

Aug. 4, 1953

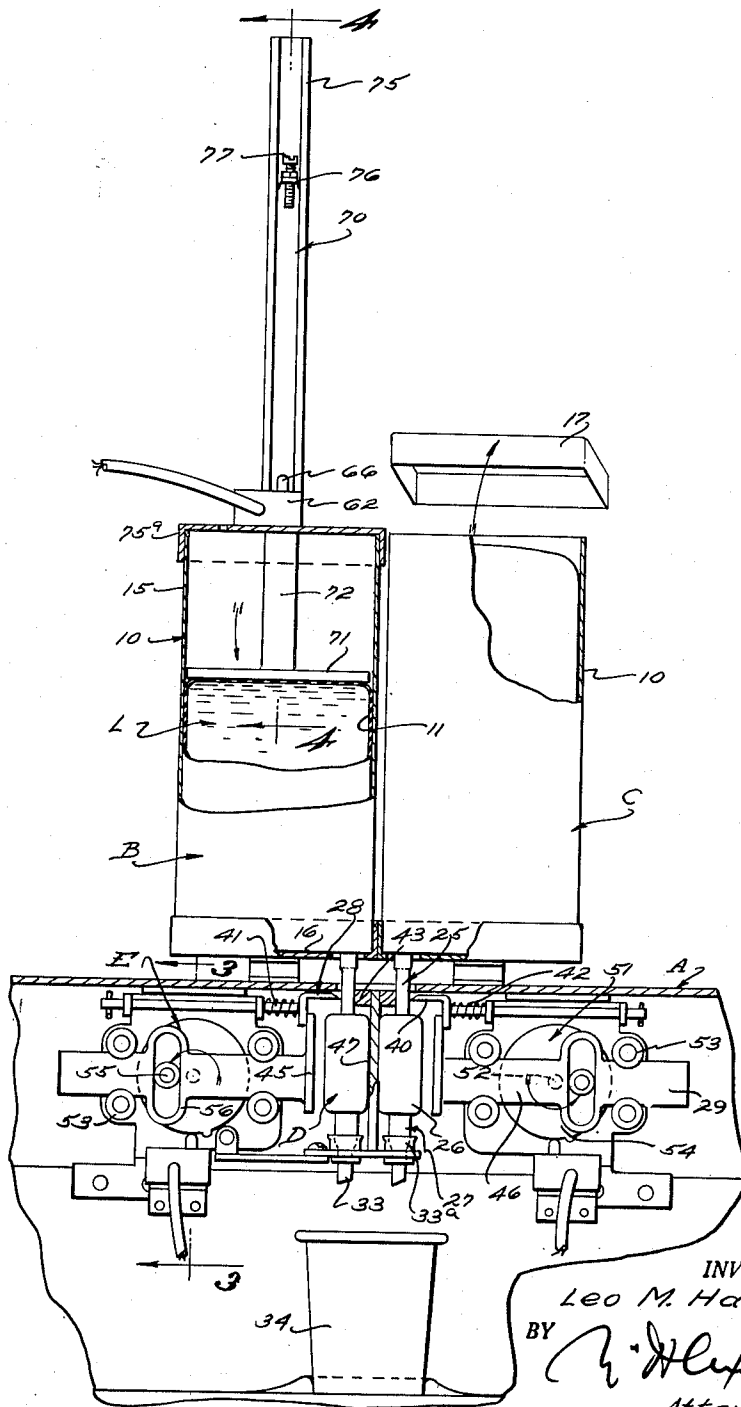
L. M. HARVEY
MECHANISM FOR DISPENSING LIQUID FROM
A PLURALITY OF SUPPLY CONTAINERS

2,647,661

Filed June 26, 1950

3 Sheets-Sheet 1

Fig. 1.



