Nov. 3, 1953 W. VON STOESER 2,657,628

BEVERAGE DISPENSING APPARATUS

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Fig. 1.

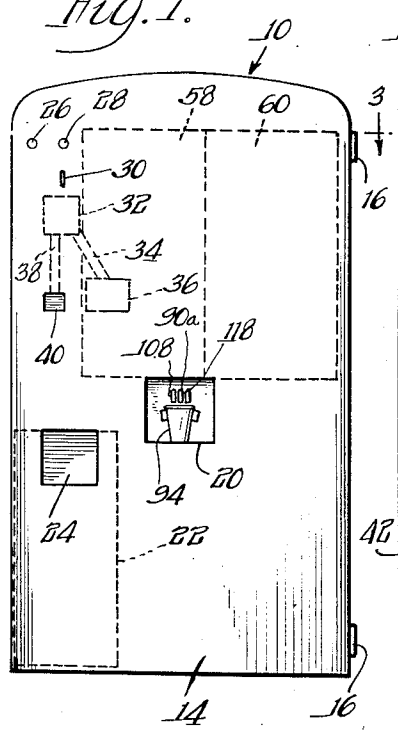


Fig. 2.

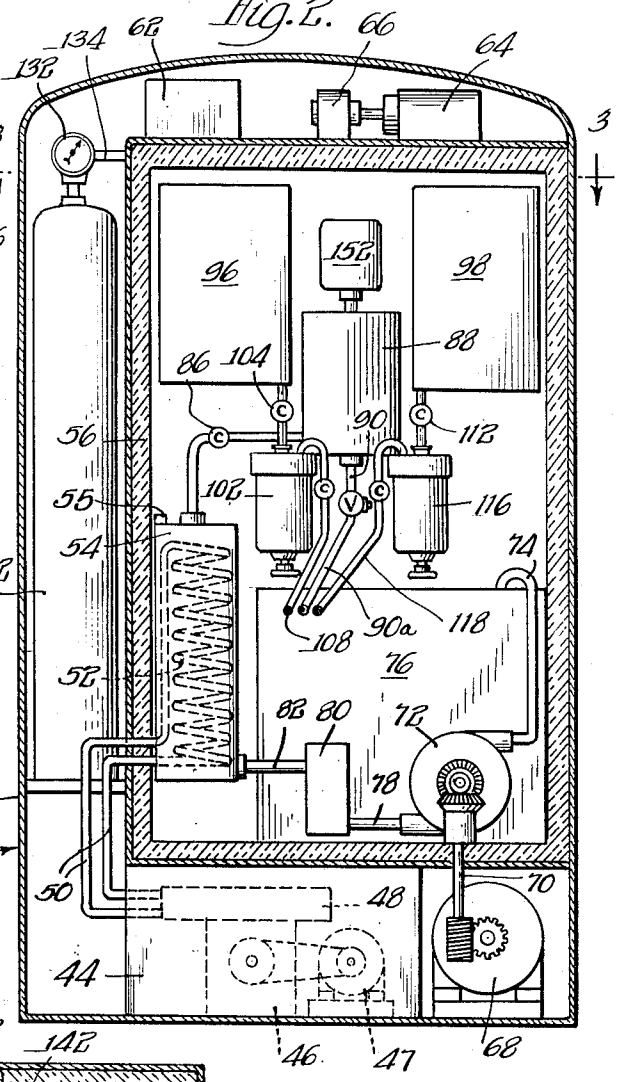
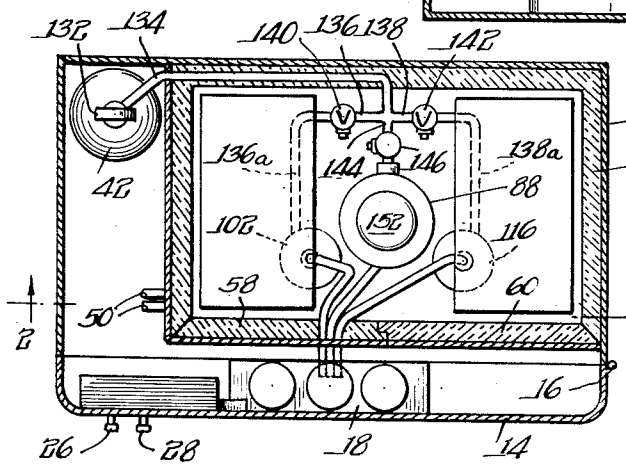


Fig. 3.



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Fig. 4.

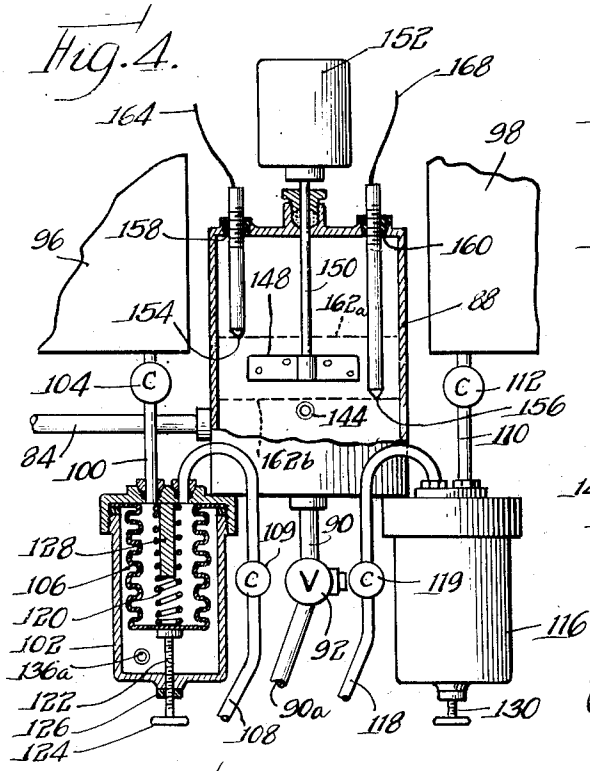


Fig. 5.

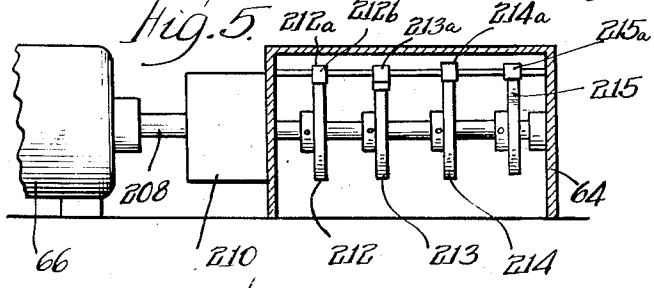


Fig. 6.

