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APPARATUS FOR DISPENSING CARBONATED BEVERAGES

Filed Feb. 15, 1946

3 Sheets-Sheet 1

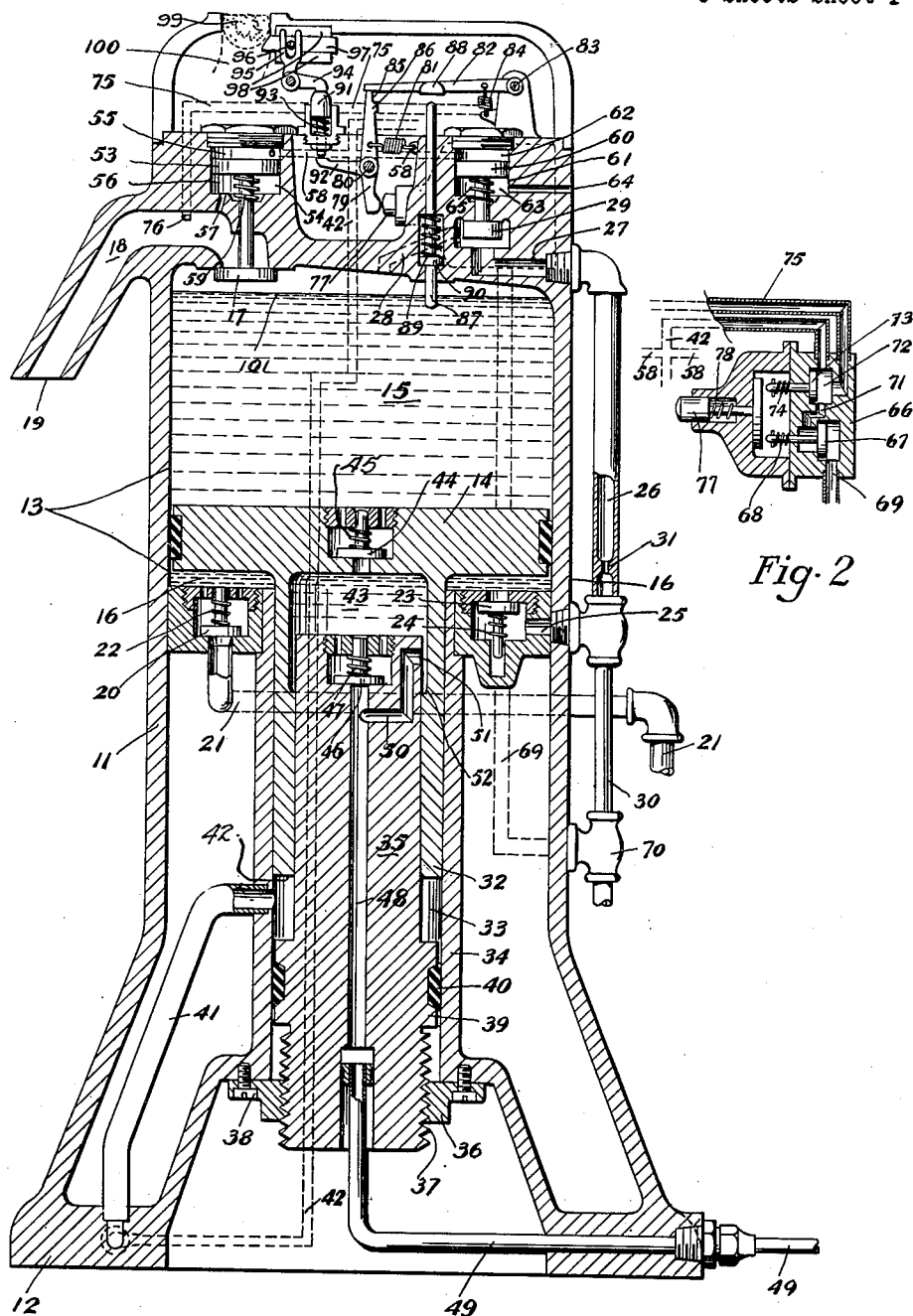


Fig. 1

Fig. 2

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3 Sheets-Sheet 2

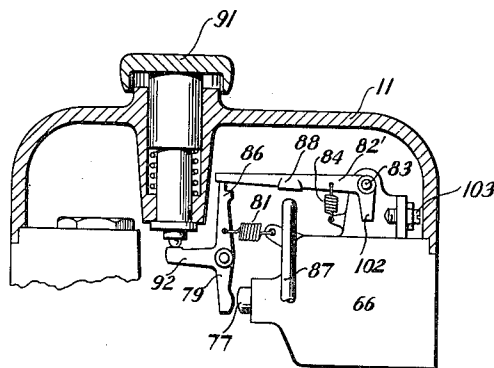


Fig. 3

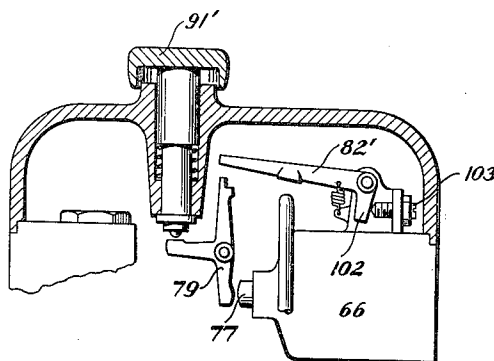


Fig. 4

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Fig. 6

