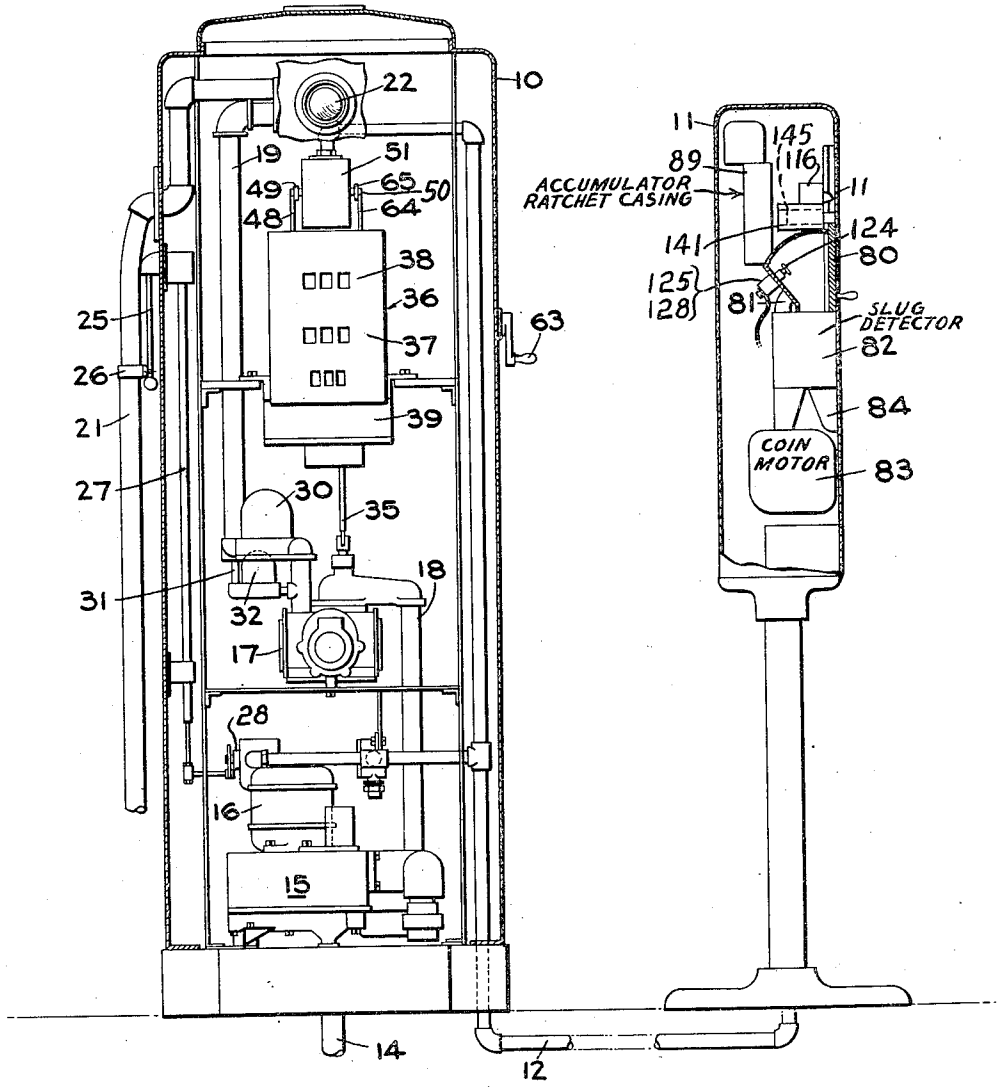
Oct. 30, 1951 P. M. SCHNECKENBURGER 2,573,112

COIN-OPERATED DISPENSING PUMP

Filed Jan. 22, 1944 5 Sheets-Sheet 1

Fig. 1.



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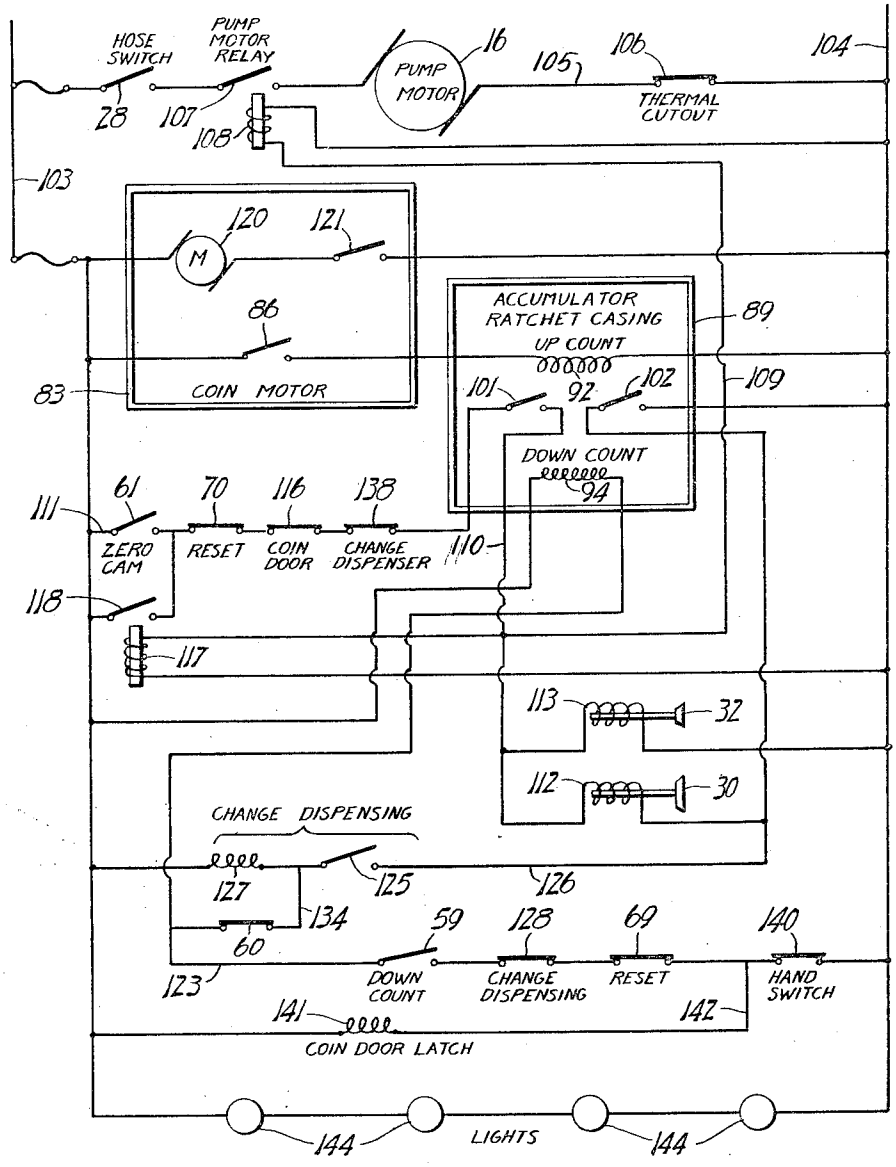


Fig. 2

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COIN-OPERATED DISPENSING PUMP

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Fig. 3.