INVENTOR.
Leo M. Harvey
BY *R. H. H. H.*
Attorney

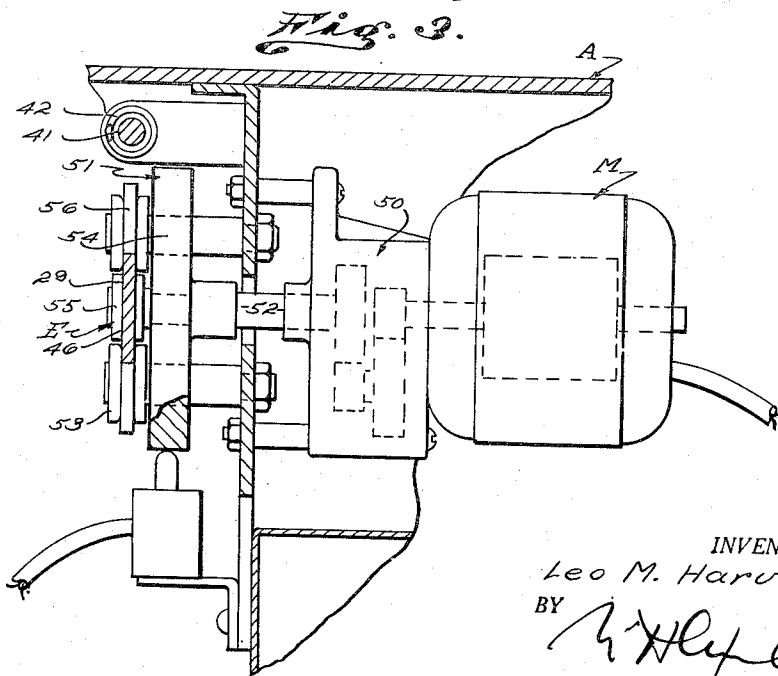
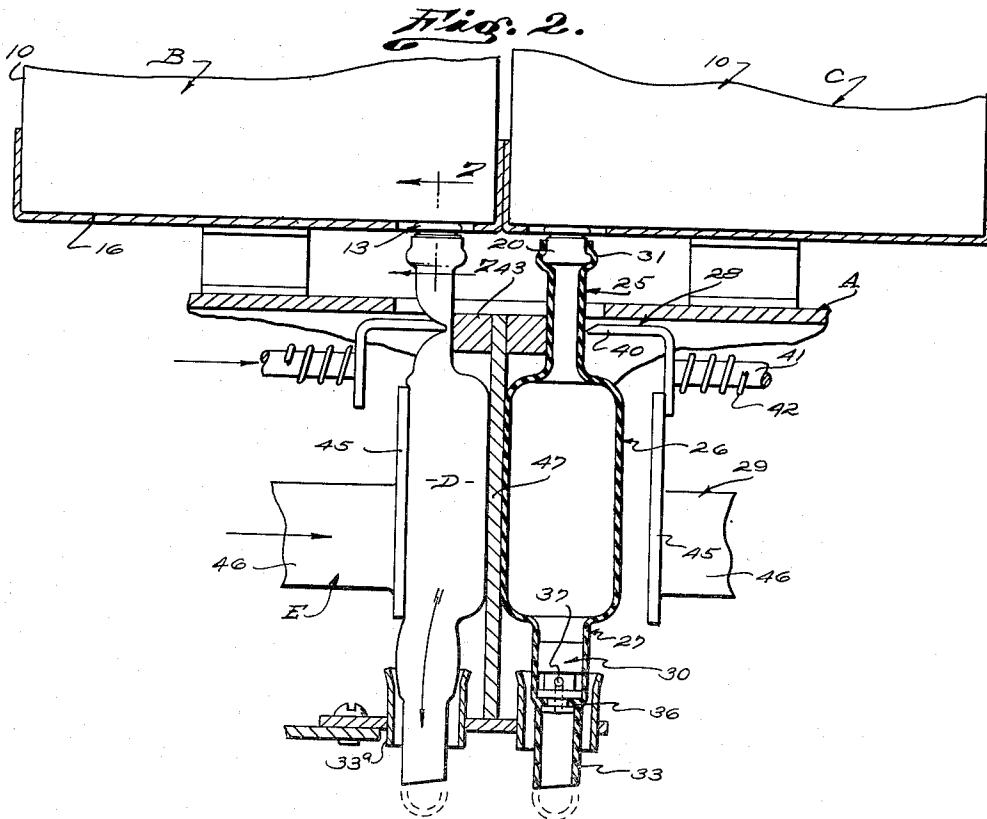
Aug. 4, 1953

