details of the coin slots and slides shown in Fig. 6; in this view contiguous parts are broken away.

Fig. 9 is a broken section taken about on the line 9—9 of Fig. 5 and further illustrating details of the driving connection through which the stop device may be set, and through which the actuating means for the gasoline measuring cylinder is controlled.

Fig. 10 is a side elevation in partial section with certain parts broken away, and further illustrating the mechanism including the holding magnet for holding the coin temporarily when it has been inserted in the machine.

Fig. 11 is a cross section on the line 11—11 of Fig. 10, particularly illustrating details of the construction and operation of the stop device.

Fig. 12 is a horizontal section taken about on the line 12—12 of Fig. 10 and illustrating details of the valve mechanism and particularly the auxiliary valve which controls flow of the operating fluid to and from the actuating cylinder which operates the measuring cylinder.

Fig. 13 is a horizontal cross section looking upwardly and taken about on the line 13—13 of Fig. 10.

Fig. 14 is a side elevation of the coin contacts showing their normal relation, that is, before the coin is inserted.

Before proceeding to a detailed description of the apparatus, it will facilitate the disclosure to state that Fig. 4 shows an embodiment of the invention in which the control is not entirely automatic but in which the apparatus at the vending station is provided with coin slots for the insertion of coins of different denominations. This station is in telephonic communication with a central station where an attendant, having noted that a certain coin has been inserted, will close a switch which will effect the delivery of the desired amount of gasoline. The other figures of the apparatus illustrate a completely automatic mechanism in which the apparatus automatically effects the delivery of the desired amounts of gasoline.

In the automatic controlled apparatus, and referring particularly to Fig. 1, 1 represents a casing in which there is mounted a measuring cylinder 2 carrying within it a measuring piston 3. Any suitable means may be provided for supplying this measuring cylinder with the liquid to be dispensed, such as gasoline. In this connection, it should be understood that the piston normally rests at one end of the cylinder and the cylinder is kept full of gasoline. In the present instance, the cylinder 2 is mounted in a vertical position and the piston 3 at its bottom. The cylinder is supplied with gasoline through its lower end from a supply tank 4 through which the liquid passes upwardly past the check valve 5, being delivered under the piston 3. The piston is provided with a check valve 6 which permits gasoline to flow upwardly on every down stroke, that is to say, in the return movement of the measuring piston which occurs after every measuring movement.

An automatic stop device is provided, the function of which is to arrest the measuring movement of the piston. If desired, this stop device can be constructed so that it will permit a single movement of predetermined amount of the measuring piston in which case it would merely dispense the amount of gasoline corresponding to a coin of a certain denomination. In the present instance, however, I prefer to construct the automatic stop device as a variable stop device so that it operates in conjunction with coin controlled apparatus, the operation being that the variable stop device will be set to correspond with the denomination of the inserted coin.

This automatic means for controlling the stop device and for controlling the actuating means which actuate the measuring piston, will be best understood by referring to Fig. 5. When a coin is inserted in the mouth of one of the coin slots 7 (see Fig. 8), it descends in the slot and operates to close a circuit 8 (see Fig. 5), which passes through a coil 9 of a solenoid, including a core 10, the circuit being supplied with electricity by a source of E. M. F., such as the battery B. The core 10 in this solenoid is connected up to means which actuates the variable stop device and also controls the flow of operating fluid to the actuating cylinder which will be presently described. When the coin is inserted in the slot, it closes the circuit 8 through a branch circuit 11 through the agency of a holding switch 12, there being several of these branches, each branch to correspond with the denomination of the coin inserted. Each branch circuit also includes a switch 13 corresponding to it, and these switches 13 are normally closed.