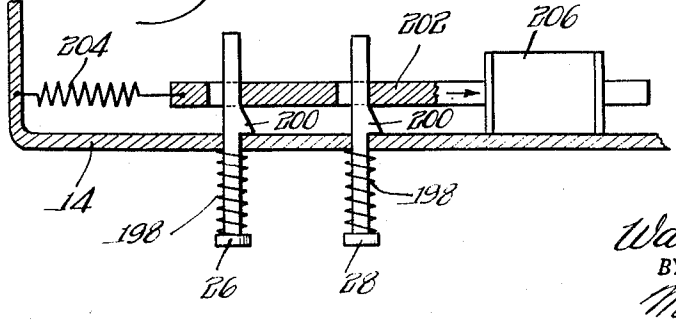


Fig. 7.

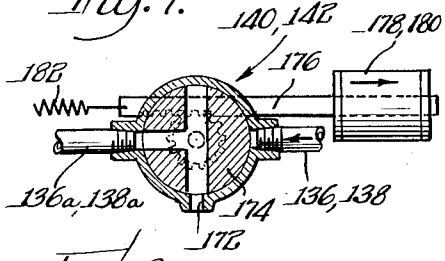


Fig. 8.

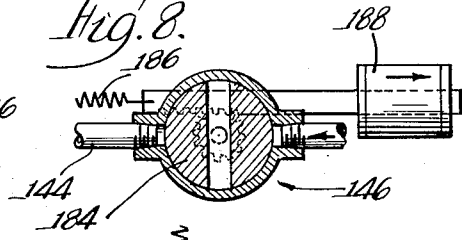
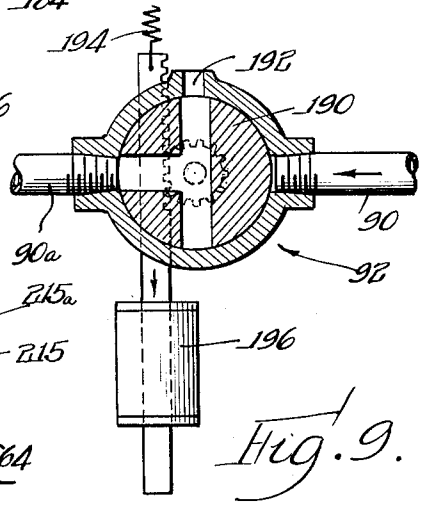


Fig. 9.



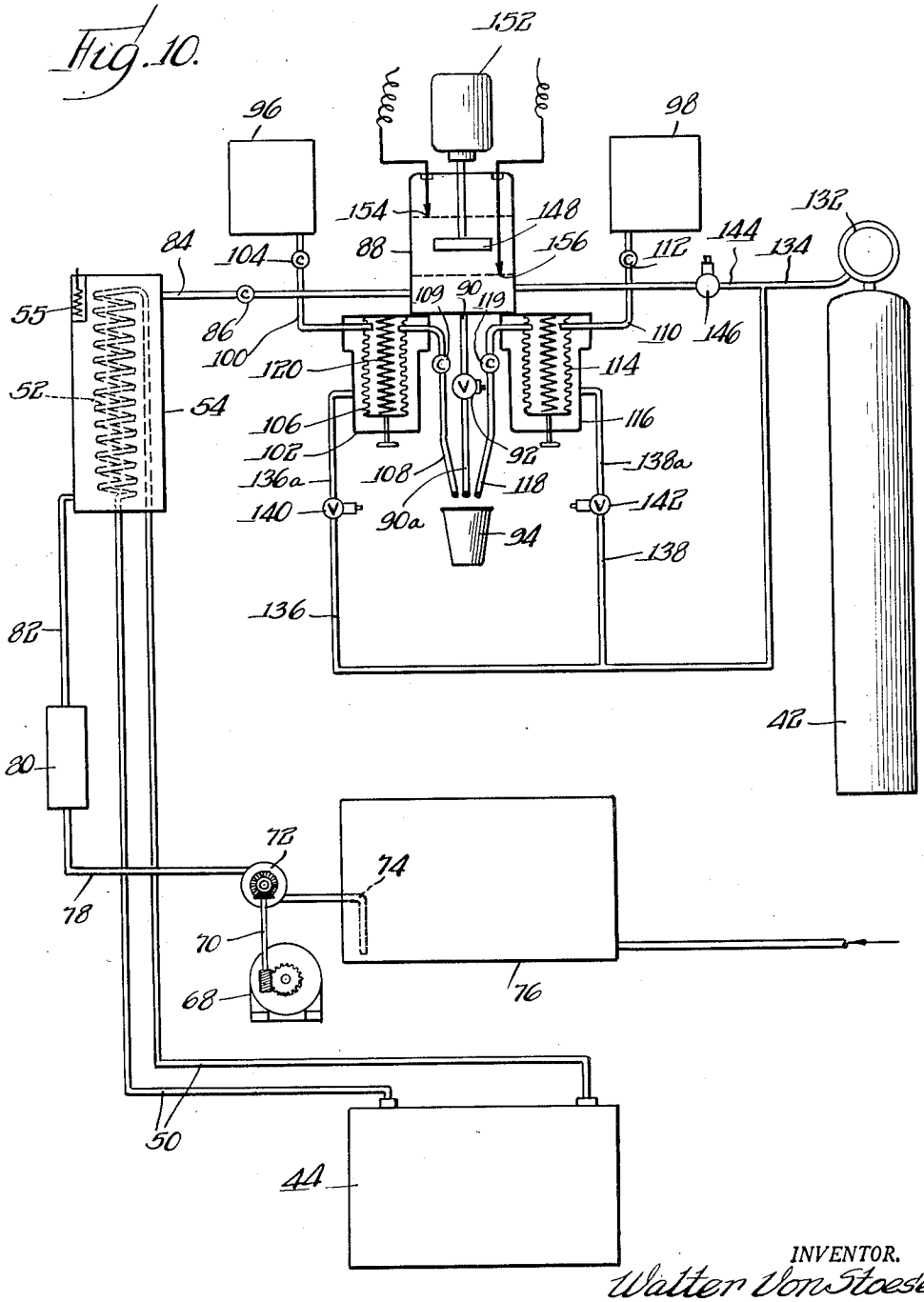
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BEVERAGE DISPENSING APPARATUS

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Fig. 10.