L. M. HARVEY
MECHANISM FOR DISPENSING LIQUID FROM
A PLURALITY OF SUPPLY CONTAINERS

2,647,661

Filed June 26, 1950

3 Sheets-Sheet 2



INVENTOR.
Leo M. Harvey
BY *[Signature]*
Attorney

Aug. 4, 1953

L. M. HARVEY
MECHANISM FOR DISPENSING LIQUID FROM
A PLURALITY OF SUPPLY CONTAINERS

2,647,661

Filed June 26, 1950

3 Sheets-Sheet 3

Fig. 4.

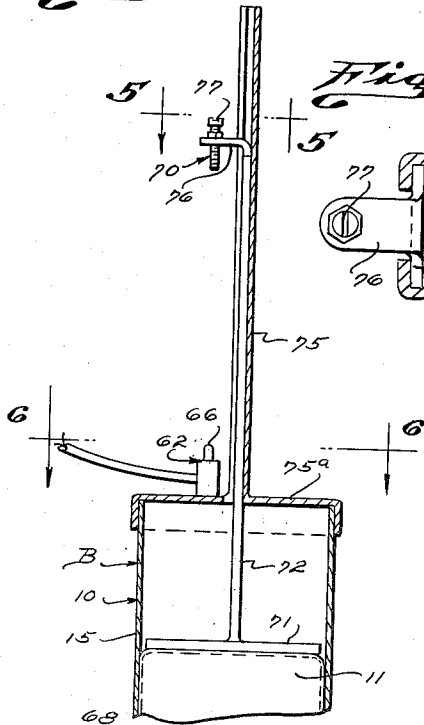


Fig. 5.

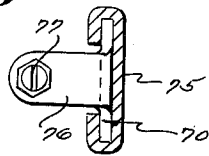


Fig. 6.

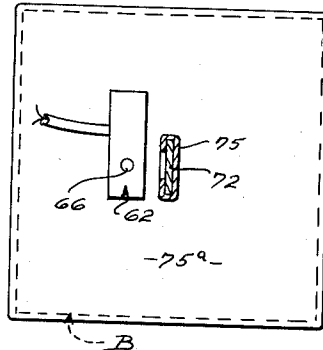


Fig. 7.

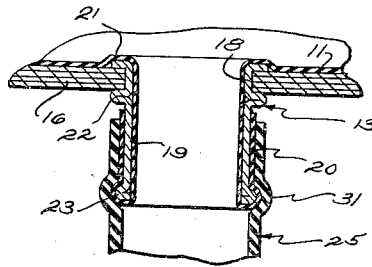


Fig. 9.