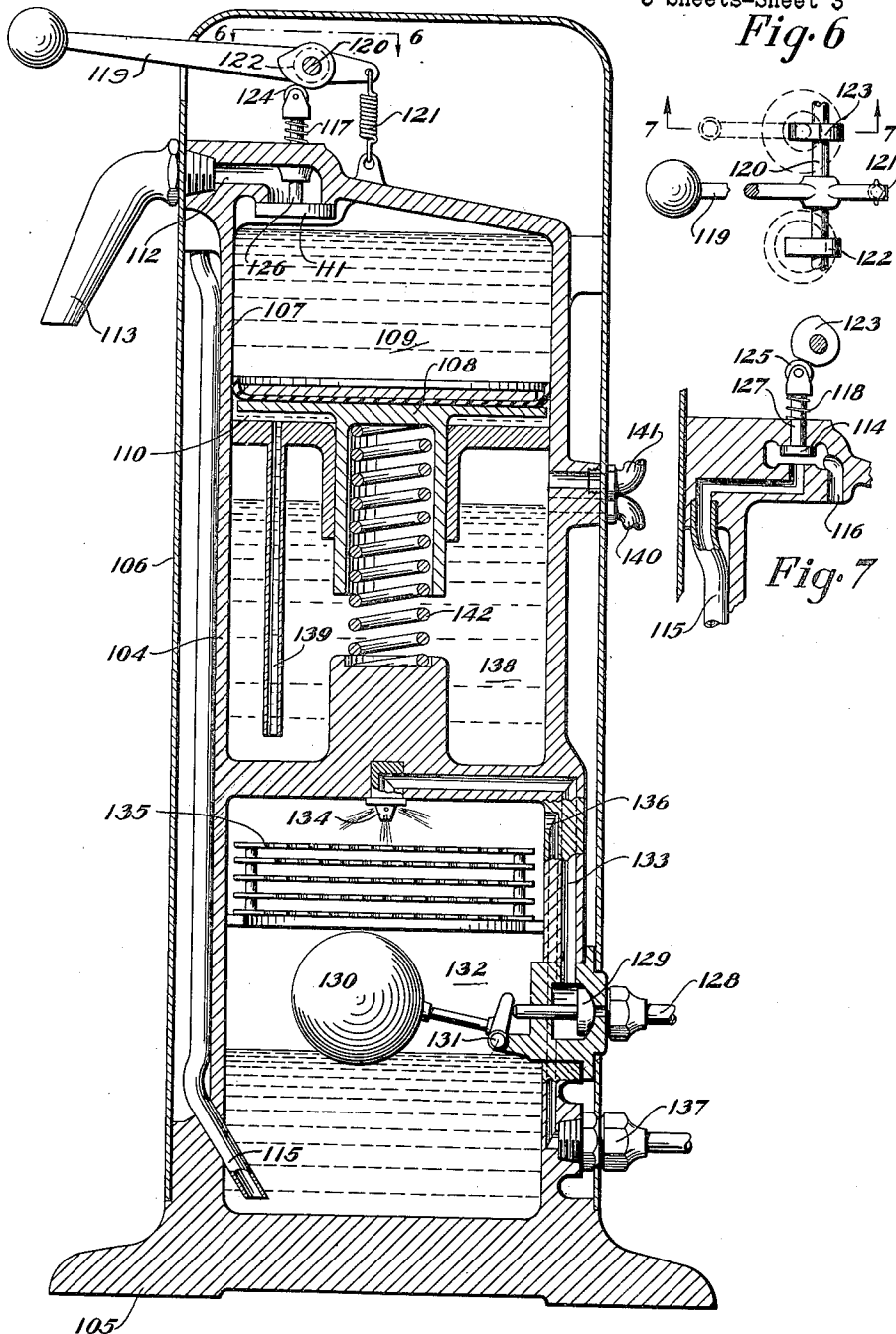


Fig. 5

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APPARATUS FOR DISPENSING CARBONATED BEVERAGES

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10 Claims. (Cl. 261-76)

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This invention provides an apparatus for dispensing measured quantities of carbonated beverages.