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BEVERAGE DISPENSING APPARATUS

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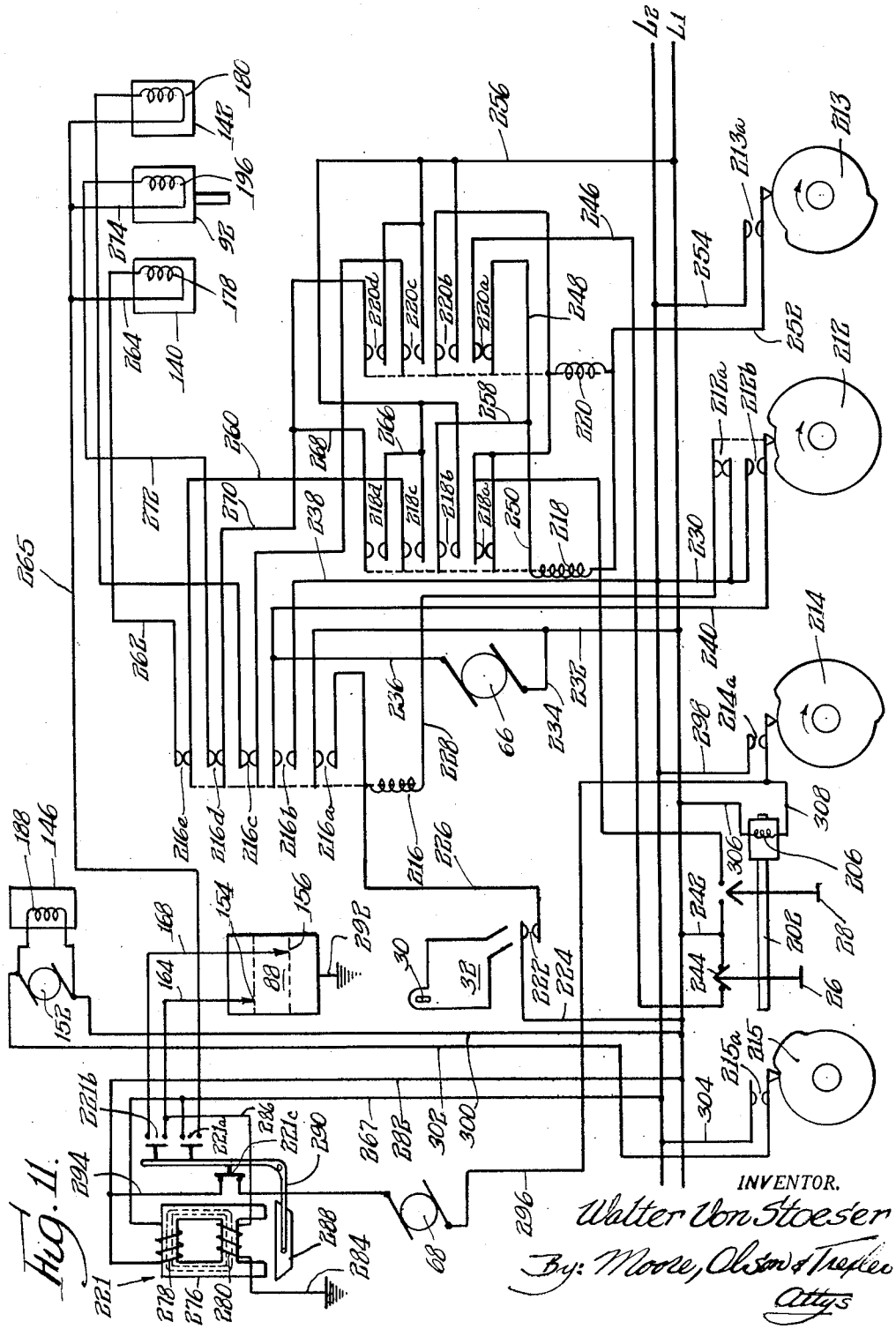


Fig. 11.

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UNITED STATES PATENT OFFICE

2,657,628

BEVERAGE DISPENSING APPARATUS

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Application January 9, 1947, Serial No. 720,994

15 Claims. (Cl. 99—275)

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This invention relates to dispensing apparatus for beverages and the like, and particularly to that type of beverage dispensing apparatus wherein the flavoring syrup is mixed with the carbonated water or other carrier liquid as an incident to and during the dispensing operation.

It is the object of the invention to provide a beverage dispensing apparatus of the foregoing type, of improved construction and improved operating characteristics.

More specifically stated, it is an object of the invention to provide an improved beverage dispensing apparatus of the self-mix type, which is automatic, rapid, and reliable in operation, and wherein accurately measured quantities of carrier liquid and flavoring material are selected, dispensed, and mixed in an improved manner.

A further object of the invention is to provide, in apparatus of the type defined, means for effecting the carbonation of the carrier liquid in an improved and accurately controlled manner.

Another object of the invention is to provide, in apparatus of the type defined, improved means for effecting the selection of one of a plurality of flavoring materials, for mixing with the carrier liquid during the dispensing operation, as may be desired.

A still further object of the invention is to provide, in apparatus of the type defined, simplified mechanism for measuring and intermixing the flavoring syrup and the carrier liquid, upon operation of the machine.

Various other objects, advantages, and features of the invention will be apparent from the following specification when taken in connection with the accompanying drawings, wherein a preferred embodiment is set forth for purposes of illustration.

In the drawings, wherein like reference numerals refer to like parts throughout:

Fig. 1 is a front view, generally diagrammatic in form, of a beverage dispensing apparatus constructed in accordance with and embodying the principles of the invention;

Fig. 2 is an enlarged vertical sectional view of the apparatus illustrated in Fig. 1, taken as indicated by the line 2—2 of Fig. 3;

Fig. 3 is a horizontal sectional view of the apparatus, taken as indicated by the line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail view of the syrup and water measuring chambers, and associated parts, certain of the structures being shown in section to illustrate the construction;

Fig. 5 is a detail view of an electrical timer,

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forming a part of the electrical circuit structures of the machine;

Fig. 6 is a detail view of the flavor selecting buttons, and associated parts;

Figs. 7, 8 and 9 are detail views of certain of the valve structures, forming a part of the machine;

Fig. 10 is a schematic hydraulic layout of the various operating elements; and

Fig. 11 is an electrical wiring diagram for the electric control structures.

Referring more specifically to the drawings, and first to Figs. 1–3, the structure illustrated comprises a casing or housing 10 having a main body portion 12 closed at its front side by a door 14. The door may be suitably pivoted to the main casing as indicated at 16, the door and main casing body forming a completely enclosed cabinet when the door is in closed position.