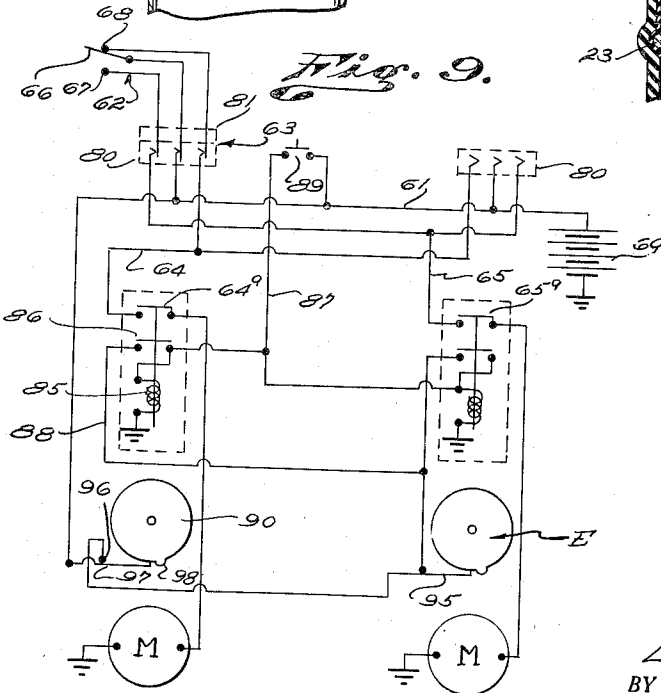
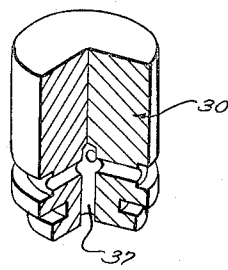


Fig. 8.



INVENTOR.
Leo M. Harvey
BY *W. H. Hill*
Attorney

UNITED STATES PATENT OFFICE

2,647,661

MECHANISM FOR DISPENSING LIQUID FROM A PLURALITY OF SUPPLY CONTAINERS

Leo M. Harvey, Los Angeles, Calif.

Application June 26, 1950, Serial No. 170,352

3 Claims. (Cl. 222-68)

1

2

This invention is concerned with a mechanism for dispensing liquid and it is a general object of the invention to provide a simple, dependable, commercially practical structure serving to dispense liquid from separate receptacles or containers successively and in such manner that operation is switched from one container to the other when the first container has been emptied.

Liquid dispensers are employed in various devices or mechanisms and when employed in vending machines, or the like, they present a supply problem and, heretofore, have required considerable servicing. As an example, where liquid is to be dispensed from a sealed container that cannot be readily replenished by simply adding liquid thereto, a container may be partially full when the machine is serviced, making it necessary for the operator to elect whether he should remove the container and thus waste a quantity of liquid, or leave a partially filled container in service, with the risk that it will become exhausted or emptied before the next servicing.

Another object of this invention is to provide a machine or mechanism of the general character referred to in which the liquid containers are individually sealed so that air is excluded from the liquid being dispensed.

A further object of the invention is to provide liquid handling apparatus of the general character referred to wherein the liquid carrying containers are expendable or of such simple, inexpensive construction as to make it commercially practical to discard them or dispose of them when exhausted of their supply of liquid.

It is another object of the invention to provide apparatus of the general character referred to with control means governing the operation of prime movers that operate measuring dispensers and which acts in response to a reversing switch operated by a follower related to the container from which liquid is initially dispensed.

The machine embodying the present invention may include a plurality of containers which are preferably alike and which are preferably of the expendable type and such as to carry liquid so that it is sealed from exposure to air. In a typical example there are two like containers, each with a rigid body and a collapsible bag in the body, which bag carries the supply of liquid. Each container has a delivery fitting at its lower end and each delivery fitting supplies liquid to a measuring dispenser characterized by an inlet duct, a collapsible cell, an outlet duct, stop means operating to close the inlet duct, a cell actuator for collapsing the cell and an outlet valve con-