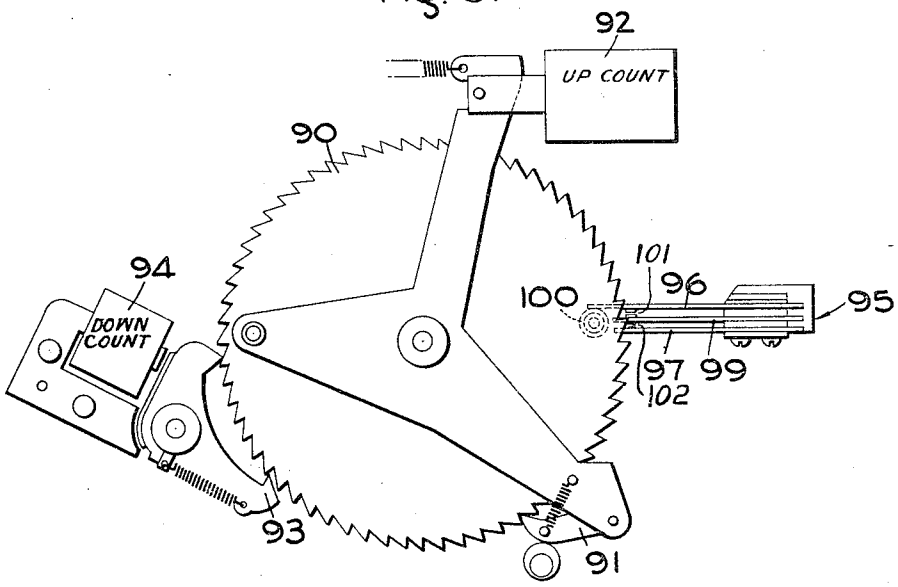
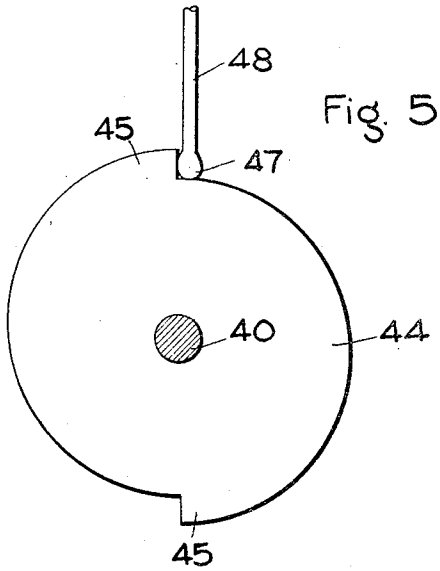


Fig. 5.



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COIN-OPERATED DISPENSING PUMP

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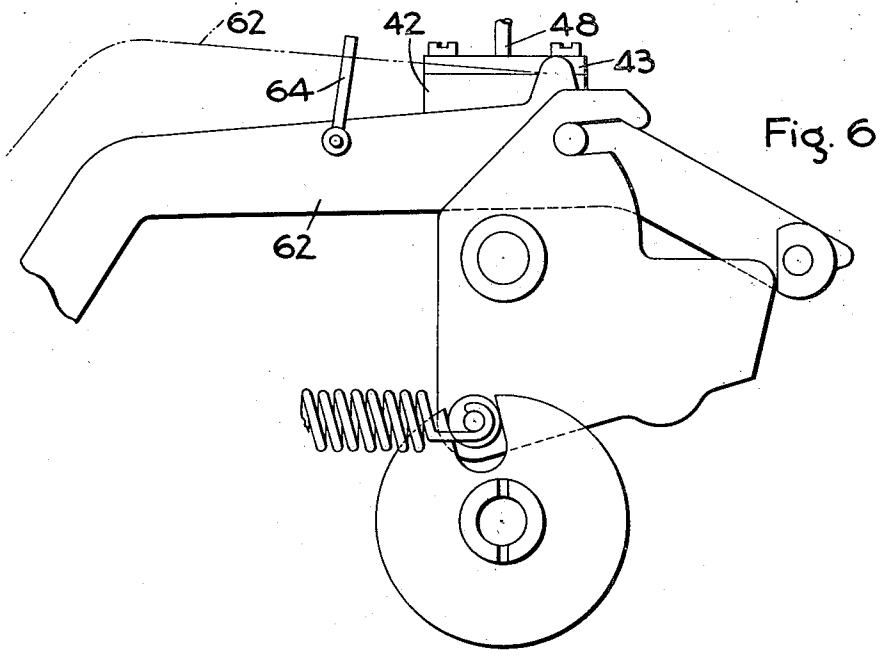


Fig. 6.

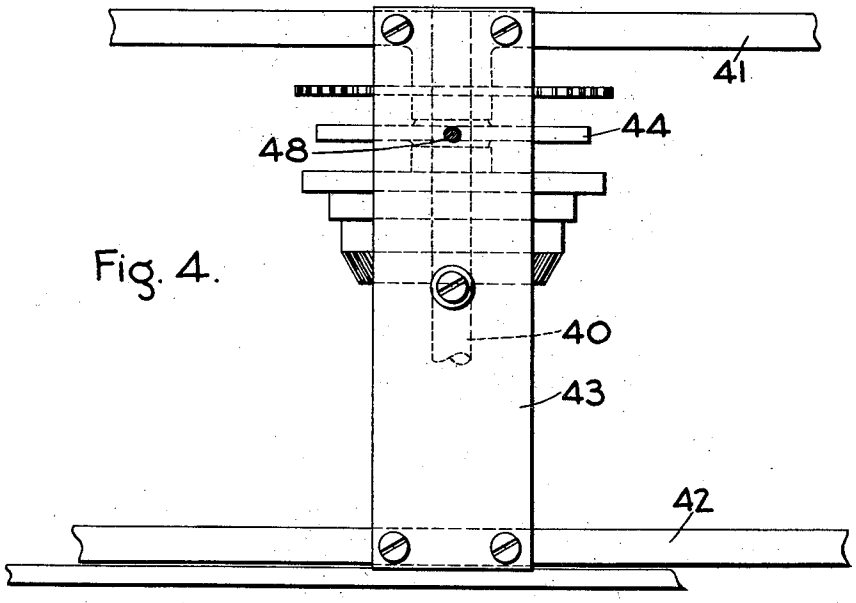


Fig. 4.

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COIN-OPERATED DISPENSING PUMP

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Fig. 7.