The door structure carries a cup storage and delivery mechanism 18, Fig. 3, the details of which form no part of the present invention, operable to present a cup upon each operation of the machine onto a delivery platform 20 forming a part of the door structure. The door structure also preferably carries a waste cup receptacle 22 having a cup receiving opening 24, a pair of selector buttons 26 and 28 for selecting the desired syrup flavor in the drink to be dispensed, and a coin slot 30 into which a coin may be dropped to initiate operation of the machine. The door also preferably carries, in association with the coin slot, a slug rejector 32 of suitable design and construction from which proper operating coins are transmitted through a chute 34 into a door carried coin storage receptacle 36, spurious coins being transmitted from the rejector through a chute 38 to a return opening formed through the door as indicated at 40.

Disposed internally of the main casing 12 there is arranged a storage tank 42 for carbon dioxide gas (CO_2) under pressure, and a refrigerating unit 44. This refrigerating unit, the details of which form no part of the present invention, may comprise the usual compressor 46 driven by an electric motor 47, and condenser 48 from which circulating refrigerant may be transmitted by means of pipes 50 to an expansion coil as indicated at 52 arranged within a cooling tank 54 having a control thermostat 55. This cooling tank, and the other elements of the hydraulic system presently to be described, are arranged within the refrigerated compartment 56, suitably insulated and disposed internally of the main casing structure. This compartment is closed at

its forward portion by a pair of doors 58 and 60, Fig. 3, which may be opened to permit access to the mechanisms disposed therein when the main casing door 14 has been moved to open position.

Disposed upon the top surface of the compartment 56 there is provided an electrical panel box 62 carrying certain electrical relays and other elements of the electric circuit, and a timer 64 arranged to be suitably driven by a motor as indicated at 66, and as will be later described. Disposed below the refrigerated casing there is provided an electric motor 68 having drive connections as indicated at 70 for driving a pump 72 disposed within the refrigerated casing structure.

This pump, as best shown in Fig. 10, is arranged, when operated, to withdraw water by means of a conduit 74, from a main storage tank or reservoir 76 suitably provided within the refrigerated casing. From the pump the water is propelled by means of a conduit 78 to a filter 80, of suitable construction, from which it is delivered by conduit 82 into the cooling tank 54. From the cooling tank the water is adapted to be delivered through conduit 84 and through a check valve 86 into a water measuring chamber 88, the details of which are best shown in Fig. 4.

A discharge conduit 90—90*a* leads from the water measuring chamber, this conduit being under control of a solenoid actuated discharge and vent valve 92, the detailed functioning of which will be later described. The discharge conduit 90—90*a* projects through the forward wall of the refrigerated compartment 56, below the doors 58—60 into juxtaposition with the delivery platform 20, being arranged to discharge into a cup as indicated at 94, Fig. 1, suitably positioned thereon.

Also disposed within the refrigerated compartment is a plurality of storage reservoirs for flavoring syrups, depending upon the number of flavored beverages to be delivered by the machine, there being two storage tanks as indicated at 96 and 98, Fig. 2, for different flavored syrups, in the particular embodiment illustrated.

The syrup storage tank or reservoir 96 is connected by means of a conduit 100 to a syrup measuring chamber as indicated at 102, there being a suitable check valve 104 in the line so as to permit liquid flow only in a direction from the storage tank into the measuring chamber. The measuring chamber 102 is provided with a bellows 106, Fig. 4, mounted therein, the arrangement being such that the interior of the bellows is sealed from fluid communication with the interior of the measuring chamber. The conduit 100 is arranged to discharge into the interior of the bellows, as will be best understood by reference to Fig. 4. A discharge conduit 108, provided with a check valve 109, is also connected internally to the bellows, and leads from the measuring chamber 102 in juxtaposition to the discharge conduit 90—90*a* to the delivery platform 20 for discharge into the cup 94 positioned thereon.

In a similar manner the syrup reservoir 98 is provided with the conduit 110 leading through a check valve 112 to the interior of a bellows 114, Fig. 10, disposed internally of a second measuring chamber 116 of a kind and construction similar to the measuring chamber 102 previously described. A discharge conduit 118, provided with a check valve 119, connected to the interior of bellows 114 leads from the measuring chamber 116 in juxtaposition to the conduits 90—90*a* and 108 to the delivery platform 20 and for discharge into the cup 94 when the flavoring syrup passes therethrough.

In the operation of the structure, measured amounts of syrup are ejected into the receiving cup 94 by the contraction and expansion of the bellows within one or the other of the syrup measuring chambers, as the case may be. To this end each of the bellows 106 and 114 is expansible and contractible within its measuring chamber, means being provided for adjustably limiting the expanding and contracting operations, to control the quantity of syrup dispensed. As shown in Fig. 4, a compression spring 120 is arranged within the bellows 106, normally expanding the lower free end of the bellows against the end of an adjustable stop screw 122 threaded through the end of the measuring chamber. Screw 122 is provided with an adjustment handle as indicated at 124 for effecting its adjustment, a lock nut being provided as indicated at 126 for holding the screw in adjusted position. The upper end of the measuring chamber is provided with a depending fixed abutment post 128 engageable with the end of the bellows for limiting its contracting movements. It will thus be seen that the limits of movement of the bellows, upon each contracting and expanding operation, is determined by the position of the adjustable stop 122.

Similar adjustment and control means is provided for the bellows 114 within the measuring chamber 116, the adjustable stop screw therefor being indicated at 130 in Fig. 4.

The pressure of the CO_2 gas from the supply tank 42 is employed for contracting the bellows against the action of their expanding springs. Supply tank 42 is provided with a pressure regulator 132 from which a gas supply conduit 134 extends, Fig. 3, into the refrigerated compartment. This conduit is provided with a pair of branches 136—136*a* and 138—138*a* leading, respectively, into the syrup measuring chambers 102 and 116 externally of the bellows, the terminal end of the conduit 136—136*a* being indicated within the measuring chamber 102 in Fig. 4. Solenoid actuated control and vent valves are provided as indicated at 140 and 142, Fig. 3, for controlling the gas flow through each of the conduits 136 and 138. As will be seen, the introduction of gas pressure into the syrup measuring chambers effects the contraction of the bellows therein against the action of the bellows expanding springs.

Gas supply line 134 is provided with a third branch 144, Fig. 3, provided with a solenoid control valve 146 and leading to the interior of the water measuring chamber 88. See Fig. 4. By means of the conduit 144, water within the measuring chamber 88 may be carbonated prior to its discharge from the chamber, as will presently appear.