trolling flow through the outlet duct. An operating means is provided in connection with each measuring dispenser and may involve a prime mover in the form of an electric motor and a drive from the prime mover to the cell actuator, which drive preferably involves a speed reducing mechanism and may involve a crank device between the reducing mechanism and the cell actuator. A control governs the operation of the prime movers which are preferably energized from a single source of power, for instance, a power circuit energized by a battery or a generator. The power circuit is controlled by a selector switch operated by a follower cooperatively related to the container which is to be first in use. The selector switch establishes connection between the source of power and motor lines, one of which extends to each of the prime movers. A reversing means is provided for changing the relationship of the selector switch to the motor lines and motor switches are provided in the motor lines. Relays control the motor switches and each involves a coil operating when energized to close the motor switch and a holding switch in a relay holding circuit in which there are stop switches in series and cooperatively related to the cell actuators. A starting switch, preferably manually operated, is provided in a starting circuit which initiates operation of the control means.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a vertical sectional view of a typical embodiment of the present invention, showing a follower applied to one liquid container of the mechanism, which container is shown partially full. Fig. 2 is an enlarged detailed sectional view of a portion of the mechanism shown in Fig. 1, illustrating one measuring dispenser in elevation and partially operated while the other measuring dispenser is shown in section and unactuated. Fig. 3 is an enlarged, detailed sectional view taken as indicated by line 3-3 on Fig. 1. Fig. 4 is a view of a part of the mechanism shown in Fig. 1, being a view taken as indicated by line 4-4 on Fig. 1. Fig. 5 is an enlarged plan section taken as indicated by line 5-5 on Fig. 4. Fig. 6 is an enlarged plan section taken as indicated by line 6-6 on Fig. 4. Fig. 7 is an enlarged detailed sectional view taken as indicated by line 7-7 on Fig. 2. Fig. 8 is a perspective view of the outlet valve shown removed from the other

parts, and Fig. 9 is a diagrammatic view illustrating the control means provided by the present invention.

The structure as provided by the present invention involves, generally, a frame A which may, in practice, vary widely in form and construction and which serves primarily as a mounting or carrier for the various other elements. A liquid supply means is supported by the frame and preferably involves separate liquid containers B and C. Each liquid container is connected with and supplies a measuring dispenser D and each measuring dispenser is provided with an operating means E. A control means or system is provided in connection with and serves to govern the action of the other elements and is illustrated diagrammatically in Fig. 9 of the drawings.

The machine illustrated throughout the drawings is suitable for handling a liquid that can be advantageously used in a vending machine or the like and which is best kept out of contact with air. For purpose of example the liquid supply means will be considered as involving a plurality of separate containers carrying liquid and in the drawings I show containers of an expendable type and of like size and construction. It is to be understood and it will be apparent from the drawings and the following description that the invention may be utilized under conditions widely different from those herein set forth, and that in practice numerous variations can be resorted to as different working conditions are encountered.

The two liquid containers, as shown throughout the drawings, being alike I will describe one, it being understood that the description is equally applicable to both. The container in its general construction involves a body 10, preferably rigid in construction, a collapsible bag 11 holding liquid and carried in the body 10, and an outlet fitting 13 through which liquid is passed from the container to a measuring dispenser D. The particular body illustrated in the drawings is a box-like structure that may be advantageously constructed of paper, or the like, and is shown as involving vertical sides 15, a bottom 16 and a top 17. The top 17 is detachable or removable, being in the nature of a lid, as shown in Fig. 1 of the drawings, where it is shown removed or separated from its body.

The collapsible bag 11 carries a body of liquid L and in practice may be formed of rubber or rubber-like material so that it contracts as liquid is dispensed until it finally is fully collapsed or in the bottom of the body 10, when all or practically all of the liquid has been dispensed from it.

The outlet or delivery fitting 13 is shown as a simple tubular element carried in an opening 18 provided through the bottom 16 of the body and having a depending portion that projects downwardly a substantial distance below the bottom 16 to receive a part of the measuring dispenser, as will be hereinafter described. The particular fitting 13 illustrated receives an outlet neck 19 that depends from the bag 11 and the end portion 20 of the neck 19 is folded back around and up over the depending portion of the fitting 13, as clearly shown in Fig. 7 of the drawings. The fitting can be secured to or made fast with the body of the container in any suitable manner. In the drawings I have shown flanges 21 and 22 that confine the fitting to the bottom 16 of the body and a rib or ridge 23 is provided at the lowermost end of the fitting to provide a retaining device for the dispenser part that is engaged with the fitting.