Conventional handling and dispensing of carbonated beverages usually involves storage of the charged beverage under pressure and dispensing or feeding of the beverage into a cup or measuring vessel under turbulence accompanied by a substantial drop in pressure whereby a considerable portion of the carbon dioxide charge is driven out. As a result the beverage reaching the consumer has lost much of its effervescence.

According to the present invention the carbonated beverage is maintained under pressure throughout its handling and measuring and the carbon dioxide pressure is only relieved at the final dispensing stage after the beverage has assumed a quiescent state, whereafter it is poured or dispensed at a controlled low rate of flow to maintain turbulence of the liquid low whereby greatest possible charge of carbon dioxide is retained in the beverage.

The objects, features and advantages of this invention will appear more fully from the detailed description which follows accompanied by drawings showing for the purpose of illustration apparatus for practicing the invention.

The invention also consists in certain new and original features of construction and combination of parts as well as in a certain combination of steps hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof in which:

Fig. 1 is an elevational view, partly in section, of a coin operated machine for dispensing a measured quantity of beverage carbonated in the machine proper;

Fig. 2 is a detailed view of a valve assembly of the machine of Fig. 1;

Fig. 3 is modified actuating mechanism for the machine illustrated in Fig. 1;

Fig. 4 shows the actuating mechanism of Fig. 3 in a different adjustment;

Fig. 5 is an elevational view, partly in section, of another form of machine embodying the invention;

Fig. 6 is a detailed plan view of an actuating and valve mechanism of the machine of Fig. 5; and

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Fig. 7 is a sectional view of a valve shown in Fig. 6 the section being taken on line 7-7 of Fig. 6.

In the following description and in the claims various details will be identified by specific names for convenience. The names, however, are intended to be as generic in their application as the art will permit.

Like reference characters refer to like parts in the drawings. In the drawings accompanying, and forming part of, this specification, certain specific disclosure of the invention is made for the purpose of explanation of broader aspects of the invention, but it is understood that the details may be modified in various respects without departure from the principles of this invention and that the invention may be applied to other structures than the ones shown.

The carbonating and dispensing apparatus shown in Fig. 1 comprises a housing 11 having a base 12 upon which the housing rests. The housing provides a cylinder 13 in which a piston 14 is movable dividing the cylinder space into a beverage chamber 15 and a pumping chamber 16. The beverage chamber 15 has a discharge valve 17 controlling a discharge passage 18 leading to a dispensing spout 19.

The pumping chamber 16 is provided with an inlet check valve 20 controlling an inlet duct or passage 21 leading to a suitable source or reservoir of beverage (not shown). The inlet valve 20 is biased by a spring 22 normally maintaining the valve closed, but permitting opening of the valve in response to suction in the pumping chamber 16.

An outlet valve 23 biased by a spring 24 controls a passage consisting of a series of ducts 25, 26, 27 and 28 leading to the beverage chamber 15 controlled further by an admission valve 29 between the ducts 27 and 28.

A supply duct 30 of carbon dioxide coming from a suitable source of carbon dioxide under pressure is connected to the passage between the pumping and the beverage chamber to introduce carbon dioxide into a flow of liquid flowing from the pumping chamber to the beverage chamber, turbulence and intimate intermixing of the gas and liquid being promoted by a constriction 31 in the duct 26.

The outlet valve 23 is normally held closed by a spring 24 permitting opening of the valve in response to pressure in the pumping chamber which forces liquid through the passages 25, 26, 27 and 28 into the beverage chamber 15.

The piston 14 has a tubular extension 32 fitting in a tubular space 33 between a cylindrical inner

wall 34 and a central post 35 in the housing 11. The central post 35 is axially adjustable in the tubular space 33 and is held by a nut 36 engaging threads 37 at the bottom end of the post, the nut being secured to the base 12 of the housing by screws 38. The post 35 has an intermediate cylindrical portion 39 tightly fitting against the cylindrical inner wall sealed by an appropriate packing 40.

Carbon dioxide under pressure is admitted into the tubular space 33 through a passage comprising ducts 41 and 42 coming from a control valve assembly later to be described. Pressure in the tubular space 33 causes the tubular extension 32 of the piston 14 to move upwardly, in piston fashion, thereby moving the main piston 14 which divides the beverage chamber 15 from the pumping chamber 16 causing decrease of the volume of the beverage chamber and increase of the volume of the pumping chamber.