To aid in the carbonating of the water an agitator 148, Fig. 4, is provided, carried at the lower end of a drive shaft 150 extending through the upper wall of the water measuring chamber and adapted to be driven by an electric motor as indicated at 152. The agitator is adapted to be driven at predetermined intervals as the carbonating gas is introduced into the measuring chamber, to effect the water carbonation.

As will be understood, the water is adapted to be introduced into the measuring chamber 88, at periodic intervals from the supply tank 76 by means of the pump 72. To control the water level, and thus control the amount of water delivered into the cup 94 at each machine operation,

upper and lower electrodes are provided as indicated at 154 and 156, Fig. 4, carried within the measuring chamber by support sleeves 158 and 160, respectively, within which the electrodes may be vertically adjusted to a desired predetermined level. The arrangement is such that when water within the measuring chamber reaches an upper level as indicated at 162a electrical contact is established with the electrode 154, the electrode thus constituting a switch structure; whereas when the water level drops below a lower level as indicated at 162b contact with the electrode 156 is broken. As shown in Fig. 4, the electrodes are connected, respectively, to wires 164 and 168, and the manner in which they function to control the water level will be later described.

The valves 140 and 142 may be of identical construction, and are shown in detail in Fig. 7. These are two-position control and vent valves, the arrangement being such that when the valves are in the position shown in Fig. 7 the measuring chamber connections 136a and 138a, as the case may be, are vented to atmosphere through a vent as indicated at 172. When the valve barrel 174 is rotated 90° clockwise by means of a rack 176 pulled by a solenoid 178 or 180, in the instance of each valve, against the action of a return spring 182, the vent is cut off and communication is established with the gas pressure supply lines 136 or 138.

The valve 146 is a two-position solenoid valve, and is shown in detail in Fig. 8. When the valve barrel 184 is in the position shown communication within the gas line 144 is cut off. When the valve barrel is rotated 90° clockwise against the action of return spring 186 by energization of the solenoid 188, communication within the gas supply line 144 is established.

The water discharge control vave 92 is shown in detail in Fig. 9. This valve is a two-position solenoid actuated control and vent valve. When the valve barrel 190 is in the position shown, the discharge conduit 90a is vented to atmosphere through vent 192. When the valve barrel is rotated counterclockwise 90° against the action of return spring 194 by energization of solenoid 196, the vent is closed and communication between the discharge conduits 90 and 90a is established.

The details of the flavor selector buttons 26 and 28 are shown in Fig. 6. It will be seen that each button is normally pressed outwardly by a compression spring 198 associated therewith. Each button is provided with a notched projection 200 adapted for cooperation with a suitably shaped opening in a latch bar 202, the latter being normally urged into the position shown in Fig. 6 by a tension spring 204. It will be seen that as either button is depressed it will be held in depressed position against the action of its spring 198 by the latching arrangement 200—202. Either button may be released by depression of the other in the event the user desires to change his selection prior to operation of the machine. Energization of solenoid 206 pulls the latch bar 202 to the right as seen in Fig. 6, against the action of spring 204, to release the depressed button upon operation of the machine.

The details of the electric timer mechanism 64, and its associated drive motor 66, are shown in Fig. 5. As will be seen, the drive shaft 208 of the motor operates the timer through a suitable speed reducer 210. The timer includes a series of cams 212, 213, 214, and 215 arranged to actuate switch contacts associated therewith as will be presently described.

In the operation of the structure, the thermostat 55 operates to energize the motor 47 of the refrigerating unit whenever the temperature within the cooling tank 54 rises above a predetermined minimum, whereby to maintain the water within the cooling tank at a predetermined refrigerated level. At periodic intervals, as the machine is operated, the motor 68 is energized whereby to actuate pump 72 and propel water from the water reservoir 76 through the cooling tank 54 into the water measuring chamber 88, from which it is discharged under control of valve 92. The volume of water introduced into the water measuring chamber 88, on each operation, is controlled by the positioning of the electrodes 154 and 156. Flavoring syrup is transmitted from the supply reservoirs 96 or 98, in accordance with the demands and operation of the machine, into the measuring bellows 106 and 114, and discharged therefrom in measured quantities, the operations being under the control of valves 140 and 142, which control the introduction of bellows contracting gas pressures into the syrup measuring chambers. While the water is within water measuring chamber 88, the carbonation thereof is effected under control of valve 146, coupled with operation of the agitator 148. The timed functioning of the various operations will be best understood by reference to the electrical circuit, Fig. 11.

The electrical circuit includes, in addition to the parts previously described, a starting relay 216, two selector relays 218 and 220, and a liquid level control relay 221, mounted within the control box 62, each relay being provided with a series of associated switch contacts, as shown.

Normally the water measuring chamber 88 is maintained filled with water, carbonated and under carbonating pressure, to the upper level 162a, Fig. 4; and the syrup measuring bellows are maintained full of syrup and in an expanded condition under actuation of their expanding springs. Assuming that the user wishes to select a drink represented by the flavor within the reservoir 96, he actuates push button 26 which thereupon remains latched in depressed position. As a coin of proper value is now deposited in coin slot 30, a coin switch 222, Fig. 11, associated therewith is momentarily closed by a proper coin passing to the coin storage box. The closing of switch 222 closes a circuit from power line L_1 through lines 224 and 226 to the starting relay 216. From the relay the current passes through line 228, normally closed switch contacts 212a of the timer cam 212, and line 230 back to the power line L_2, completing the circuit.

Actuation of starting relay 216 closes a set of normally open holding contacts 216a associated therewith, which establishes a holding circuit from line L_1 through wire 232, switch contacts 216a, relay 216, wire 228, switch contacts 212a and wire 230 to line L_2, so that the starting relay remains energized after the coin switch 222 opens as the coin moves to the storage box.

The actuation of relay 216 also closes its normally open timer contacts 216b which upon closing establish circuit from line L_1 through wires 232 and 234 to the timer motor 66, and from the timer motor through wire 236, switch contacts 216b, and wire 238 back to the line L_2.

As the timer is actuated, upon operation of the timer motor 66, timer cam 212 operates after a predetermined interval to open its normally closed

contacts 212a and close its normally open contacts 212b. The opening of contacts 212a breaks the holding circuit to the starting relay 216 which is thereupon deenergized, returning to normal position. As the contacts 216b of the starting relay are opened the circuit to the timer motor 66 is broken, but simultaneously the timer cam contacts 212b are closed reestablishing or maintaining the circuit to the motor from line L1 through wires 232 and 234 to the timer motor, and from the motor through wires 236 and 240, contacts 212b and wire 230 back to the line L2. The timer motor is thus maintained in actuation, under control of the timer cam 212, after the starting relay 216 returns to normal deenergized condition.