In the preferred construction, as where two containers are employed, the fittings are adjacent to sides of the bodies so the bodies can be arranged with the fittings close together, as shown throughout the drawings.

Each container supplies a measuring dispenser D and the relationship of the measuring dispensers may be such as I have fully described and claimed in my copending application entitled "Liquid Dispenser," Serial No. 170,351 filed on even date herewith.

In the drawings each measuring dispenser is shown as involving, generally, an inlet duct 25, a collapsible cell 26, an outlet duct 27, stop means 28 for stopping flow through the inlet duct, a cell actuator 29 for collapsing the cell 26 and an outlet valve 30 controlling flow through the outlet duct 27.

The inlet duct 25 may be a simple elongate tubular part with a receiving end portion 31 that can be expanded around and engaged over the fitting 13 of the container that supplies the dispenser. The duct 25 is of such length as to connect the container and collapsible cell 26, which is of a predetermined size so that it has a definite capacity. The particular cell 26 shown in the drawings is an elongate tubular member with the inlet duct 25 joined to its upper end and the outlet duct 27 joined to its lower end. The outlet duct 27 depends from the cell 26 and has a lower end portion 33 in the form of a discharge spout located to deliver liquid into a container 34 or the like. The spout is preferably held in the desired position by a suitable guide 33^a. In practice it is preferred that the ducts 25 and 27 be integrally formed with the cell 26 and that these parts be formed of a body of rubber, or the like, so that they have the desired physical characteristics and are inexpensive of manufacture, making them such that they can be dispensed with after one use in the machine.

The outlet valve 30 as shown in Fig. 8 is a plug type valve arranged in the outlet duct 27 so that it is embraced or snugly held in the outlet duct. A rib 35 in the outlet duct holds the plug valve in place and the valve has a liquid handling port system 37 which opens at the lower end of the plug into the spout portion 33. The structure is such that when pressure is applied to liquid in the cell 26 following operation of the stop means 28 the duct 27 is expanded away from the plug uncovering the port 37 so the liquid passes into the spout 33 and thus discharges from the dispenser.

The stop means 28 is shown as involving a shiftable or reciprocating choke 40 carried on a stem 41 and operated by a spring 42. The spring 42 normally yieldingly urges the choke 40 toward the inlet duct 25 and opposes a stop 43. When the stop 28 is in operation the choke 40 pinches the duct 25 against the stop 43 and thus prevents passage of liquid through the duct.

The cell actuator is shown as involving a pressure plate 45 carried on a reciprocating stem 46 and when it is operated or advanced it compresses the cell 26 against an abutment 47 which is preferably in the form of a plate that occurs between the cells 26 of the two dispensers. In the particular mechanism illustrated, when the pressure plate 45 is retracted it holds the stop 28 unactuated, and as it starts operation it allows the spring 42 to move the choke into operating engagement with the duct 25 so that the duct is closed before pressure is applied to the cell 26.

There is a separate operating means for each

5

6

cell actuator 29 and this means E preferably involves a prime mover in the form of an electric motor M and a drive between the motor and the stem 46 of the actuator 29, which drive preferably includes a speed reducing mechanism 50 and a crank mechanism 51. The speed reducing mechanism and motor M are suitably supported from frame A and operating drive shaft 52. In the case illustrated the stem 46 of the cell actuator 29 is mounted by means of rollers 53 so that it is free to reciprocate. The crank mechanism shown in the drawings involves a crank disc 54 on the drive shaft 52 and a crank pin 55 on the disc 54 cooperating in or with a yoke 56 on the stem 46.