In the normal position of the core 10, it will be disposed in a position to the left of that illustrated in Fig. 5. When the branch circuit is closed by the inserted coin, the coil 9 is energized and the core 10 is moved toward the left. The core operates automatically depending upon the denomination of the coin inserted, to stop the movement of the core at a predetermined point. For example, in Fig. 5 the coin switch 12^a is represented as closed and the core is shown in a position advanced beyond the two switches 13 at the left. The core is provided with means for opening these switches as it passes them. The switch at the left may correspond, if desired, to a twenty-five cent coin, and the middle switch correspond to a fifty-cent coin, and the switch 12^a correspond to a silver dollar. The switches 13 may be opened by means of a tooth 14 on the core cooperating with a toothed space 15 on each pivoted switch member 16. In this way it will be seen that when the tooth 14 opens the switch corresponding to the branch circuit which has been closed by the coin, it will open the circuit through the coil 9 and stop the advancing movement of the core. In other words, this apparatus determines the amount of movement of the core.

I shall now describe the means by which this movement affects the stop device and sets it; also the other mechanism controlled by this core. Any suitable means may be provided to enable the core 10 to actuate this other mechanism. In the present instance, I provide a rack 17 attached to the end of the core and I provide means, such as a coil spri g 18, attached to the end of the rack to return it after the closed branch circuit has been opened.

The rack 17 drives a driving ratchet and pawl device 19 (see Figs. 9 and 10), which includes a driving member 20 in the form of a gear wheel meshing with the rack. This gear wheel carries a driving pawl 20ª (see Fig. 5), which cooperates with the teeth of a driving ratchet wheel 21. This driving ratchet wheel is connected by a sliding coupling 22 with a rotary stop shaft 23 which is disposed in a vertical position (see Fig. 10), and parallel with a rod 24 which connects the measuring piston 3 with a fluid operated actuating cylinder 25. (See Fig. 1.) This shaft carries a plurality of stops 26 which are adjustably mounted on it by reason of the fact that the shaft is provided with a continuous screw thread 27. These stops project at different angles progressively from the shaft (see Fig. 11). They are arranged so that any one of them may project into the path of a stop-head or disk 28 carried at the lower end of the rod 24. (See Fig. 1.) When one of the stops is in the path of this stop-head, the other stops are out of its path. In this way the rotary shaft operates as a variable stop device to stop the movement of the measuring piston at a plurality of selective points. Any suitable automatic means may be provided which is controlled by engagement of the stop-head with the stop to effect the return of the measuring piston and to effect the return of the other parts to their initial position.

However, I shall first describe the mechanism for controlling the flow of the operating fluid to and from the actuating cylinder 25. For this purpose, I form a part of the sliding connection 22 into a cam 29 and when the gear wheel 20 is rotated this cam of course rotates also. I provide valve mechanism controlled by the rotation of these parts and this valve mechanism includes a main valve 30 (see Fig. 13), the stem 31 of which engages the face of the cam 29 so that when the cam is rotated the stem 31 will be pushed inwardly, thereby unseating the ball valve 32 which is normally held on its seat by the spring 33. This will admit an operating fluid, such as compressed air, from a main reservoir, not illustrated, through a supply pipe 34 and this air, after passing the main valve 30, passes through a connection 35 to an auxiliary valve or cock 36 (see Fig. 12). This auxiliary valve 36 is connected up to an auxiliary air reservoir 37 (see Fig. 1) by a pipe 38. When the cam 29 is rotated as described, a Geneva gear 39, rigid on the shaft 23 cooperates with another Geneva gear 40 on the plug 41 of the valve 36 and rotates it into the position shown in Fig. 12. This permits air to flow from the pipe 35 through the port 42 of the auxiliary valve 36 into a pipe 43 which leads to the lower end of the actuating cylinder 25 and delivers the compressed air under the actuating piston 44; at the same time compressed air flows past the auxiliary valve and fills the auxiliary tank 37. The Geneva gears are intermittent gears so that when the gear 39 has rotated the auxiliary valve 36 to the position shown in Fig. 12, no further rotation will take place, the periphery of the Geneva gear 39 being received in an arcuate recess 45 in the side of the other gear. In the opposite position, the port 42 will connect the pipe 43 to the atmosphere through a port 46 in the side of the auxiliary valve. In the position of the valve shown in Fig. 12, the upper end of the actuating cylinder 25 is connected by a pipe 47 through a port 48 to the atmosphere through a port 46, and at the same time air from the auxiliary tank is admitted through pipe 38, port 42 and pipe 43 to the lower end of the actuating cylinder 25. This actuates the piston 3. In other words, the auxiliary valve is constructed so that it can admit the fluid under pressure to either end of the actuating cylinder 25 while it opens the other end of the cylinder to the atmosphere.