As the timer continues in actuation, timer cam 213 closes its normally open contacts 213 which establishes a circuit through one or the other of the selector relays 218 and 220, depending upon which selector push button has been actuated. In the instance assumed, push button 26 has been depressed. Accordingly a circuit is thereby established from line L1 through wire 242, contacts 244 associated with the push button 26, wire 246, normally closed contacts 220a of the selector relay 220, and wires 248 and 250 to the selector relay 218. From the selector relay the current returns through wire 252, timer cam contacts 213a and wire 254 back to the line L2. Accordingly, assuming that selector push button 26 has been actuated, as the timer cam switches 213a close the selector relay 218 is actuated, corresponding to the push button depressed. It will be noted that the energizing circuit for the selector relay 218 passes through the contacts 220a of the selector relay 220 which are closed only when the latter is deenergized. The contacts thus act as checking contacts to insure that both selector relays cannot be energized at the same time.

As relay 218 is energized, holding contacts 216b are closed establishing a holding circuit for the relay 218 from line L1 through wire 256, contacts 218b, wire 258, wire 250, relay coil 218, wire 252, timer cam contacts 213a and wire 254 back to the line L2. By this means the selector relay remains energized, so long as the timer cam contacts 213a remain closed, even though the push button contacts 244 shall be opened.

As the selector relay 218 is energized its normally open contacts 218c and 218d are closed. The closing of these contacts effects the delivery of the selected syrup and the carbonated water from their respective measuring units by circuits which will now be described.

The closing of contacts 218c establishes a circuit from line L1 through wire 256, contacts 218c, wire 260, checking contacts 216e of the starting relay 216 which are now closed if the starting relay has been properly deenergized, and wire 262 to the coil 178 of the syrup control valve 140. From the coil 178 the current returns through wire 264, wire 265, contacts 221a of the relay 221 (which contacts are now closed as will be presently described), and wire 267 back to the power line L2. The energization of magnet 178 operates the valve 140, as previously described, so as to introduce gas pressure from the tank reservoir 42 into the syrup measuring chamber 102. This gas pressure collapses the syrup filled measuring bellows 106 within the measuring chamber, causing a measured quantity of syrup to be ejected from the bellows into the cup 94.

Simultaneously with the closing of selector relay contacts 218c, which eject the syrup, relay contacts 218d are closed to eject the carbonated water into the cup. More particularly, the closing of contacts 218d establishes a circuit from power line L1 through wire 256, wire 266, contacts 218d, wire 268, wire 270, checking contacts 216d of the starting relay which are closed if the starting relay has been properly deenergized, and wire 272 to the coil 196 of the control valve 92. From the coil 196 the current returns through wire 274, wire 265, the relay contacts 221a, and wire 267 back to the power line L2. The energization of coil 196, as previously described, establishes communication between pipes 90 and 90a thus permitting the carbonated water to be ejected from the measuring chamber 88 under the impetus of the carbonating pressure therein, resulting from the fact that the water is stored within the measuring chamber in carbonated or charged condition and under gas pressure from the carbonating operation associated with the previous machine cycle.

The selected syrup and carbonated water are thus simultaneously delivered into the cup 94, with sufficient speed and pressure to be properly mixed therein. As the water level within the measuring chamber 88 reaches its preset lower level, and leaves contact with the electrode 156, the liquid level control relay 221 functions to open its contacts 221a, thus deenergizing valve magnets 178 and 196 and causing the valves 140 and 92 to be restored to normal position. The closing of valve 92 shuts off further water delivery from the measuring chamber 88, and simultaneously vents the pipe 90a through the valve vent 192, Fig. 9, facilitating the complete and rapid drainage of the carbonated water from the delivery pipe into the cup. The closing of valve 140 shuts off gas pressure from the pipe 136, and simultaneously vents pipe 136a through the valve vent, thus relieving gas pressure within the measuring chamber 102 and permitting the spring 120 to expand the bellows 106, drawing a new charge of syrup into the measuring bellows from the supply reservoir 96.

The manner of functioning of the liquid level control relay 221 will now be described. As shown in Fig. 11, this relay comprises an A-shaped laminated core 276 carrying a primary coil 278 and a secondary coil 280, as shown. The primary coil 278 is interconnected across the power lines L1 and L2 by means of the wire 267, previously mentioned, and a wire 282, the coil thus being energized continuously during the time that the power lines are connected to their source of supply, as for example when the machine is connected for operation. The continuous energization of the coil is permissible, inasmuch as its power consumption is low. As is obvious, however, the supply lines to the coil may, if desired, be interconnected with suitable cam switches so that the coil is energized only during the cycling of the machine.

The secondary coil 280 of the relay is interconnected to ground by means of a wire 284, and to the measuring chamber electrode wire 164 by means of a wire 286. When the contacts 221b of the relay 221 are closed, wire 286 is also adapted for interconnection with the measuring chamber electrode wire 168 which is associated with the electrode 156, as previously described.

When the circuit through the secondary coil 280 is open, the magnetic flux induced within the A-frame of the relay by the primary coil 278 follows the path of least resistance, as indicated by dotted lines in Fig. 11, and does not attract the relay armature indicated by the reference

numeral 288. However, when the connections to the secondary coil 280 establish a closed circuit, the counter E. M. F. set up in the secondary coil by the flux produces a bucking action sufficient to divert some of the flux induced by the primary coil downwardly so as to pass through the armature 288, thus causing the armature to be attracted upwardly into engagement with the A-frame. This upward movement of the armature, by means of the bell-crank 290, causes the closing of the relay contacts 221*a* and 221*b*, and the opening of the relay switch contacts 221*c*.