The control means provided by the present invention governs operation of the prime movers and is responsive to liquid in one of the containers. The control means is such that when the machine is started or put into operation, as by closing of a starting switch which may be coin controlled, manually operated, or actuated in any suitable manner, the motor driving one of the liquid dispensers will operate to complete one cycle of operation of the dispenser, thus causing liquid to be dispensed from one of the containers. Operation of the particular dispenser will be repeated each time the starting switch is closed until such time as the container serving that dispenser is empty, whereupon the action of the control means is reversed and the motor actuating the dispenser for the other container is put into service so it is operated each time the starting switch is closed.

The control means will be best understood from a consideration of the diagram, Fig. 9, where a suitable source of electrical energy is illustrated at 60. In practice a battery or generator can be employed to supply the desired operating current. A power circuit from the power source 60 is carried by a line 61 which is under control of a selector switch 62 and a reversing means 63. The selector switch establishes or controls connection between the power line 61 and motor lines 64 that extend from the selector switch to the motors M. The reversing means 63 serves to change or reverse the relationship between the selector switch 61 and the motor lines 64 and 65.

In the particular case illustrated the selector switch 62 involves a shiftable contact 66 and two fixed contacts 67 and 68, the contacts 67 being connected to motor line 65 and the contact 68 being connected to motor line 64. The switch 62 is preferably such that the movable contact 66 is normally in an up or unactuated position where it engages contact 67, readying the circuit through the motor line 64, and when it is actuated it is in a down position and engages contact 67, readying the motor circuit through line 65.

An operator 70 is provided to actuate the contact 66 of selector switch 62 and in the form of the invention illustrated in the drawings it involves a follower 71 in the body 10 of the container which is to be operated first. The follower rests on the collapsible bag 11 in said container and has a stem 72 that projects upwardly through a guide 75 which may include a part 75^a in the nature of a closure applicable to the top of the body in place of the top 17 removed when the container is put into use. An arm 76 projects from the stem 72 and carries an adjustable actuator 77 so that when the follower 71 reaches its lowermost position the shiftable element 66 is engaged and operated. This relationship of parts is best illustrated in Figs. 4, 5, 6 and 9 of the drawings.

The reversing means 63 is provided as a means for conveniently gaining a reversal of the relationship between contacts 67 and 68 of the selector switch and motor lines 64 and 65. In the particular case illustrated the reversing means involves a plug construction having two female elements or sockets 80 and a single male element or plug 81. The contacts of switch 62 are permanently connected with the three terminals of plug 81 and the power line 61 is connected to one terminal of each socket 80, the other terminals of the sockets 80 being connected to the motor lines 64 and 65, the relationship of these two elements being opposite in the two sockets. Through this construction, when the plug 81 is engaged in one socket, as shown in Fig. 9, operation is effected through motor line 62, whereas when the plug is engaged in the other socket operation is effected through motor line 65. This construction enables the person handling or servicing the machine to set it so that whichever dispenser he elects is the first to be operated or put into service.

There are motor switches in and controlling the motor lines, there being a motor switch 64^a in line 64 as it extends to the motor at the left in Fig. 9, and a switch 65^a in the motor line 65 as it extends to the motor at the right in Fig. 9. Relays responsive to operation of a starting switch 89 control the motor switches, there being a relay for each motor switch. Each relay involves an operating coil 85 which operates when energized to close the motor switch, and a holding switch 86 that closes with the motor switch and which is in a holding circuit carried by lines 87 and 88.

The starting switch 89 is in line 87 connected to power line 61 and the holding switches 86 of the relays are in line 88 that connects with power line 61 and is connected to the windings 85 of the relays through the holding switches 86 of the relays and through stop switches 95. The stop switches 95 are in series in the line 88 and are cooperatively related to the dispensing machines or the operating means therefore so that when either dispensing machine completes a cycle of operation the holding circuit through line 88 is opened and the relays released so operation of the machine stops until the starting switch is closed.

In the case illustrated the stop switches are alike and each involves a stationary contact 96 normally engaged by a movable contact 97 that is tripped by a projection 98 on the disc 51 of one of the means E. The projection momentarily opens or operates the movable contact 97 as the cycle of operation is completed.