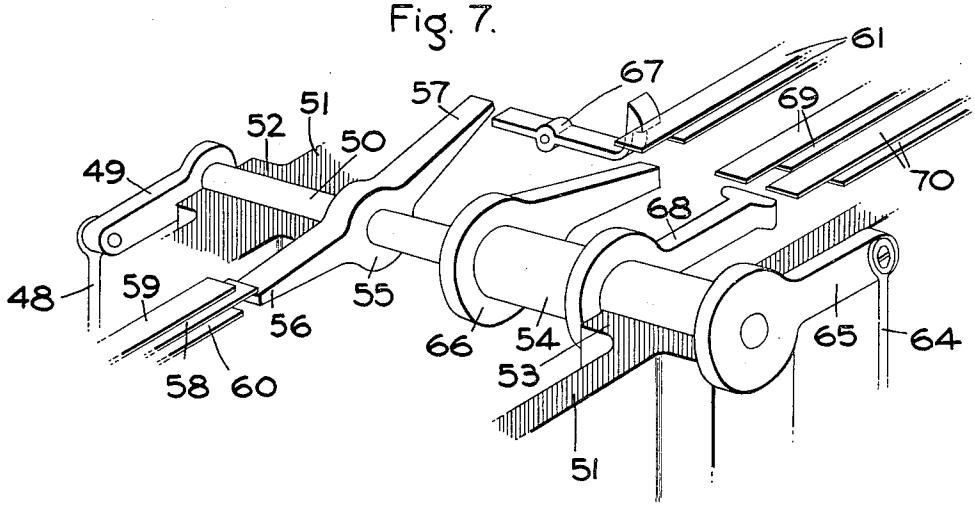
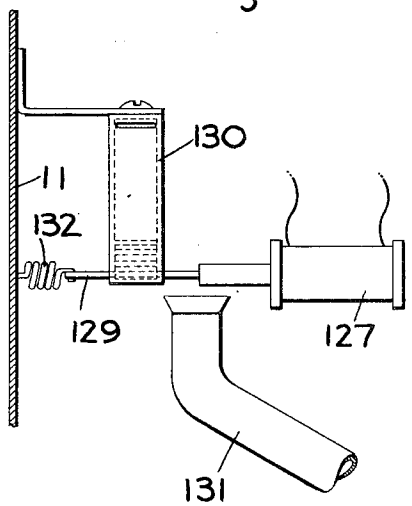


Fig. 8.



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Patented Oct. 30, 1951 2,573,112

UNITED STATES PATENT OFFICE

2,573,112

COIN-OPERATED DISPENSING PUMP

Philip M. Schneckenburger, Buffalo, N. Y., assignor to Gasoteria Corporation, Buffalo, N. Y.

Application January 22, 1944, Serial No. 519,253

22 Claims. (Cl. 194—3)

1

This invention relates to improved coin-controlled liquid dispensing means and particularly to apparatus wherein electrical energy is arranged to accomplish substantially the entire coin-controlled dispensing operation.

Prior art mechanical means suggested for use in coin-controlled dispensing of gasoline or other liquids have been extremely complex in construction, uncertain in operation and, from the standpoint of the user, either too complicated to operate or not sufficiently versatile. Those of sufficient practicality to permit actual construction and operation are so designed that only a single coin of a particular denomination may be inserted for a full dispensing cycle.

According to the principles of the present invention, a number of coins of different denominations may be inserted at one time, the apparatus being adapted to subsequently dispense a quantity of liquid variably proportionate to the total value of the coins deposited, depending on the variable unit price of gasoline or other liquid being dispensed.

In the apparatus of my invention a patron may withdraw coins or tokens equivalent in value to those deposited, if he desires, prior to delivery of the called-for quantity of gasoline. Further, if a part only of the gasoline is delivered, the patron may withdraw coins or tokens equivalent in value to the undelivered portion.

The numerous advantages attendant upon the construction and use of the novel dispensing apparatus will occur to those skilled in the art from a consideration of the following description of a single complete and specific embodiment of the principles of my invention, taken in conjunction with the accompanying drawings. It is to be understood, however, that the apparatus shown and described in detail is by way of example only, and the spirit and scope of my invention is not limited excepting as defined in the appended claims.

In the drawings:

Fig. 1 is a general elevational view of one form of the apparatus of my invention with the casing portions thereof in cross section;

Fig. 2 is a schematic view comprising a wiring diagram of the electrical apparatus contemplated in the exemplary form disclosed herein;

Fig. 3 is a fragmentary elevational view of the means for accumulating and registering increments of coin deposit and for subsequently reversely registering increments of liquid dispensing or coin return;

Fig. 4 is a fragmentary top plan view of a portion of the computer mechanism;

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Fig. 5 is a detailed elevational view of the cam element of Fig. 4;

Fig. 6 is a fragmentary side elevational view of the upper portion of the computer;

Fig. 7 is a fragmentary perspective view of an explosion-proof box normally located within the pump casing proper and housing certain electrical contact elements and their control means; and

Fig. 8 is a fragmentary elevational view of a token or coin return device associated with the coin-control means.

Throughout the several figures of the drawings, like characters of reference denote like parts and the numeral 10 designates generally a casing containing liquid pumping and measuring apparatus while the numeral 11 designates generally an adjacent casing containing electrical coin-operated means for controlling the operation of the pumping and measuring apparatus.

The present example of the application of the principles of my invention is a gasoline pump but other liquid fuel or lubricant dispensing apparatus may embody the teachings of my invention.

The pumping, dispensing, measuring and computing elements contained in the casing 10, which shall be referred to herein as the pump casing, are in a large part conventional and to the extent that conventional elements and practices are employed they will not be described in detail herein. The form of apparatus set forth herein by way of example contemplates the use of a wet hose system, as that term is understood in the gasoline pump art, but the principles of the invention may be applied to other forms of liquid dispensing systems.

In describing the exemplary embodiment of the invention it will aid in clear understanding to state that in the main and so far as is practical the electrical controls are located in a separate casing designated 11 in Fig. 1, and the casing 11 may be disposed as close to or as remotely from the pump casing 10 as considerations of practice and convenience dictate. In the embodiment here set forth by way of example the arrangement is such that no mechanical connection between the casings 10 and 11 is necessary, merely a stout and properly protected conduit for the several electrical conductors extending between the casings 10 and 11 is required. This conduit may be carried beneath the ground line or within the conventional "island" upon which pumps are usually mounted, as indicated at 12 in Fig. 1. However, the control casing may be secured directly to and supported by the pump casing,

if desired. For convenience the pump casing 10 and its associated elements shall be described, followed by a detailed description of the electrical coin control elements housed within casing 11 and the manner in which the latter cooperate in controlling the pump proper.