When the water within the measuring chamber 88 is at its upper level, both electrodes 154 and 156 are immersed therein, and a closed circuit is thereby established through the secondary coil 280, as follows: From ground through wire 284, through coil 280, through wire 285, through wire 164 and also in parallel through wire 168 if holding contacts 221*b* of the relay are closed, and thence through the water within the measuring chamber and through the grounded reservoir chamber as indicated at 292, Fig. 11. Accordingly when the measuring chamber is filled to its upper level, at the time the syrup dispensing and water dispensing coils 178 and 196 are to be energized, a closed circuit through secondary coil 280 is established through electrode wire 164; and this closed circuit is maintained via the holding contacts 221*b* and the electrode wire 168 until the water level drops free of the lower electrode 156, to the level indicated at 162*b*. As the closed circuit through the secondary coil 280 is broken, the relay armature 288 drops to the position shown in Fig. 11 opening switch contacts 221*a* and 221*b*, and closing the contacts 221*c*, as shown. It will thus be seen that the relay contacts 221*a* are closed, when the syrup and water dispensing coils 178 and 196 are energized, the contacts 221*a* opening automatically as the water level drops to its predetermined lower level within the measuring chamber, thus terminating the dispensing operation. As will be understood, the current passing through the secondary relay coil 280, and through the water within the measuring chamber, is very small, on the order of 40 milliamperes or less.

At a suitable time interval after the completion of the delivery of the carbonated water from its measuring chamber, timer cam 213 opens its contacts 213*a* so as to preclude reenergization of the selector magnets during the machine cycle.

Promptly after opening of contacts 213*a*, timer cam 216 effects the closing of its associated contacts 214*a* to effect the refilling of the water measuring chamber from the water storage reservoir. More particularly, the closing of contacts 214*a* establishes a circuit from power line L_1 through wire 282, a wire 294 connected therewith, and relay switch contacts 221*c* which are now closed, to the water pump motor 66. From the pump motor the current returns through wire 296, cam timer contacts 214*a*, and wire 298 back to the line L_2. Accordingly as the timer contacts 214*a* are closed, the pump 72 begins operation to refill water into the measuring chamber 88 from the water supply reservoir, provided that the control relay 221 has been properly conditioned.

The pumping continues until the water within the measuring chamber 88 reaches its predetermined upper level, whereupon the circuit through the secondary coil 280 is again established through wire 164. The engagement of the water with the lower electrode 156, during the filling operation, produces no effect upon the relay 221, due to the fact that holding contacts 221*b* are open. As the upper electrode 154 is engaged, the relay armature 288 is again drawn into contact with the relay frame, closing switch contacts 221*a* and 221*b*, and opening switch contacts 221*c*, which deenergizes the pump motor. The closing of contacts 221*b* reestablishes the holding circuit through wire 168, so that the relay armature 288 is not again dropped until the water level drops below the lower electrode 156, in the next dispensing operation.

Shortly after the deenergization of the pump motor 66, cam 215 operates to close a set of contacts 215*a* associated therewith, whereby to establish a circuit to the agitator motor 152 and the gas inlet valve 146, in parallel. More particularly, the closing of cam contacts 215*a* establishes a circuit from line L_1 through a wire 300 to the agitator motor 152 and the coil 188 of the valve 146, in parallel, the current returning through wire 302 and through contacts 215*a* and a wire 304 to the line L_2. The agitator 148 is thus set into operation, and carbonating gas is simultaneously introduced to the measuring chamber through the valve 146 to effect the carbonating operation. The carbonation continues to a point near the end of the machine cycle, whereupon timer cam contacts 215*a* are opened, stopping the agitator motor and permitting valve 146 to close. Shortly thereafter, timer cam 212 opens its timer contacts 212*b*, whereupon the timer motor 66 is deenergized and the machine cycle is complete.

As cam contacts 214*a* were closed, a circuit was also established thereby to the magnet 206 through wires 306, 308, the switch contacts 214*a* and wire 298, thus operating the latch release bar 202 so as to restore the depressed selector button 26 to normal position.

It is believed that the operation of the machine upon depression of the selector button 28 will be obvious from the foregoing, the operation being the same except that the selector relay 220 rather than the relay 218 is actuated. In this instance the contacts 218*a* act as the checking contacts for the relay 220, similar to the manner in which the contacts 220*a* operated as checking contacts for the relay 218 in the machine cycle previously described. As the selector relay 220 is actuated, its contacts 220*b* serve as holding contacts, and its contacts 220*c* and 220*d* effect the operation of the syrup and water delivery valves, respectively, in a manner similar to the contacts 218*c* and 218*d* previously described. The water valve circuit is checked through the starting relay contacts 216*d* as before, the starting relay contacts 216*c* checking the syrup valve in a manner similar to the action of the contacts 216*e* in the cycle specifically described.

As will be understood, additional contacts may be associated with one or the other of the timer cams, or with additional timer cams provided, to light lamps, operate the cup mechanism, or provide such other operations as may be desired.

It is obvious that various changes may be made in the specific embodiment set forth without departing from the spirit of the invention. The invention is accordingly not to be limited to the specific embodiment shown and described, but only as indicated in the following claims.

The invention is hereby claimed as follows:

1. A beverage dispensing apparatus comprising a measuring chamber for flavoring liquid for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, a measuring chamber for carrier liquid for

measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a supply source for gas under pressure, means within said measuring chambers for limiting ejection of liquid therefrom to a predetermined amount, means including individual connections from the gas supply source to the measuring chambers actuated by a gas pressure supply for ejecting the liquids from said measuring chambers to a point of delivery, and means for refilling the measuring chambers after each dispensing operation.

2. An electrically operated beverage dispensing apparatus comprising a measuring chamber for flavoring liquid for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, a measuring chamber for carrier liquid for measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, separate means interconnecting said chambers to a substantially common point of delivery, a supply source for gas under pressure, means within said measuring chambers for limiting ejection of fluids therefrom to a predetermined amount, means including a plurality of valves individually interconnecting the gas supply source and said measuring chambers, and common control means for effecting the actuation of said valves in predetermined timed sequence whereby to effect the ejection of the liquids from said measuring chambers in predetermined timed relationship.

3. An electrically operated beverage dispensing apparatus comprising a supply reservoir for carrier liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a supply reservoir for flavoring syrup, a measuring chamber interconnected therewith for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, said syrup measuring chamber including a collapsible measuring bellows, and means including a source of gas under pressure for exhausting syrup and carrier liquid from said measuring chambers, said last named means including positive stop means between fully extended and collapsed positions of the bellows for limiting actuation of said bellows between predetermined limits of movement.

4. A beverage dispensing apparatus comprising a measuring chamber for flavoring liquid, a measuring chamber for carrier liquid for measuring a predetermined quantity of liquid to be ejected during each dispensing operation, a source of gas under pressure operable to evacuate said chamber, means interconnecting the gas pressure source and carrier liquid measuring chamber including a valve, an agitator within the carrier liquid measuring chamber for thoroughly mixing said gas and said carrier liquid in said measuring chamber, and common control means for actuating said valve and agitator.