The slip connection 22 may be of any suitable construction, and in the present instance, it includes pins or studs 49 rigidly attached to a disk 50 on the lower end of the shaft 23 (see Fig. 9), and these studs or pins slide freely in corresponding openings 51 in the body of the cam 29.

It should be understood that by reason of the Geneva gears, after the gear 39 has opened the auxiliary valve it can continue to rotate as far as may be necessary to set the proper stop 26 of the stop shaft 23 in position to cooperate with the stop-head 28. Returning means is provided which exerts a force in a direction to rotate the stop shaft 23 back to its initial position and for this purpose the lower portion of the cam 29 is formed into a drum or pulley 52 carrying a belt 53 which runs over and is attached to a pulley 54 which is connected with a coil spring 55. When the shaft 23 is rotated to set it to the proper position, this spring 55 is held against returning the shaft at once to its initial position through the agency of a detent ratchet wheel 56 which is carried on the upper end of the shaft 23 and which cooperates with a detent pawl 57. When the stop-head 28 strikes the stop which is set in its path it shifts the shaft 23 longitudinally upwardly and this moves the ratchet wheel 56 out of the plane of the pawl 57, whereupon the spring 55 will immediately rotate the cam on the shaft 23 and their cooperating parts back to their initial position. The slip connection 22 permits this shifting movement of the shaft 23 without disconnecting it from the driving gear 20.

When the spring 55 pulls the shaft 23 back to its initial position, rotation of the shaft 23 will continue under the influence

of the spring 55 until a radial stop finger 58 comes up against a fixed stop or stop post 59 (see Fig. 13), and this stop finger 58 is so placed with respect to the detent ratchet wheel 56 that when the stop finger 58 is against the post 59 the detent ratchet wheel will be in such oriented position that it can shift back when the shaft 23 descends so as to come into the plane of the detent pawl. In other words, this detent ratchet wheel will be held in position so that the nose of the detent pawl will be aligned with the toothed space of the ratchet wheel as indicated in Fig. 7. This prevents any possibility of a tooth of the ratchet wheel projecting across the pawl so as to prevent the ratchet wheel from coming back into the plane of the pawl. The detent pawl 57 is pressed by a spring 60 which presses the nose of the pawl toward the ratchet wheel but in order to keep the pawl from moving further in, in such way that it might interfere with the return of the ratchet wheel to the plane of the pawl, I provide the pawl with a tail 61 which is held against a stop pin 62 by the action of the spring.

When the spring 55 rotates the shaft 23 back to its initial position, it, of course, also returns the valve mechanism to its initial position, thereby admitting air from the auxiliary tank 37 to the upper end of the actuating cylinder 25 and this automatically returns the measuring piston 3 to its initial position. I provide means for shifting the shaft 23 downwardly automatically at the end of the return stroke of the measuring piston 3. For this purpose I provide means on the stop shaft 23 to engage the stop-head 28 at the end of its stroke to shift the shaft 23 downwardly. In the present instance, this function is performed by the Geneva gear 39, the periphery of which projects into the path of the stop-head. (See Fig. 10.)

In order to permit the shifting of the shaft 23 to and fro as described above, I provide means for holding it yieldingly in either of its shifted positions. For this purpose, a frame member 63, which guides the lower end of the stop shaft 23, is provided with a spring pressed pin 64 which cooperates with either one of two grooves 65 formed in the shaft in the vicinity of the annular pin. (See Fig. 10.)