Referring again to Fig. 1, the numeral 14 designates a gasoline conduit leading from a gasoline tank or reservoir, not shown, and delivering liquid to the suction side of a pump 15 having an electric driving motor 16. The exhaust side of the pump 15 is connected to the intake of a meter 17 by a conduit 18 and the outlet side of the meter 17 has a conduit 19 terminating in a dispensing hose 21. A conventional sight glass 22 is interposed in the conduit 19 and the dispensing hose 21, in the illustration set forth by way of example, is of a kind known in the art as the "New York" type. In this type of hose it is necessary that the portion of the hose beneath its point of emergence from the pump casing 10 be moved away from the casing, as in normal dispensing use, before the pumping motor circuit is closed. This is effected by means of a pivoted depending arm 25 whose lower free end is connected to the hose 21 as by means of a band 26. Mechanical linkage, indicated at 27 and not shown in detail because of its conventionality, is provided for thus controlling a switch 28 disposed in the energizing circuit of the motor 16.

Fig. 1 of the drawings shows a main control valve 30 interposed in the conduit 19 and having incorporated therein a solenoid control. The valve and its controlling solenoid are enclosed in an explosion proof casing, the assembly being obtainable as a commercial unit. The details of construction and arrangement are accordingly not shown. A by-pass conduit 31 connects with the conduit 19 around the solenoid controlled valve 30 and it likewise has interposed therein a solenoid controlled valve 32. This valve, like the one designated 30, has an explosion proof casing and is similar thereto excepting that it is preferably of substantially smaller size.

As will appear later, the valves 30 and 32 open simultaneously in a dispensing operation, but close sequentially, the larger valve 30 closing first and the smaller valve 32 closing later to finally terminate a dispensing operation. This arrangement is provided for insuring greater accuracy of delivery of a given quantity of gasoline.

The meter 17 has a shaft 35 extending upwardly therefrom which, as is customary, rotates in response to the flow of metered quantities of gasoline and operates an integrating and computing mechanism designated generally 36. The computing mechanism shown is known in the art as a Veeder-Root computer and has a portion 37 for integrating and indicating the amount of gasoline metered, a portion 38 for integrating and indicating the money value of the amount so metered, and a portion 39 which constitutes a variable ratio transmission between the portions 37 and 38 for readily adjusting the computer as unit prices of gasoline change.

In Fig. 2 of the drawings the various electrical contacts are shown in the position to which they are normally biased, as by conventional spring means, inherent resilience or the like. That is to say, normally open contacts are shown open and normally closed contacts are shown closed.

Veeder-Root computers, which are almost universally employed in present-day gasoline pumps, are well known to those skilled in the art here concerned. Accordingly, the present description

will detail only the manner in which a Veeder-Root computer is modified or augmented in pursuing the principles of the present invention. In a Veeder-Root computer a shaft 40 extends across between side frames designated 41 and 42 in Fig. 4, the shaft 40 being directly beneath a transverse top plate 43 which bridges the side frames 41 and 42 centrally thereof. The shaft 40, in dispensing operation, rotates once for each 10 cents worth of gasoline dispensed by the apparatus and this rotational impulse is utilized in what is referred to hereinafter as "down-count" operation.

Speaking generally, the present apparatus contemplates an "up-count" operation, wherein coins of various denominations may be indiscriminately deposited, the total deposit being automaticaly integrated and registered, and a subsequent "down-count" operation which comprises the actual gasoline dispensing operation and during which the computer, through the means presently to be described, acts to reduce the integrating and registering means until a zero position thereof is reached, which means that all of the gasoline paid for has been received by the customer. The pump computer is active only during the so-called "down-count" or dispensing operation, not during the "up-count" or coin depositing, registering and integrating phase of operation.

As appears from Figs. 4 and 5, the shaft 40 is provided with a cam 44 having a pair of diametrically opposite gradual rises 45 which engage a follower 47 carried by a push rod 48. The latter may be guided for vertical movement by projection through an opening formed in the computer top plate 43. The upper end of push rod 48 engages an arm 49 which is carried by a rock shaft 50.

Referring to Fig. 7, the numeral 51 designates an explosion-proof box or casing having bearings 52 and 53 formed in its opposite side walls. The rock shaft 50 is journaled at one end in the bearing 52 and has a tubular rock shaft 54 extending thereabout. The tubular rock shaft is journaled in bearing 53 of casing 51. At this point it need merely be noted that a lever 55 is fixed to shaft 50 and has a pair of oppositely extending arms 56 and 57, the former of which is disposed to engage a leaf 58 and raise it against resilient resistance whenever the push rod 48 and arm 49 are raised by one of the cam rises 45. The leaf 58 cooperates with a contact member 59 to form a normally open switch and also cooperates with a contact member 60 to form a normally closed switch. For convenience, the normally open contacts are designated 59 in the wiring diagram, Fig. 2, and the normally closed contacts are designated 60. The normally open contacts 59, as will later appear, are "down-count" contacts for reverse actuation of an accumulator ratchet mechanism illustrated in Fig. 3 and to be described later herein. The normally closed contacts 60 are called "down-count coin return interlock" contacts and their purpose and functions will presently appear.

Attention is here directed to the detail view of "down-count" cam 44, Fig. 5, which illustrates the cam rises 45 as being so formed as to gradually raise the follower 47 during 180° of rotation of shaft 40 of the computer, then permit the follower to drop abruptly to a low point, to be successively gradually raised again upon continued rotation of shaft 40. The arrangement of contacts 59 and 60 is such that arm 56 opens

contacts 60 and closes contacts 59 after the follower has traversed half way from a low point to a high point of cam 44, that is, 90° from a low point. Obviously, the contacts 59 and 60 open and close, respectively, after a further 90° of rotation of cam 44 and shaft 40 when the follower again drops off of a rise 45.

From the foregoing it will be seen that contacts 60 are closed during the dispensing of the first 2½ cents worth of gasoline, contacts 59 are closed from 2½ to 5 cents, contacts 60 are closed from 5 to 7½ cents, and alternately so on.

For other control purposes which will presently appear it is desired to provide a pair of normally open contacts which are closed only upon complete resetting of the computer dials and during any period thereafter that the computer dials remain in zero position. Such contacts, hereinafter referred to as zero contacts, are designated 61 and are disposed within explosion-proof casing 51. Fig. 6 shows a fragmentary elevational view of the upper portion of the computer 36 and the numeral 62 designates a lever which is conventionally present in such computers and which rocks upwardly and downwardly, respectively, at the beginning and end of each manual resetting of the computer dials. In Fig. 1 the numeral 63 designates a conventional reset handle which, as is known to those skilled in the art, is arranged to reset the computer dials, both price and quantity, to zero, upon a single manual rotation thereof. The lever 62, in a conventional computer, is provided for the primary purpose of closing shutters over all of the dials at the beginning of a reset operation and opening the shutters at the conclusion of a "reset" when all of the dials are at zero.