5. A beverage dispensing apparatus comprising a supply source for liquid to be dispensed, a measuring chamber interconnected therewith for measuring a predetermined quantity of liquid to be ejected during each dispensing operation, means interconnecting the measuring chamber with a point of liquid discharge, and means including a pair of electrodes disposed at different levels within the measuring chamber operable upon each dispensing operation for dispensing measured volumes of liquid between said supply source and said point of discharge, said means being actuated by one of said electrodes and stopped by the other of said electrodes.

6. A beverage dispensing apparatus comprising a supply source for liquid to be dispensed, a measuring chamber filled and evacuated upon each dispensing operation, a pump for propelling liquid from the supply source to the measuring chamber, a conduit interconnecting said measuring chamber with a point of liquid discharge, a valve for controlling liquid flow through said conduit, an electrode within the measuring chamber for controlling the operation of the pump by its emersion or lack thereof in said liquid, and an electrode within the measuring chamber for controlling the operation of said valve.

7. A beverage dispensing apparatus comprising a supply source for liquid to be dispensed, a measuring chamber for measuring a predetermined quantity of liquid to be ejected during each dispensing operation and filled and evacuated on each dispensing operation, a pressure pump for propelling liquid from the supply source to the measuring chamber, a source of gas under pressure, means including a valve for connecting and disconnecting the gas pressure source with the measuring chamber to evacuate liquid therefrom, an agitator in the measuring chamber, and common control means including electrical means actuatable in accordance with the level of the liquid in said measuring chamber for controlling the operation of said pump, agitator, and valve in predetermined sequence.

8. A beverage dispensing apparatus as defined in claim 7, wherein said electrical means comprises an electrode disposed within the measuring chamber.

9. An electrically operated beverage dispensing apparatus comprising a normally filled measuring chamber for flavoring liquid, a normally filled measuring chamber for carrier liquid, a conduit interconnecting the flavoring liquid measuring chamber with a point of discharge, a conduit interconnecting the carrier liquid measuring chamber with said point of discharge, said liquids being separated prior to leaving said points of discharge, a valve disposed in said last named conduit, and common control means for controlling the transmission of the liquid through said conduits, said control means controlling the operation of said valve, said valve including means for venting the terminal portion of its conduit when moved to closed position.

10. A beverage dispensing apparatus comprising a supply reservoir for carrier liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a supply reservoir for flavoring liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, means interconnecting said measuring chambers with a point of liquid discharge, and control means individually controlling each chamber in predetermined timed relation for transmitting measured quantities of liquid through the measuring chambers upon each dispensing operation from the supply reservoirs to the point of discharge, said control mechanism including a motor driven timer, and a plurality of switches actuated thereby.

11. A beverage dispensing apparatus comprising a supply reservoir for carrier liquid, a measuring chamber interconnected therewith for meas-

uring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a supply reservoir for flavoring liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, means interconnecting said measuring chambers with a point of liquid discharge, and control means individually controlling each chamber in predetermined timed relation for transmitting measured quantities of liquid through the measuring chambers upon each dispensing operation from the supply reservoirs to the point of discharge, said control means including a plurality of electrical relays, a motor driven timer, and a plurality of switches controlled by said timer and interconnected with said relays for controlling the actuation thereof.

12. A beverage dispensing apparatus comprising a supply reservoir for carrier liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a supply reservoir for flavoring liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, means interconnecting said measuring chambers with a point of liquid discharge, and control means actuatable during each dispensing operation for transmitting measured quantities of liquid through the measuring chambers from the supply reservoirs to the point of discharge, said control means including a switch actuated by the level of liquid within one of said measuring chambers, a motor driven timer, and a plurality of switches actuated thereby.

13. A beverage dispensing apparatus comprising a supply reservoir for liquid to be dispensed, a measuring chamber for measuring a predetermined quantity of liquid to be ejected during each dispensing operation and filled and evacuated upon each dispensing operation, a pressure pump for delivering liquid from the reservoir to the measuring chamber, means interconnecting the measuring chamber with a point of liquid discharge, control means including a valve for controlling the transmission of liquid through the measuring chamber to the point of discharge, a motor driven agitator within the measuring chamber, a supply source of gas under pressure, means for connecting and disconnecting said gas pressure supply source with the measuring chamber including a control valve, and a motor driven electrical timer for controlling the operation of said valves, pump, and agitator in predetermined timed sequence.

14. A beverage dispensing apparatus comprising a supply reservoir for carrier liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a plurality of supply reservoirs for flavoring liquid, a plurality of measuring chambers respectively interconnected therewith for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, means interconnecting said measuring chambers to a point of liquid discharge, and common control means for controlling the transmission of liquids through said measuring chambers to effect the filling and evacuation thereof in accordance with each dispensing operation, said common control means including a plurality of selector buttons respectively operating a plurality of switches electrically interconnected with the flavoring liquid measuring chamber structures.

15. A beverage dispensing apparatus comprising a supply reservoir for carrier liquid, a measuring chamber interconnected therewith for measuring a predetermined quantity of carrier liquid to be ejected during each dispensing operation, a plurality of supply reservoirs for flavoring liquid, a plurality of measuring chambers respectively interconnected therewith for measuring a predetermined quantity of flavoring liquid to be ejected during each dispensing operation, conduit means interconnecting said measuring chambers to a point of liquid discharge, a valve for connecting and disconnecting said carrier liquid measuring chamber with said conduit means, check valves in said conduit means between each of said flavoring liquid chamber means and said point of discharge and common control means for controlling the transmission of liquids through said measuring chambers, said common control means including a plurality of selector switches, a plurality of electrical relays operating said first mentioned valve, and a motor driven electrical timer interconnected therewith.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
80,847	Wheeler	Aug. 11, 1868
94,235	Nida	Aug. 31, 1869
1,316,528	Wooten et al.	Sept. 16, 1919
1,416,307	Severson	May 16, 1922
1,944,809	Rogers	Jan. 23, 1934
1,962,192	Hapgood	June 12, 1934
2,284,880	Nicholson	June 2, 1942
2,327,432	Johnson	Aug. 24, 1943
2,391,003	Bowman	Dec. 18, 1945
2,376,403	Thompson et al.	May 22, 1945
2,416,581	Harr	Feb. 25, 1947
2,427,428	Waite et al.	Sept. 16, 1947
2,462,019	Bowman	Feb. 15, 1949
2,502,610	Wegman	Apr. 4, 1950
2,538,111	Luster	Jan. 16, 1951
2,547,423	Wegman	Apr. 3, 1951