In order to prevent the driving pawl 20a from interfering with the backward rotation of the shaft 23 in returning it to its initial position, I provide this pawl with a tail 66 which, in the normal position of the gear wheel 20, comes against an adjustable stop 67. In other words, after the gear 10 has been operated to seat the variable stop device in its proper position, the spring 18 brings the gear wheel 20 back until the pawl occupies the position indicated in dotted lines in Fig. 5.

I shall now describe the coin slides, referring especially to Figs. 6, 8 and 10. As illustrated in Fig. 8, there are three coin slots 7 corresponding to the different denominations. At the left of each coin slot I provide a coin slide 68 (see Fig. 6) having a retractile spring 69 and a knob 70 which is adapted to be shoved forwardly, thereby advancing the coin. When this occurs, the stem of the knob or button 70 slides forwardly in a horizontal slot 71.

Any suitable means may be provided for preventing slugs or spurious coins from operating the device. In the present instance, I provide a teeter 72, which is pivoted at 73 and has an adjustable counterweight 74, the organization of parts being such that when the slide 68 advances the coins out onto the arm 75 of the teeter, if the coin is too light, it will not depress the arm 75 and hence the coin cannot fall into the coin chute 76. In this connection reference is had to Fig. 3, which shows a guard-plate 77 behind the plane of the slide 68. This guard 77 is formed with an opening 78 but the edge 79 of this opening projects down sufficiently so that it engages over the upper edge of the coin supported on the arm 75; and if the weight of the coin is not sufficient to depress the arm 75, the upper edge 79 keeps the coin from falling away from the slide and hence when the slide 68 moves back the coin will follow it and will run back down the arm 75 which is slightly inclined upwardly toward its right end (refer to Fig. 6). If the coin is too heavy, it will depress the arm 75 and fall out to one side and will not pass into the coin chute 76. If the coin is the proper coin, and hence has the proper weight, it will depress the arm 75 and fall into the chute 76 as the slide 68 shoves the coin toward the end of the arm. I shall now describe the manner in which the proper coin closes the electric circuit to energize the coil 9. (Refer to Fig. 10.) As the coin falls down this chute, it comes between two contacts 80, 81, the latter of which is grounded and the former of which is connected by a conductor 82 to a holding coil or electromagnet 83. These coils 83 correspond to each branch circuit also indicated in Fig. 5. When the current energizes the holding coil 83 it pulls open its core 84, the end of which is attached to a bell crank lever 85 carrying the contact 81. This presses the contact 81 over against the contact 80 and holds the coin temporarily in position. After the circuit is broken, a coil spring 86 pulls the bell crank lever 85 back against a fixed stop pin 87. It should be understood that in this position of the bell crank lever 85, the contacts 80 and 81 will be far enough apart to permit the coin to fall out and, at the same time, they are near enough together to insure that a coin pass-

ing between the contacts will close the branch circuit. They converge at their upper ends (see Fig. 14).

It will be noted that the stop shaft 23 is provided with more than three stops 26. This is done in order to enable a person to insert a number of coins, for example, three quarters in rapid succession, each quarter being inserted immediately after the spring 18 has returned the core 10 to its normal position. In this way, by inserting two or three coins in succession, the stop shaft 23 can be given a succession of rotations by the successive movements of the core 10. In other words, the insertion of a second coin can be accomplished in operating the machine any time before the measuring piston 3 is started on its return movement. However, I provide means for preventing the insertion of the coin after the measuring piston has started on its return movement, or rather just as it is about to start on its return movement. For this purpose, I provide a locking plate 88 (see Fig. 8), which is guided to slide vertically in cleats 89. The under edge of this locking plate is provided with a plurality of slots 90, each slot being opposite the stem of one of the knobs 70 for the coin slides 68. Hence when this plate 88 is depressed, it will lock all of the slides against movement, and the plate 88 will also cover the coin slots 90.

I provide automatic means for moving this locking plate downwardly. For this means I provide a lever 91 (see Fig. 10), one arm of which is formed into a yoke 92 to engage over the edge of the detent ratchet wheel 56; the other arm of this lever is provided with a slot 93 which cooperates with a pin 94 extending outwardly from a bracket 95 on the back of the locking plate.