A secondary pumping chamber 43 is formed above the central post 35 by the central bore of the extension 32 of the piston and the post proper. The secondary pumping chamber communicates with the beverage chamber 15 through an outlet check valve 44 normally closed by a biasing spring 45. An intake check valve 46 normally held closed by a biasing spring 47 controls an intake passage consisting of ducts 48 and 49 leading to a source (not shown) of flavoring liquid, for example, syrup.

A bypass duct 50 extends across the intake valve 46 and leads to a port 51 which may be closed by a control edge 52 on the inner wall of the tubular extension 32 after the tubular extension 32 has moved a certain distance relatively to the stationary post 35.

The discharge valve 17 and the admission valve 29 are both automatically controlled by pressure fluid operable servo-motors. The servo-motor for the discharge valve 17 comprises a servo-piston 53 movable in a servo-cylinder 54 and subdividing the cylinder space into chambers 55 and 56. The chamber 56 is vented to the atmosphere through a passage 57 while chamber 55 is supplied with fluid under pressure at appropriate times from a branch duct 58 communicating with the pressure duct 42. A spring 59 normally holds the discharge valve 17 closed and acts opposite to pressure inside the actuating chamber 55.

A servo-motor of similar construction operates the admission valve 29 and comprises a servo-piston 60 movable in a servo-cylinder 61 which is sub-divided by the piston 60 into chambers 62 and 63. Chamber 63 is vented through a passage 64. Fluid under pressure is admitted to the operating chamber 62 through the branch duct 58 coming from the pressure duct 42. A biasing spring 65 bears against the servo-piston 60 and tends to maintain the valve 29 closed.

Admission of carbon dioxide under pressure into the duct 42 and its branches 58 is controlled by a control valve assembly 66. In the assembly a valve 67 normally held closed by a spring 68 controls a carbon dioxide supply duct 69 branching off from the supply duct 30 at a T-connection 70. After opening of the valve 67 carbon dioxide under pressure is admitted through a passage 71 to the valve chamber 72 of the valve 73 normally held open by a spring 74. In the position shown, the duct 42 leading to the valve chamber 72 is in communication with a vent duct 75 leading to the atmosphere at 76.

The valves 67 and 73 have a joint actuating

member 77 biased by a spring 78 towards an inactive position in which it is shown in the drawing. The actuating member 77 is operable by a three-arm lever 79 pivoted at 80 and acted upon by a spring 81 which tends to turn the lever clockwise.

An arm of the lever 79 cooperates with a trip lever 82 pivoted at 83. The trip lever 82 is acted upon by a spring 84 tending to turn it counterclockwise. After turning of the three-armed lever 79 in counterclockwise direction, the trip lever 82 engages a side surface 85 of the tripple armed lever and comes to rest against a stop or projection 86 of the lever, thereby maintaining the three-armed lever in a deflected position in which both valves 67 and 73 are actuated. Valve 67 is then open to admit carbon dioxide under pressure, valve 73 being closed to seal the valve chamber 72 against the atmosphere.

The trip lever 82 may be restored to its inactive position by a release pin 87 adapted to engage the trip lever at 88 and extending into the metering chamber 15 for engagement with the top surface of the pistons 14. A spring 89 bearing against a sleeve 90 on the release pin normally holds the pin in the depressed position in which it is shown in the drawing.

The triple armed lever 79 is actuated by a push button 91 bearing against the third arm 92 of the triple armed lever 79. The push button 91 is under the action of a spring 93 normally holding the push button in the inactive position shown and may be depressed by a coin operable mechanism comprising a bell crank lever 94 engaging with a forked arm 95 a pin 96 of a bar 97 slidable in guides 98. The bar 97 is displaced to the right when a coin 99 inserted into a coin slot 100 thereby turning the bell crank lever 94 in a clockwise sense, which in turn causes depression of the push button 91 for actuation of the control valve assembly 66 in the manner just described.

For an explanation of the operation of the apparatus, it may be assumed that the apparatus is connected to suitable sources of supply, the inlet duct 21 being connected to a tank or reservoir containing water, the duct 49 to a tank containing flavoring syrup, and the supply duct 30 to a source of carbon dioxide under pressure.

In the condition in which the apparatus is ready to dispense beverage, the beverage chamber is filled with a quantity of fully carbonated and flavored beverage under pressure up to a certain level which may be the liquid level 101 indicated in the drawings. The apparatus is then actuated by insertion of a coin into the coin slot 100 which starts an automatic cycle of operations as follows:

The coin 99 displaces the sliding bar 97 to the right which in turn causes turning of the bell crank lever 94 in a clockwise sense and depression of the push button 91. The push button 91 turns the triple armed lever 79 counterclockwise and the trip lever 82 drops down onto the projection 86 thus maintaining the triple armed lever deflected even after the coin 99 has cleared the sliding bar 97.