In the present apparatus, lowering movement of lever 62 at the end of a reset operation is arranged to close normally open contacts 61 and latch means are provided for maintaining the contacts closed until such time after resetting as the dials are again moved away from zero by dispensing or "down-count" operation. Referring to Figs. 6 and 7, a push rod 64 has its lower end pivotally connected to lever 62 and its upper end pivotally connected to an arm 65 which is fixed to tubular rock shaft 54 exteriorly of the box 51. Interiorly of box 51 rock shaft 54 carries an arm 66 having a nose portion which moves downwardly past an extension of the upper of the contacts 61 during shutter-opening movement of lever 62 at the completion of resetting, to close contacts 61. A pivoted latch 67 is gravity-biased to latch contacts 61 in closed position after arm 66 passes downwardly beyond the contact extension so that contacts 61 remain closed until the next "down-count" increment, whereupon the arm 57 of lever 55 engages the tail of latch 67 to release the same and open contacts 61.

In addition to arm 66, tubular rock shaft 54 carries an arm 68 which, upon raising movement of lever 62 at the beginning of a manual reset operation, opens two pairs of normally closed contacts 69 and 70, by engagement against extensions formed on the upper contact of each pair. Completion of resetting is accompanied by lowering of arm 68 and contacts 69 and 70 are free to resume their normally closed position. For convenience, the contacts 69 and 70 will hereinafter be referred to as the first and second computer reset contacts, respectively.

The control casing 11 is shown at the right of Fig. 1 and contains, as is indicated schematically, several commercially available coin control instrumentalities. The numeral 80 designates a vertically slidable door which, when open, gives access to slots in coin chutes 81 for coins of various denominations. Coins deposited therein pass downwardly through a slug detector 82 which in the illustrated instance is Model B–70 manufactured by National Slug Rejectors, Inc., of St. Louis, Mo. From the slug detector good coins go to a motor-driven coin registering mechanism 83 and rejected coins or slugs go to a coin return receptacle 84 from which they may be taken by the patron. The coin registering mechanism 83 is likewise a commercially available unit produced by The Rudolph Wurlitzer Company of North Tonawanda, New York, and is known in the art as a "Moto Drive Coin Switch." It is sufficient for present purposes to say that the coin motor, upon passage of a coin therethrough, closes a pair of electrical contacts, indicated in the wiring diagram Fig. 2 at 86. If a coin of least denomination is received (in the present instance a five cent piece) the contacts 86 close once. If a ten cent piece is received, the contacts close twice sequentially, and so on.

Fig. 3 illustrates an accumulator ratchet wheel mechanism which is provided with electrical means for rotating it in opposite directions for sequentially moving it away from and back to a zero position. The casing for the accumulator ratchet mechanism is designated 89 in Figs. 1 and 2. Speaking generally, a ratchet wheel 90 is mounted to be rotated in a clockwise direction as viewed in Fig. 3, from the "zero" position there illustrated, by a ratchet pawl 91 actuated by an electromagnet 92. This phase of movement of the ratchet wheel 90 results from the deposit of coins by a customer and is what has previously been referred to herein as "up-count" operation. The contacts 86 referred to in the preceding paragraph control the circuit of electromagnet 92 and the result is that the deposit of one or more coins rotates the ratchet wheel 90 in a clockwise direction, the degree of rotation corresponding to the total value of the coins deposited, in the illustrated instance one ratchet tooth for each five cents. The electromagnet 92 will hereinafter be referred to as the "up-count solenoid." Subsequent pumping of gasoline or "token-return" operation results in reverse rotation of the ratchet wheel 90 by an escapement mechanism 93 which has an actuating electromagnet 94, hereinafter called the "down-count solenoid." Means for controlling a pair of electric circuits are designated generally 95 in Fig. 3 and comprise a switch arm 96 and a switch arm 97 arranged at opposite sides of a common contact arm 99.

It will be noted that in zero position of the accumulator mechanism, which is the position illustrated in Fig. 3, the contacts are all open. The arms 97 and 99 are shown in their free unstressed position in Fig. 3, but the arm 96 is resiliently biased toward the arms 97 and 99 and is held in the open position shown in Fig. 3 by a roller 100 carried by ratchet wheel 90 when the accumulator is in zero position. When the ratchet wheel 90 is moved away from zero position by operation of the up-count solenoid 92 the resilient bias of the switch arm 96 closes two pairs of contacts, one pair by means of arms 96 and 99 and the other by means of arms 99 and 97. The former pair shall hereinafter be referred to as the "small valve solenoid contacts" and are designated 101 in the wiring diagram, Fig. 2, while the latter pair shall be designated the "large

valve solenoid contacts" and are designated 102 in Fig. 2.

In the wiring diagram, Fig. 2, the numerals 103 and 104 designate opposed conductors of a power source and the pump motor 16 is connected thereacross by means of a conductor 105. The latter contains a conventional normally closed thermal cut-out switch 106 and the previously described normally open dispensing hose switch 28. Switches 106 and 28 are conventional and need not be discussed further. The numeral 107 designates a further switch in the motor circuit 105 which switch is relay-actuated by means of a solenoid winding 108 which is in a branch 109 of a main actuating circuit 110. The actuating circuit 110, between the winding 108 and a lead 111 from one of the conductors 103 of the power supply, is provided with several normally closed switches which serve certain protective ends which will presently appear.

In the wiring diagram the windings of the large and small solenoid controlled valves 30 and 32 are designated 112 and 113, respectively.

In Fig. 1, as has been stated, the numeral 80 designates a vertically sliding door which a patron must raise to gain access to the coin slots and which he must close to dispense the gasoline for which payment has been made by the deposit of one or more coins. In Fig. 2 the numeral 116 designates a pair of normally closed contacts which are opened by opening movement of door 80 and it will be noted that the contacts 116 are in the conductor 111, so that when the door is open the valve circuits and the motor circuit are all open and the pump can accordingly not be operated. Incidentally, in Fig. 2, 117 designates a winding which constitutes a holding coil for the motor and valve circuits. For the motor and valve circuits to be initially established prior to the beginning of a dispensing phase of the usual cycle of operation, by closure of the contacts 101 and 102 of the accumulator ratchet wheel mechanism which energize the windings 112 and 113 respectively of the solenoid valves 30 and 32, the computer must be in zero position and the zero contacts 61, in the explosion-proof box 51, accordingly closed. However, the holding coil 117 simultaneously closes a pair of contacts 118 in parallel with the zero contacts 61 to maintain the valve and motor circuits operative during the gasoline dispensing operation.

In Fig. 2 the coin registering mechanism 83 is indicated schematically in a box. The operation of the coin motor, being understood by those skilled in the art, will be alluded to only to properly associate it in the present invention. The up-count solenoid 92 and the up-count contacts 86 of the coin registering mechanism, all previously described, appear in Fig. 2. The coin registering mechanism is motor driven and a driving motor 120 is energized whenever a coin is present in the registering mechanism by closure of normally open contacts 121. As is conventional, movement of a coin through the coin slot closes contacts 121 by lever action and means are provided to hold contacts 121 closed until the deposited coin or coins is or are fully registered, whereupon contacts 121 are automatically opened.