I also provide means, such as the dial 96, for indicating the position in which the stop shaft 23 has been set (see Fig. 10). The numbers of this dial pass before a window 97 in the casing 1 and this dial is driven through bevel gears 98, from the upper end of the shaft 23. The beveled gear 99 is connected to the shaft 23 through a square or angular slip coupling 100.

In the embodiment of the invention illustrated in Fig. 4, I provide a telephone apparatus 101 on the outer side of the casing 102 and cables with conductors 103 to connect this telephone with another telephone 104 at a central station. A bell 105, such as the bell shown in Fig. 1, indicates to the operator at the central station the character of the coin which has been inserted at one of the coin slots 106 and the operator at the central station then closes by hand a switch 107 in the proper branch circuit 108 to energize an electromagnet similar to the electromagnet 9 shown in Fig. 5 within the casing 102. The rest of the mechanism within the casing 102 will be substantially the same as that described above for setting the stop device and for actuating the measuring piston. In the operation of the telephone, of course, it will be constructed in such a way that by merely removing the receiver 109 at the dispensing station, the operator at the central station will be called by a signal. The operator would then listen for the sound of the bell and would then close the proper switch 107 to deliver the desired amount of gasoline.

A contact device 105^a is wired to ring the bell 105 in case an unauthorized person opens the door to the coin box 76^a (see Fig. 1).

Any suitable means may be provided for delivering the gasoline from the casing 1. As illustrated in Fig. 1, when the piston 3 rises the gasoline is forced out through a port 110 closed through a gauze screen 111 and passes up a standpipe 112 where it flows into a chamber 113 in the upper end of the casing and above a hood 114. This hood 114 is provided with a delivery elbow 115 connected with a pipe 116 which is connected to a flexible hose 117. This hose ends in a loop, (not illustrated), so that the free end 118 of the hose may be hooked up at the side of the casing. This end of the hose is provided with a nozzle 119 for directing the stream of gasoline into the tank of the automobile.

When the apparatus is standing idle, of course the standpipe 112 would be substantially full of gasoline so that as soon as the upward movement of the piston 3 started gasoline would commence to flow through the delivery pipe 116. The dome 120 of the chamber 115 would be provided with a vent 121 to permit escape of gasoline vapors and prevent danger from explosions.

Of course the price of gasoline varies from week to week. However, this fact is taken care of in my apparatus by reason of the screw thread 27 on the stop shaft 23 which enables the stop to be adjusted slightly up or down as may be necessary.

I shall now briefly describe the general mode of operation of the apparatus:

Referring especially to the completely automatic type of the apparatus, when a purchaser inserts the proper coin in one of the coin slots 7, the coin comes into position before the coin slide 68, whereupon the purchaser then shoves the coin slide forward by moving the knob 70 horizontally in the slot 71. If the coin is the proper coin, when it advances out over the arm 75, it will depress the arm and fall into the coin chute 76 whereupon it will pass between the two contacts 80 and 81 (see Fig. 10), and this will close a circuit through the holding coin 83 and through the solenoid coil 9. (See Fig. 5.) Through the agency of the bell

crank lever 85 the contact 81 will clamp the coin against the contact 80 and hold the coin in position to maintain the circuit. When the coil 9 is energized, it pulls the core 10 into it and this actuates the rack 17 to rotate the stop shaft 23 through the sliding coupling 22. The switches 13 being normally closed, as the core 10 advances it will open these switches in succession until it reaches the switch corresponding to the branch circuit in which the coin of a certain denomination was inserted. When it strikes this switch of course it opens the circuit through the solenoid coil 9 and through the holding magnet. The coin thus falls out and descends into the coin box. The spring 18 also operates to pull the core 10 back toward the left as viewed in Fig. 5. As this rotation occurs the driving pawl 20 moves back idly over the teeth of the ratchet wheel 21 and eventually comes into position so that its tail 66 engages the fixed adjustable stop 67. This holds the pawl out of the path of the teeth of the ratchet wheel 21 and enables the ratchet wheel to permit a backward rotation of the stop shaft 23 when it returns to its initial position.