The triple armed lever 79 bears against the joint actuating member 77 of the control valve assembly 66 closing valve 73 and opening valve 67. Valve 73 seals the valve chamber 72 and the duct 42 against the atmosphere and carbon dioxide under pressure enters through the duct 69 and flows through passage 71 and valve chamber 72 into the duct 42 and its branches 58.

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As a result the pressure increases in the servo-motor chamber 52 above the servo-piston 60, forcing the valve member 29 downwardly and shutting off the interior of the beverage chamber 15 and the passage 28 from the source of carbon dioxide.

Substantially simultaneously the pressure increases in the servo-motor chamber 55 above the servo-piston 53 causing the discharge valve 17 to open whereby the carbon dioxide pressure in the beverage chamber 15 is relieved and the beverage therein is prepared for dispensing.

At the same time carbon dioxide under pressure flows through the duct 42 into the tubular space 33 forcing the tubular piston extension 32 and the main piston 14 upwardly. The movement of the piston 14 takes place at a controlled slow rate depending on the flow resistance in all the ducts and forces the volume of carbonated beverage slowly through the dispensing spout 19 into a suitable cup or container placed thereunder.

The upward movement of the piston 14 causes reduction in pressure in the pumping chamber 16 with the result that water is drawn through the inlet duct 21 past the inlet check valve into the gradually expanding pumping chamber which is filled with water.

After the piston 14 has traveled a certain distance, the control edge 42' on the inner cylindrical surface of the tubular piston extension 32 moves past the port 51 shutting off the bypass duct 50. During the further movement of the piston 14 suction is created in the secondary pumping chamber 43 and flavoring liquid, such as syrup, is drawn through ducts 49 and 48 into the secondary pumping chamber 43 past the intake check valve 46 of that chamber. A certain amount of flavoring liquid is thus accumulated in the secondary pumping chamber 43.

Near the end of its stroke the piston 14 engages the release pin 87 and pushes it against the trip lever 82 thus releasing the triple armed lever 79 with the result that the valves 73 and 67 in the control valve assembly 66 return to their normal positions. Valve 67 closes and shuts off further supply of carbon dioxide under pressure from duct 69. Valve 73 opens and vents passage 42 and its branches 58 to the atmosphere through duct 75. The pressure above the servo-pistons 53 and 60 drops to atmospheric pressure and the discharge valve 17 closes under action of the spring 59 while the admission valve 29 opens under the action of the spring 65. Carbon dioxide under pressure is now admitted through supply duct 30, 26, 27 and 28 into the beverage chamber 15 initiating downward movement of the piston 14. The servo-motor of the piston 14, the tubular extension 32 movable in the tubular space 33, offers no resistance to the downward movement since the pressure in it was relieved by opening of the valve 73 in the control valve assembly.

The downward movement of the piston 14 forces the water out of the pumping chamber 16 past the outlet valve 23. The water flows through the passage 25 and meets with the flow of carbon dioxide in the duct 26 where it is subjected to violent turbulence at the constriction 31 insuring saturation of the water with the carbon dioxide. The charged water flows into the beverage chamber 15 where it mixes with flavoring syrup which at the same time is forced into the beverage chamber past the outlet valve 44 due to reduction of the volume of the secondary pumping

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chamber 43 by the downward movement of the piston 14. The piston 14 finally comes to rest with the beverage chamber 15 filled with carbonated flavored beverage under pressure ready for dispensing in the next cycle of operations.

In the illustrated embodiment the invention provides a fully automatic apparatus for feeding, flavoring, carbonating, and dispensing of a beverage. The water used in the beverage need not be under pressure but is drawn from any ordinary water storage tank under atmospheric pressure. Likewise it is not necessary that syrup be supplied to the apparatus under pressure since it is likewise drawn or pumped into the device.

The entire motive power is supplied by the pressure of the carbon dioxide thus making the apparatus independent of other sources of power, such as electricity. The beverage from the time of carbonation until actual dispensing is maintained under pressure, whereby partial loss of the charge is prevented while the beverage flows through the passages of the apparatus. As the beverage flows into the beverage chamber 15, it is naturally in a turbulent state and would lose a substantial portion of its carbon dioxide charge were it not for the automatic provision that the beverage during these stages of handling is maintained under full carbon dioxide pressure. The pressure is not relieved until the actual instant of dispensing of the beverage at which time the beverage has assumed a quiescent state in which it best retains its charge. The rate of discharge of the beverage is low whereby turbulence is prevented or maintained at a minimum.

The ratio between flavoring syrup and water is adjustable by simple adjustment of the central post 35. By adjusting the post upwardly the length of the stroke during which flavoring syrup is drawn into the secondary pumping chamber is decreased and by an opposite adjustment it is increased.