After a patron has deposited one or more coins and closes the coin door 80 to close contacts 116, if the computer has been reset so that the zero contacts 61 are closed, he may dispense gasoline by means of the hose 21. In so doing the normal operation of the computer 36, as has previously been indicated, periodically and alternately closes and opens down-count contacts 59 (appearing schematically at the bottom of Fig. 2) and energizes the down-count solenoid 94, both the contacts and the solenoid being in a common conductor 123 extending across the power supply 103, 104. This continues until the accumulator ratchet wheel 90 approaches its zero position, whereupon the roller 100 engages the resilient switch arm 96 to raise the same. Prior to this operation the middle contact arm 99 is pressed down against the lower arm 97 by the arm 96 so that, when roller 100 first raises switch arm 96, the large valve contacts 102 (of arms 99 and 97) open first, followed, upon continued rotation of the ratchet 90 to zero position, by opening of the small valve contacts 101 (of arms 96 and 99), as arm 96 raises still farther. The large valve contacts 102 open 2½ cents before the ratchet wheel 90 reaches zero position, thus slowing delivery to a point where subsequent closure of the small valve 32 insures accurate stoppage of delivery. Opening of contacts 101 de-energizes the small valve winding, the motor relay winding, and the holding coil 117, whereupon the holding coil contacts 118 open. tI will be noted here that further pump operation can only be achieved by resetting the computer 36 to zero position by manual operation of the reset handle 63, which permits the zero contacts 61 to again close and condition the circuit 111, 110 for further operation by the deposit of additional coins.

If a patron fills his tank before withdrawing all of the gasoline for which he has deposited coins, or if the pump runs dry, or if for some other reason he does not get or does not want all of the gasoline for which he has deposited coins, he may withdraw coins, or tokens usable for future purchases, by manipulation of a token return lever 124. Each time the token return lever is manipulated it momentarily closes a pair of normally open token return contacts 125 in a conductor 126, Fig. 2, which, assuming the pump is otherwise in condition to deliver gasoline and the patron has more than 2½ cents worth of gasoline owing to him so that large valve contacts 102 are closed, energizes a token return solenoid 127. Simultaneously with the closure of contacts 125 a pair of normally closed contacts 128 in conductor 123 are momentarily opened by the same manipulation of the lever 124.

The solenoid 127 withdraws a slide 129, Fig. 8, which moves a coin or token of unit value (in the present instance 5 cents) from the bottom of a stack of coins or tokens disposed in a coin return container tube 130 into a chute 131 which leads into the coin or slug return receptacle 84 from which returned coins or tokens may be taken by the patron. A spring 132 returns the slide 129 when solenoid 127 is de-energized by release of lever 124. It will be noted that each energization of token return solenoid 127 must be accompanied by a cycle of actuation of down-count solenoid 94 to move the accumulator ratchet mechanism back toward zero a corresponding increment. The down-count solenoid 94 is arranged to be connected in parallel with the token-return solenoid by a conductor 134 containing the previously mentioned normally closed down-count coin return interlock contacts 60.

It will be remembered that contact 60 is closed whenever down-count contact 59 is open and vice versa. It thus serves as an interlock in the coin return circuit. If the pump is stopped for any reason before the full amount of gasoline paid for by deposit of coins is dispensed, and if at

the time of such stoppage the contacts 59 are closed, as determined by the position of the computer cam 44, and the patron operates the token-return lever 124, token-return contacts 125 are momentarily closed and, assuming large valve solenoid contacts 102 are closed as previously mentioned, the solenoid 127 is energized to return a coin or token. Before such operation, the down-count solenoid was continuously energized through conductor 123 so it is necessary to de-energize and re-energize conductor 123 to complete a down-count increment on ratchet wheel 90. This is accomplished through the opening and closing of contacts 128 which accompanies manipulation of coin return lever 124. Under these circumstances interlock contacts 60 are open and conductor 134 is ineffective.

If it happens that the pump be stopped with down-count contacts 59 open and interlock contacts 60 closed, then conductor 123 is ineffective, down-count solenoid 94 is de-energized before manipulation of lever 124, and each manipulation of lever 124 to energized solenoid 127 and return a coin or token will result in simultaneous momentary energization of solenoid 94 through parallel conductor 134 whereby a down-count increment of rotation is produced in the accumulator ratchet mechanism.

Computer reset contacts 69 and 70 have been previously described as being disposed in the explosion-proof box 51 and as normally closed contacts adapted to be opened by and during computer reset operations. The contacts 69 are in conductor 123 and prevent double energization of down-count solenoid 94 as the computer wheels go back to zero. Contacts 70 are in conductors 110, 111 and de-energize the motor and valve circuits in the event that the computer is reset during delivery. This prevents damage to the computer and insures against loss of gas to either the patron or the station owner or operator.

A pair of normally closed contacts 138 are disposed in conductor 110, 111 and arranged to be open during manipulation of coin return lever 124. This insures de-energization of the motor and valve circuits whenever the coin return lever is being manipulated and prevents the possibility of fraudulent operation by depositing a coin, wedging the coin return lever in a position where the down-count solenoid 94 is constantly energized, closing the coin box door, and proceeding to dispense gasoline indefinitely. If contacts 138 were not present the down-count solenoid would be constantly energized by a circuit through large valve contacts 102, conductor 126, token return contacts 125, conductor 134 and interlock contacts 60, assuming the latter to be closed at the time. Accordingly the making and breaking of down-count contacts 59 would not have any effect.

In Fig. 2 the numeral 140 designates a hand operated switch disposed in series in conductor 123. By inserting a coin and throwing this switch to its open position the pump is continually operative and can be used as a conventional operator-controlled pump. Fig. 2 also shows a coin door latch solenoid winding 141. The latch for coin door 80 is designated 145 in Fig. 1 and may be biased to latching position by gravity or a spring; the latch solenoid winding 141 is constantly energized when hand switch 140 is closed to hold the latch open.

With winding 141 connected through conductor 142 the coin door is locked when the pump is in condition to be operated by an attendant and not by coin operation. If conductor 142 extends directly to conductor 104 the coin door will be unlatched until a main power switch is thrown off. In either event, the latch is sure to lock the coin door whenever the control mechanism is de-energized.

Lights indicated schematically at 144 in Fig. 2 may be disposed where required to illuminate the coin chutes, operating instructions, etc. Lights 144 may also be employed near the coin chutes to prevent moisture condensation and freezing.

It is to be understood that coins, tokens, checks and like elements may be used interchangeably and that the use of these various terms is in a generic sense.

It is further to be understood that the term "solenoid valve" is used in a generic sense to include any electromagnetic or other electromotive means for producing an equivalent result.