From the foregoing description it will be understood how the present invention provides a simple compact dependable mechanism that is highly desirable in a liquid vending machine. As a practical example the machine may be designed so that one container carries a supply of liquid about sufficient for operation between times that the machine is serviced. The machine may be started in operation with two containers both full, and with the follower applied to but one container and the reversing means engaged or set so that the dispenser of that container is operated each time the starting switch is closed. Each time the starter switch is closed, as by manual operation or through a coin control or as circumstances require, the dispenser related to the container having the follower combined therewith dispenses a predetermined quantity of

liquid into a cup 34 or the like, suitably positioned beneath the dispensing mechanism of the machine. This operation of the machine will be repeated each time the starting switch is closed and until the supply of liquid has been exhausted from the said container equipped with the follower, or until the level of liquid in that container reaches a predetermined point, whereupon the follower operates the reversing switch. When the reversing switch is operated the dispenser of the first mentioned container is taken out of service and that of the other or reserve container is put into service or made ready for operation. Any subsequent closing of the starting switch results in operation of the dispenser related to the reserve or second container. In a typical situation a limited amount of liquid will be dispensed from the reserve container prior to the machine being serviced, and when the machine is serviced the first mentioned or emptied container is discarded and a new, full container arranged in its place and the follower is applied to the second or reserve container above referred to. As the machine is thus serviced the reversing means is operated so that each time the starting switch is thereafter closed the dispensing mechanism related to the container bearing the follower operates and this operating condition continues until, as above described, the container equipped with the follower becomes empty, whereupon the operation is switched to the other or full container.

It is important to observe that the invention provides simple, inexpensive containers that can be easily applied to and removed from the machine, it being anticipated that containers with dispensing parts such as the inlet tubes, cells, and outlet ducts, be provided as units to be discarded, rather than reused. Through the control provided by the present invention the liquid handled, which may be valuable concentrate, is handled without loss or waste, and through the sealed container construction, that is, by employing containers with collapsible liquid-carrying bags, such concentrate can be handled without deterioration or contamination by contact with air. As a practical example, a coffee concentrate or a liquid containing volatile oils, or other elements, can be handled to advantage and in a highly economical manner.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may

appear to those skilled in the art and fall within the scope of the following claims:

Having described my invention, I claim:

1. In combination, two expendable liquid carrying containers, an individual liquid measuring dispenser handling liquid from each container, a power operated means actuating each dispenser, and control means responsive to liquid in one container switching operation from the dispenser of said container to the dispenser of the other container when a predetermined level of liquid is reached in said first mentioned container, each container including a rigid body and a collapsible liquid-carrying bag in the body.
2. In combination, two expendable liquid carrying containers, an individual liquid measuring dispenser handling liquid from each container, a power operated means actuating each dispenser, and control means responsive to liquid in one container switching operation from the dispenser of said container to the dispenser of the other container when a predetermined level of liquid is reached in said first mentioned container, each container including a rigid body, a tubular fitting carried by the body and depending therefrom, and a collapsible liquid-carrying bag in the body and having a neck engaged through the fitting and turned back to engage over the fitting.
3. In combination, two liquid carrying containers, an individual liquid measuring dispenser handling liquid from each container, a power operated means actuating each dispenser, and control means responsive to liquid in one container switching operation from the dispenser of said container to the dispenser of the other container when a predetermined level of liquid is reached in said first mentioned container, each dispenser including, an inlet duct, a collapsible cell, an outlet duct, stop means controlling flow through the inlet duct, an outlet valve controlling flow through the outlet duct and an actuator operating to collapse the cell, the ducts and cell being a continuous body of rubber-like material.

LEO M. HARVEY.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,146,729	Gavin	Feb. 14, 1939
2,314,899	Samiran	Mar. 30, 1943
2,394,431	Curtis et al.	Feb. 5, 1946