It is of course not necessary that the apparatus be coin operated. Fig. 3 illustrates a modification in which a simple push button 91' extending to the outside of the housing 11 is employed for actuating the triple armed lever 79. In the illustrated modification the trip lever is provided with an angular extension 102 cooperating with a set screw 103. In the adjustment shown in Fig. 3 the set screw 103 is inoperative and the mechanism functions in the same manner as the mechanism of the apparatus shown in Fig. 1.

Fig. 4 shows the operating mechanism in different adjustments with a set screw 103 moved against the extension 102 whereby the trip lever 82' is moved out of a path of the three-armed lever 79. In this adjustment a partial volume of beverage may be dispensed from the apparatus, the actual dispensed volume depending on the length of time the push button 91' is depressed. After release of the push button 91', the control valve assembly 66 returns to its normal position whereby the discharge of beverage is interrupted and the metering chamber refilled. The release of the push button 91' in the adjustment of Fig. 4 acts in the same manner as the release of the trip lever 82 by the release pin 87 in the apparatus shown in Figs. 1 and 3.

A simplified form of dispensing apparatus is shown in Figs. 5 to 7. The apparatus comprises a housing 104 on a base 105 enclosed in an outer shell 106. The housing provides a cylinder 107 in which a piston 108 is movable dividing the

cylinder space into a beverage chamber 109 and a dash-pot chamber 110.

The beverage chamber 109 has a discharge valve 111 controlling a discharge passage 112 leading to a dispensing spout 113.

An admission valve 114 at the end of a beverage supply duct 115 controls a passage 116 leading into the beverage chamber 109. The valves 111 and 114 are biased by springs 117 and 118, the discharge valve being normally closed and the admission valve 114 being normally open.

Both valves 111 and 114 are jointly actuated in predetermined sequence by an actuating lever 119 on a shaft 120 biased by a spring 121. A pair of cams 122 and 123 are fast on the shaft 120 and cooperate with rollers 124 and 125 on the ends of valve shafts 126 and 127 on the valve members 111 and 114. The cams 122 and 123 are so shaped as to cause actuation of the admission valve 114 before actuation of the discharge valve 111.

Uncarbonated beverage under pressure, for example, water from a water supply system, is supplied to the apparatus through a supply duct 128 leading to a float valve 129 operated by a liquid level responsive float 130. The float is pivotally mounted at 131 and operates to close the valve 129 after the liquid has risen to a predetermined level in the carbonating chamber 132. The carbonating chamber 132 is in the base of the apparatus and is supplied with beverage under pressure through a beverage duct 133 leading to a spray nozzle 134 at the top of the chamber. The nozzle 134 discharges beverage in the form of a spray over a system of baffles 135 in the chamber to insure intimate contact and saturation with carbon dioxide in the chamber. Carbon dioxide is admitted into the carbonating chamber 132 through a duct 136 extending from a pipe connection 137 to which a suitable source of carbon dioxide under pressure is connected. The beverage supply duct 115 extends into the lower normally beverage filled portion of the carbonating chamber 132.

The dash-pot chamber 110 is normally filled with liquid, for example water, and communicates with a liquid filled central chamber 138 through a restricted passage 139. The central chamber 138 is filled with liquid through a duct 141. Excess liquid may escape through a further duct 140.

The piston 108 is under the action of a spring 142 tending to force the piston into the chamber 109 to expel the beverage therefrom, the spring 142 acting in opposition to the pressure in the chamber 109 which tends to expand the chamber 109 and compress the spring 142.

The operations of the device shown in Figs. 5 to 7 is substantially as follows:

Depression of the actuating lever 119 first causes the admission valve 114 to close, thereby shutting off the beverage chamber 109 from further supply of beverage and carbon dioxide pressure. After closing of the admission valve 114 the discharge valve 111 opens, relieving the carbon dioxide pressure in the beverage chamber 109. The piston 108 now rises under the action of the spring 142 causing the beverage to flow out through the dispensing spout 113. The rate of discharge of the beverage is slow and is determined by the flow resistance of the constricted passage 139 which admits fluid from the central chamber 138 into the dash-pot chamber 110 at a low controlled rate of flow. The speed of the piston 108 is adjusted to a rate sufficiently

low to cause minimum disturbance of the beverage flowing through the spout 113. Since the beverage is not under pressure when it flows through the discharge passage its turbulence is very low and practically all of its carbon dioxide charge is retained in it.