What is claimed is:

1. Coin controlled liquid dispensing apparatus comprising a conduit having inlet and discharge passages, motor operated fluid displacement means and metering means in said conduit, integrating means for computing and registering the money value of liquid dispensed, accumulator means movable away from and toward an initial zero position, coin receiving and registering means including electromagnetic means adapted to be intermittently energized a number of times proportionate to the total value of coins received, said electromagnetic means being arranged to move said accumulator means away from zero position a number of successive increments corresponding to the number of its energizations, second electromagnetic means adapted to be energized a number of times proportionate to the total value of liquid delivery registered by said integrating means, said second electromagnetic means being arranged to move said accumulator means toward zero position by successive increments corresponding to the number of its energizations to cancel the coin deposit movement in proportion to the value of liquid delivered through said conduit, coin return means manually actuable to withdraw coins from said apparatus when said accumulator means is away from zero position, and means operable by and upon manipulation of the coin return means for energizing said second electromagnetic means a number of times proportionate to the value of coins withdrawn for canceling the coin deposit movement of said accumulator.

2. Means for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, motor-operated fluid displacement means and metering means in said conduit, integrating means in said pump casing driven from said metering means for computing and registering the value of liquid dispensed, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, an explosion-proof box in said pump casing and a pair of electrical

contacts therein, means operable from said integrating means for making and breaking said contacts sequentially in response to the registering of predetermined unit values of liquid delivered, and electrical conduit means between the contacts in the explosion-proof box in the pump casing and said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means.

3. Means for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, motor-operated fluid displacement means and metering means in said conduit, integrating means in said pump casing driven from said metering means for computing and registering the value of liquid dispensed, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, a pair of electrical contacts, and means operating from said integrating means for making and breaking said contacts sequentially in response to the registering of predetermined unit values of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means.

4. Means for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, motor-operated fluid displacement means, metering means, and explosion-proof solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing and registering the value of liquid dispensed, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin registering means, an explosion-proof box in said pump casing and a pair of electrical contacts therein, means operable from said integrating means for making and breaking said contacts sequentially in response to the registering of predetermined unit values of liquid delivered, electrical conduit means between the contacts in the explosion-proof box in the pump casing and said other solenoid means whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, an energizing circuit for said solenoid valve, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position during delivery.

5. Means for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, metering means, and explosion-proof solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit values of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, an energizing circuit for said solenoid valve, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position.

6. Apparatus for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, and metering means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, an explosion-proof box in said pump casing and a pair of electrical contacts therein, means operable from said integrating means for making and breaking said contacts sequentially in response to the registering of predetermined unit values of liquid delivered, electrical conduit means between the contacts in the explosion-proof box in the pump casing and said other solenoid means whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, coin return means manually actuable to withdraw coins from said apparatus when said accumulator

means is away from zero, and means operable by and upon manipulation of the coin return means for moving said accumulator means toward zero position to cancel registered coin deposit in proportion to the value of coins withdrawn.

7. Apparatus for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, fluid displacement means and metering means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said e ement toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit values of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, coin return means manually actuable to withdraw coins from said apparatus when said accumulator means is away from zero, and means operable by and upon manipulation of the coin return means for moving said accumulator means toward zero position to cancel registered coin deposit in proportion to the value of coins withdrawn.

8. Apparatus for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having in'et and discharge passages, motor-operated fluid displacement means, metering means, and explosion-proof solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing and registering the value of liquid dispensed, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin registering means, an explosion-proof box in said pump casing and a pair of electrical contacts therein, means operable from said integrating means for making and breaking said contacts sequentially in response to the registering of predetermined unit values of liquid delivered, electrical conduit means between the contacts in the explosion-proof box in the pump casing and said other solenoid means whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, an energizing circuit for said solenoid valve, switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position during delivery, coin return means manually actuable to withdraw coins from said apparatus when said accumulator means is away from zero, and means operable by and upon manipulation of the coin return means for moving said accumulator means toward zero position to cancel registered coin deposit in proportion to the value of coins withdrawn.

9. Means for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, metering means, and explosion-proof solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means in said control casing and having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means in said control casing for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit values of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, an energizing circuit for said solenoid valve, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position, coin return means manually actuable to withdraw coins from said apparatus when said accumulator means is away from zero, and means operable by and upon manipulation of the coin return means for moving said accumulator means toward zero position to cancel registered coin deposit in proportion to the value of coins withdrawn.

10. Coin controlled liquid dispensing apparatus comprising a conduit having inlet and discharge passages, fluid displacement means, metering means, and solenoid valve means in said conduit, integrating means for computing and registering the money value of liquid dispensed, accumulator means movable away from and toward an initial zero position, coin receiving and registering means including an electromagnetic means adapted to be intermittently energized a number of times proportionate to the total value of coins received, said electromagnetic means being arranged to move said accumulator means away from zero position a number of successive increments corresponding to the number of its energizations, and second electromagnetic means adapted to be energized a number of times proportionate to the total value of liquid delivery registered by said integrating means, said second electromagnetic means being arranged to move

said accumulator means toward zero position by successive increments corresponding to the number of its energizations to cancel the coin deposit movement in proportion to the value of liquid delivered through said conduit, an energizing circuit for said solenoid valve means, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero during delivery, coin return means manually actuable to withdraw coins from said apparatus when said accumulator means is away from zero, and means operable by and upon manipulation of the coin return means for moving said accumulator means toward zero position to cancel registered coin deposit in proportion to the value of coins withdrawn.

11. Coin-operated liquid dispensing means comprising a conduit having inlet and discharge passages, motor-operated fluid displacement means, fluid metering means and solenoid valve means in said conduit, integrating computer means actuable from said metering means to register the value of liquid dispensed, coin receiving means and coin controlled accumulator means adapted to register the deposit of coins, means operating from said computer means for subtractively registering delivery of liquid on said accumulating means, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said valve means is closed when said accumulator means records zero coins, means for rendering said coin receiving means unavailable, and other switch means in said circuit and controlled by said last mentioned means whereby said valve means is closed when said last mentioned means is not operating to render said coin receiving means unavailable.

12. Coin-operated liquid dispensing means comprising a conduit having inlet and discharge passages, motor-operated fluid displacement means, fluid metering means and solenoid valve means in said conduit, integrating computer means actuable from said metering means to register the value of liquid dispensed, coin receiving means and coin controlled accumulator means adapted to register the deposit of coins, means operating from said computer means for subtractively registering delivery of liquid on said accumulator means, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said valve means is closed when said accumulator means records zero coins, closure means for rendering said coin receiving means inaccessible, and other switch means in said circuit and controlled by said closure means whereby said valve means is closed when said closure means is open and said coin receiving means is therefore accessible.

13. Coin-operated liquid dispensing means comprising a conduit having inlet and discharge passages, motor-operated fluid displacement means, fluid metering means and solenoid valve means in said conduit, integrating computer means actuable from said metering means to register the value of liquid dispensed, coin receiving means and coin controlled accumulator means adapted to register the deposit of coins, means operating from said computer means for subtractively registering delivery of liquid on said accumulator means, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said valve means is closed when said accumulator means records zero coins, manual closure means for rendering said coin receiving means inaccessible, and other switch means in said circuit and controlled by said last mentioned means whereby said valve means is closed when said closure means is open and said coin receiving means is accordingly accessible.