When the coil 9 pulls the rack 17 to the right, the rotary movement of the gear wheel 20 is imparted to the cam 29 which actuates the stem 31 of the main valve 30 and this permits compressed air 34 from the supply reservoir to flow through the main valve 30 and through the auxiliary valve 36 which will also be set by the same rotary movement in its proper position to permit the air to flow through the pipe 35 and port 42 and pipe 43 to the underside of the piston 44 of the actuating cylinder 25. This will start a rising movement of the measuring piston 3 and this measuring movement will continue uninterrupted until the stop-head strikes the "set" stop 26. When this occurs the stop-head will shift the shaft 23 upwardly thereby disengaging the detent ratchet wheel 56 from the detent pawl 57. The spring 55 will then pull on the belt 53 and through the spring pulley 52 operates to rotate the shaft 23 back to its initial position. This backward rotation will continue until the stop finger 58, projecting from the cam, comes against the fixed stop or post 59. When the backward rotation of the shaft 23 occurs the main valve 30 will of course be permitted to close by the passing away of the cam face from the end of the stem 31. Incidentally the auxiliary valve 36 will also be returned to its initial positon which is the reverse of that shown in Fig. 12. The port 48 will then connect the pipe 38 to the pipe 47 and supply air from the auxiliary tank 37 to the other end; that is to say, the upper end of the cylinder 25; this will start a return movement of the measuring piston 3. At the end of the return movement the stop pin 28 will strike the gear 39 and shift the shaft 23 back to its initial position. The spring pressed pin 64, cooperating with the two grooves 65, yieldingly holds this shaft in either of its shifted positions.

If the customer desires to put in a succession of coins of the same or different denominations, he may do so provided the second or later coin is inserted before the measuring piston 3 commences its return stroke as described more fully hereinabove. At the end of the down stroke of course the downward shifting of the stop shaft 23 brings the detent ratchet wheel 56 back into the plane of the pawl 57.

When the spring 55 sets the auxiliary valve in position to admit air from the auxiliary reservoir to the upper side of the actuating cylinder 25, it also operates cam 29 to close the main valve. This prevents any escape of air from the main air supply. Of course, if the apparatus stands a long while unused, the air in the auxiliary cylinder might eventually leak out, but this is of no consequence, as the volume of the auxiliary reservoir is relatively small.

The method of operating the type of apparatus shown in Fig. 4 has been fully described above.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited to the practice of my invention, nor in my claims, to the particular embodiment set forth.

What I claim is:

1. In a vending apparatus having a measuring cylinder for vending gasoline or the like, the combination of a rotary variable stop-device operating to arrest the movement of the measuring piston at selective points, a solenoid and a circuit therefor having switches which may be closed by coins of different denomination, means actuated by the solenoid for operating the rotary variable stop-device, and automatic means for determining the amount of movement imparted by the solenoid to the rotary stop device to correspond with the denomination of the inserted coin.

2. In a vending apparatus having a measuring cylinder for vending gasoline or the like, the combination of a rotary variable stop-device operating to arrest the movement of the measuring piston at selective points, a solenoid coil with a core and a circuit passing through the coil, means connecting the solenoid core with the rotary stop-device for actuating the same, a plurality of circuits which may be closed respectively by coins of different denomination, each circuit having a switch controlled by the solenoid core and operating to determine the amount of movement of the core

by the solenoid coil and thereby determine the amount of movement of the rotary stop-device.

3. In a vending apparatus having a measuring cylinder for vending gasoline or the like, the combination of a variable stop-device operating to arrest the movement of the measuring piston at selective points, a solenoid coil with its core, a circuit passing through the solenoid coil and having a plurality of branch circuits each having a switch capable of being closed by a coin of a certain denomination, a second switch in each branch circuit, said last named switches being normally closed, automatic means for opening the last named switches in succession when the core is advanced by the energized coil so as to stop the advance of the core at a predetermined point, depending upon the denomination of the inserted coin, and means actuated by the movement of the core to set the variable stop-device to correspond with the denomination of the inserted coin.