When the actuating lever 119 is released the discharge valve 111 closes and the admission valve 114 opens. Carbonated beverage under pressure now flows from the carbonating chamber 132 through the duct 115 into the beverage chamber 109 depressing the piston 108 until the beverage chamber is filled. As the liquid level in the carbonating chamber 132 drops the float valve 129 opens admitting further beverage under pressure through passage 133 and the spray nozzle 134. The dispersed beverage issuing from the nozzle 134 hits the baffles 135 and moves intimately with the carbon dioxide in the carbonating chamber 132 absorbing a full charge of carbon dioxide. After the normal liquid level is re-established in the carbonating chamber 132 further flow of beverage is interrupted by the closing float valve 129. The carbonated beverage in the carbonating chamber now remains under the pressure of the carbon dioxide admitted into the chamber by the duct 136.

The transfer of beverage from the carbonating chamber 132 into the beverage chamber 109 takes place under carbon dioxide pressure whereby loss of the carbon dioxide charge of the beverage is prevented.

The device shown in Figs. 5 to 7 dispenses volumes up to the full volume of the beverage chamber. Partial volumes may be dispensed by releasing the lever 119 before the total volume is discharged from the beverage chamber, whereupon the beverage chamber is automatically re-filled.

The invention thus provides a method and various forms of apparatus for dispensing carbonated beverages with a particularly high charge of carbon dioxide. The beverage is maintained under carbon dioxide pressure whenever a transfer of the beverage is fed into the beverage chamber under pressure and pressure is maintained in the chamber throughout the period of filling, in distinction from the conventional practice of filling such chambers under gradually rising pressure, the pressure being atmospheric at the start of the filling period whereby a substantial portion of the carbon dioxide charge is lost.

In the machines hereinbefore described, the beverage is carbonated, or the carbon dioxide charge replenished at a relatively late stage of handling of the beverage, immediately prior to the feeding of the beverage into the beverage chamber. This is a further feature insuring full carbonation.

It is, of course, not necessary that the entire carbon dioxide charge be supplied to the beverage in the dispensing apparatus proper. For example, pre-carbonated beverage may be fed into the machine shown in Figs. 5 to 7. Any previous loss of carbon dioxide which may have occurred is then replenished in the carbonating chamber 132 prior to dispensing.

The entire motive power for the apparatus shown in Fig. 1 is supplied by the carbon dioxide under pressure. The movable piston 14 which separates the beverage chamber 15 from the pumping chamber 16 is acted upon by carbon dioxide under pressure during the pumping stroke during which beverage is drawn into the

pumping chamber. The piston is moved in the opposite direction to displace beverage from the pumping chamber into the beverage chamber by the pressure of the beverage flowing into the beverage chamber. The beverage exerts a greater force on the piston than the beverage in the pumping chamber to which a reduced area of the piston is exposed.

A further feature of the invention resides in the injection of flavoring liquid into the beverage while the beverage is under pressure. The beverage flowing into the beverage chamber 15 is naturally in a state of turbulence and mixes well with the flavoring liquid injected into the beverage chamber. Mixing of the carbonated beverage with a flavoring liquid therefore does not entail loss of a portion of a carbon dioxide charge since the beverage is maintained under pressure until it has assumed a quiescent state.

In this connection it is of course not necessary to make the means for injecting flavoring liquid an integral part of the apparatus. A manually operated pump leading to the beverage chamber will serve the same purpose. It is obviously possible to provide several ducts for injecting different flavoring liquids into the beverage chamber or into the path of the beverage flowing into the beverage chamber, whereby carbonated beverage of any of a plurality of flavors may be produced. The invention thus makes it unnecessary to store large individual supply tanks of flavored beverage since only one tank of a basic beverage or water is required.

Thus various changes and modifications of the method and the specific illustrated forms of apparatus may be made to meet specific requirements. Cooling means may be added to chill the beverage prior to dispensing. The assembly feeding flavoring syrup into the apparatus may be omitted, when fully flavored beverage is fed into the dispensing apparatus. The variable volume chamber may assume different forms, for example may be constructed as a bellows or syphon. These and various other changes, additions, omissions, modifications and substitutions may be made within the scope of the invention without departure from its spirit and general teaching.

What is claimed is:

1. A beverage dispenser comprising, in combination, a variable volume chamber; a source of supply of beverage under CO₂ pressure; an admission valve between said chamber and said source; a discharge spout; a discharge valve between said chamber and said spout; a servomotor operable by CO₂ under pressure for actuating each of said valves; a control valve for operating both of said servo-motors; and means for urging said chamber towards the adjustment of minimum volume.

2. A beverage dispenser comprising, in combination, a variable volume chamber; a source of supply of beverage under pressure, a source of carbon dioxide under pressure; an admission valve between said chamber and said sources; a discharge spout; a discharge valve near the highest point of said chamber for relieving pressure therefrom and admitting beverage from said chamber to said spout; means for urging said chamber towards the adjustment of minimum volume against the action of pressure inside the chamber means for retarding adjustment of the chamber towards its maximum volume condition; and means for actuating said valves in predetermined sequence.