14. Coin-operated liquid dispensing means comprising a conduit having inlet and discharge passages, fluid-displacement means, fluid metering means, and solenoid valve means in said conduit, integrating means actuable from said metering means to compute the value of liquid dispensed, coin-receiving means and coin-controlled accumulator means adapted to register the deposit of coins, means operating from said integrating means for subtracting from the registered deposit of coins on said accumulator means in proportion to the value of liquid dispensed, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said valve means is closed when said accumulator means records zero coins, means for rendering said coin receiving means unavailable and other switch means in said circuit and controlled by said last mentioned means whereby said valve means is closed when said last mentioned means is not operating to render said coin receiving means unavailable.

15. Coin-operated liquid dispensing means comprising a dispensing conduit, fluid-displacement means, fluid metering means, and solenoid valve means in said conduit, integrating means actuable from said metering means to compute the value of liquid dispensed, means for resetting said integrating means to zero position, coin-receiving means and coin-controlled accumulator means adapted to register the deposit of coins, means operating from said integrating means for subtracting from the registered deposit of coins on said accumulator means in proportion to the value of liquid dispensed, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said switch means is open and said valve means is closed when said accumulator means registered zero coins, a pair of switches connected in parallel with each other and in series with said accumulator switch means for insuring resetting of said integrating means prior to a dispensing operation, one of said pair of switches being closable by operation of the reset means and subsequently opened by movement of the integrating means from zero position, and a solenoid winding in series with said one parallel switch for closing the other of said parallel switches whereby to establish a holding circuit for said energizing circuit until the latter is opened by said accumulator operated switch means.

16. Coin-operated liquid dispensing means comprising a dispensing conduit, fluid-displacement means, fluid metering means, and solenoid valve means in said conduit, integrating means actuable from said metering means to compute the value of liquid dispensed, means for resetting said integrating means to zero position, coin-receiving means and coin-controlled accumulator means adapted to register the deposit of coins, means operating from said integrating means for subtracting from the registered deposit of coins on said accumulator means in proportion to the value of liquid dispensed, an energizing circuit

for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said switch means is opened and said valve means is closed when said accumulator means registers zero coins, a pair of switches connected in parallel with each other and in series with said accumulator switch means for insuring resetting of said integrating means prior to a dispensing operation, one of said pair of switches being closable by operation of the reset means and opened by movement of the integrating means from zero position, and the other of said parallel switches being normally open and having a solenoid winding in series with both of said pair of switches for closing it and establishing a holding circuit for said energizing circuit until the latter is opened by said accumulator operated switch means.

17. Coin-operated liquid dispensing means comprising a dispensing conduit having inlet and discharge passages, motor-operated fluid displacement means, fluid metering means, and solenoid valve means in said conduit, integrating computer means actuable from said metering means to register the value of liquid dispensed, means for resetting said integrating and computing means to zero position, coin receiving means and coin-controlled accumulator means adapted to register the deposit of coins, means operating from said computer means for subtractively registering delivery of liquid on said accumulator means, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said valve means is closed when said accumulator means registers the deposit of no coins, and a second switch in said energizing circuit, means for automatically opening said switch at the beginning of an integrating means reset operation and for automatically closing said switch at the conclusion of such reset operation, whereby to prevent dispensing operation during resetting.

18. Means for dispensing volatile liquids comprising in combination, a pump casing and a control casing separate therefrom, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, metering means, and explosion-proof solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means in said control casing and having an element movable away from and toward an initial zero position, means for moving said element away from zero position in unit increments predetermined in number and solenoid means for moving said element toward zero position in successive unit increments, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit values of liquid delivered, said contacts being in circuit with said solenoid means, whereby delivery of liquid proportionately cancels the value of liquid established on said accumulator means by the means for moving said element away from zero position, an energizing circuit for said solenoid valve, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position.

19. Means for dispensing volatile liquids comprising, in combination, a pump casing and a control casing separate and remote therefrom, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, metering means, and solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means in said control casing and having an element movable away from and toward an initial zero position, means associated with said control casing for moving said element away from zero position in unit increments aggregating a predetermined amount and other solenoid means for moving said element toward zero. position in successive unit increments, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit increments of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the increments established on said accumulator means by the means for moving said element away from zero position, an energizing circuit for said solenoid valve, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position.

20. Means for dispensing volatile liquids comprising, in combination, a pump casing, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, metering means, and solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means having an element movable away from and toward an intial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering electrical means for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit values of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, an energizing circuit for said solenoid valve, and switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position.

21. Means for dispensing volatile liquids comprising, in combination, a pump casing, a conduit in said pump casing having inlet and discharge passages, fluid displacement means, metering means, and solenoid valve means in said conduit, integrating means in said pump casing driven from said metering means for computing the value of liquid delivered, accumulator means having an element movable away from and toward an initial zero position, solenoid means for moving said element away from zero position in successive unit increments and other solenoid means for moving said element toward zero position in successive unit increments, coin-registering elec-

trical means for successively energizing said first solenoid means in response to passage of coins therethrough to move said accumulator means away from zero position an amount proportionate to the total value of coins received by said coin-registering means, a pair of electrical contacts, means operating from said integrating means for making and breaking said contacts sequentially in response to the registry of predetermined unit values of liquid delivered, said contacts being in circuit with said other solenoid means, whereby delivery of liquid proportionately cancels the value of deposited coins indicated by said accumulator means, an energizing circuit for said solenoid valve, switch means in said circuit and controlled by said accumulator means whereby said valve means prevents further delivery of liquid upon arrival of the accumulator means at zero position, coin return means manually actuable to withdraw coins from said apparatus when said accumulator means is away from zero, and means operable by and upon manipulation of the coin return means for moving said accumulator means toward zero position to cancel registered coin deposit in proportion to the value of coins withdrawn.

22. Coin-operated liquid dispensing means comprising a dispensing conduit, fluid-displacement means, fluid metering means, and solenoid valve means in said conduit, integrating means actuable from said metering means to compute the value of liquid dispensed, means for resetting said integrating means to zero position, coin-receiving means and coin-controlled accumulator means adapted to register the deposit of coins, means operating from said integrating means for subtracting from the registered deposit of coins on said accumulator means in proportion to the value of liquid dispensed, an energizing circuit for said solenoid valve means and switch means in said circuit and controlled by said accumulator means whereby said switch means is open and said valve means is closed when said accumulator means registers zero coins, a pair of normally open switches connected in parallel with each other and in series with said accumulator switch means for insuring resetting of said integrating means prior to a dispensing operation, means operable by and upon arrival of the integrating means at zero position for closing one of said pair of switches and a solenoid winding in series with both of said parallel switches for closing the other of said switches, whereby to establish a holding circuit for said energizing circuit until the latter is opened by said accumulator operated switch means.

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