4. In a vending apparatus having a measuring cylinder for vending gasoline or the like, the combination of a variable stop-device operating to arrest the movement of the measuring piston at selective points, a solenoid coil with its core, a circuit passing through the solenoid coil and having a plurality of branch circuits each having a switch capable of being closed by a coin of a certain denomination, a second switch in each branch circuit, said last named switches being normally closed, automatic means for opening the last named switches in succession when the core is advanced by the energized coil so as to stop the advance of the core at a predetermined point, depending upon the denomination of the inserted coin, a ratchet-and-pawl device for actuating the variable stop-device and means for actuating the ratchet-and-pawl device by the core to set the variable stop device to correspond with the denomination of an inserted coin.

5. In a vending apparatus having a measuring cylinder for vending gasoline or the like, the combination of, a rotary variable stop-device operating to arrest the movement of the measuring piston at selective points, a solenoid coil with its core, a circuit passing through the solenoid coil and having a plurality of branch circuits each having a switch capable of being closed by a coin of a certain denomination, a second switch in each branch circuit, said last named switches being normally closed, automatic means for opening the switches in succession when the core is advanced by the energized coil so as to stop the advance of the core at a predetermined point depending upon the denomination of an inserted coin, a ratchet-and-pawl device for rotating the rotary stop-device and enabling the same to be advanced by the insertion of different coins in succession, and means for actuating the ratchet-and-pawl device by the movement of the core to set the variable stop-device to correspond with the inserted coins.

6. In a vending apparatus having a measuring cylinder for vending gasoline or the like, the combination of a variable stop-device operating to arrest the movement of the measuring piston at selective points, a solenoid coil with its core, a circuit passing through the solenoid coil and having a plurality of branch circuits each having a switch capable of being closed respectively by a coin of a certain denomination, a holding magnet for holding the coin temporarily in position to maintain the circuit closed through the solenoid coil, a second switch in each branch circuit, said last named switches being normally closed, automatic means for opening the last named switches in succession when the core is advanced by the energized coil so as to open the circuit and thereby deenergize the holding magnet and permit the coin to fall, and also operating to stop the advance of the core at a predetermined point depending upon the denomination of an inserted coin, and means actuated by the movement of the core to set the rotary stop-device to correspond with the denomination of the inserted coin.

7. In a vending apparatus having a measuring cylinder and piston for vending gasoline or the like, the combination of a variable stop-device operating to arrest the movement of the measuring piston at selective points, automatic means controlled by coins of different denomination for setting the variable stop-device to correspond with the inserted coin-actuating means for said piston, automatic valve-means for controlling the said actuating means, actuated at the end of the measuring movement of the measuring piston to effect the return of the measuring piston to its initial position, and automatic means for returning the variable stop-device to its initial position.

8. In vending apparatus having a measuring cylinder and piston for vending gasoline or the like, the combination of stop-head moving with the measuring piston, a variable stop-device having a rotary shaft with a plurality of stops disposed progressively at different angles thereon so that any stop can project into the path of the stop-head with the remaining stops out of its path, to arrest the movement of the measuring piston at selective points, means controlled by coins of different denomination for rotating the said shaft to set the variable stop-device in different positions to correspond with the inserted coin, a ratchet wheel carried by the shaft, a detent pawl cooperating with the ratchet wheel for holding the said shaft in any position to which it is advanced, said shaft being mounted

to shift longitudinally when a stop is struck by the stop-head and carry the ratchet wheel out of engagement with the detent pawl to release the shaft from the same, returning means for exerting a force to rotate the said shaft back to its initial position, automatic means for returning the measuring piston to its initial position, and automatic means for shifting the shaft longitudinally back to its initial position.

Signed at Los Angeles, California, this 6th day of February, 1925.

ROBERT R. ROBINSON.