3. A beverage dispenser comprising, in combination, a cylinder; a piston movable therein dividing said cylinder into a beverage and a pumping chamber; a discharge spout; a discharge valve between said beverage chamber and said spout; operating means for said discharge valve; a passage leading from said pumping chamber to said beverage chamber; an admission valve in said passage for controlling admission of fluid into said beverage chamber; operating means for said admission valve; inlet and outlet check valves associated with said pumping chamber, said outlet valve controlling flow of fluid from said pumping chamber into said passage; a supply duct for feeding CO₂ under pressure into said passage; a pressure fluid operable servo-motor for moving said piston in said cylinder; and control means for controlling flow of CO₂ under pressure to said servo-motor and controlling said valve operating means.

4. A beverage dispenser comprising, in combination, a cylinder; a piston movable therein dividing said cylinder into a beverage and a pumping chamber; a discharge spout; a pressure fluid operable valve for controlling flow of fluid from said chamber to said spout; a passage leading from said pumping to said beverage chamber; a pressure fluid operable admission valve in said passage; a pressure fluid operable servo-motor for moving said piston in said cylinder; inlet and outlet check valves associated with said pumping chamber; a supply duct for feeding CO₂ under pressure into said passage; and control means for controlling flow of CO₂ under pressure to said pressure fluid operable valves and said servo-motor.

5. A beverage dispenser comprising, in combination, a cylinder; a piston movable therein dividing said cylinder into a beverage and a pumping chamber; a discharge spout; a discharge valve near the highest point of said beverage chamber controlling a duct to said spout; an admission valve controlling admission of liquid into said beverage chamber; an inlet valve controlling admission of liquid into said pumping chamber; a passage leading from said pumping chamber to said admission valve; a duct for feeding CO₂ under pressure into said passage; a servo-cylinder; a servo-piston in said servo-cylinder for moving said first named piston; servo-motors for said discharge and admission valves, said servo-motors being operable by CO₂ under pressure; and joint control means for controlling flow of CO₂ to said servo-motors and said servo-cylinder.

6. A beverage dispenser comprising, in combination, a cylinder; a stationary central post extending into said cylinder; a stationary annular member surrounding said central post leaving a tubular space between said post and member; a piston movable in said cylinder the piston having a tubular extension slidably fitting between said central post and annular member for movement in said tubular space, the piston subdividing the cylinder space into a beverage chamber to one side of the piston, and to the other side an annular main pumping chamber, a central secondary pumping chamber, and a tubular servo-motor chamber; a discharge spout; a discharge valve between said beverage chamber and said spout; operating means for said discharge valve; a passage leading from said main pumping chamber to said beverage chamber; an admission valve in said passage for controlling admission of fluid into said

beverage chamber; operating means for said admission valve; inlet and outlet check valves associated with said main pumping chamber, said outlet valve controlling flow of fluid from said main pumping chamber into said passage; a supply duct for feeding CO₂ under pressure into said passage; a beverage supply duct leading to said inlet valve; an intake and an outlet check valve associated with said secondary pumping chamber, said last named outlet valve controlling flow from said secondary pumping chamber into said beverage chamber; a flavoring fluid supply duct leading to said intake valve; and control means for controlling flow of CO₂ under pressure into said servo-motor chamber and controlling said valve operating means.

7. A beverage dispenser comprising, in combination, a cylinder; a stationary central post extending into said cylinder; a stationary annular member surrounding said central post leaving a tubular space between said post and member; a piston movable in said cylinder the piston having a tubular extension slidably fitting between said central post and annular member for movement in said tubular space, the piston subdividing the cylinder space into a beverage chamber to one side of the piston, and to the other side an annular main pumping chamber, a central secondary pumping chamber, and a tubular servo-motor chamber; a discharge spout; a discharge valve near the highest point of said beverage chamber controlling flow of fluid to said spout; a passage leading from said pumping to said beverage chamber; an admission valve in said passage; pressure fluid operable actuating means for said discharge and admission valve inlet and outlet check valves associated with said main pumping chamber, said outlet valve controlling flow of fluid from said main pumping chamber into said passage; a beverage supply duct leading to said inlet valve; an intake and an outlet check valve associated with said secondary pumping chamber, said last named outlet valve controlling flow from said secondary pumping chamber into said beverage chamber; a conduit for feeding CO₂ under pressure into said passage; a flavoring fluid supply duct leading to said intake valve; and control means for controlling flow of CO₂ under pressure into said servo-motor chamber and to said valve actuating means.

8. A device for carbonating and dispensing beverages comprising, a source of beverage; a source of carbon dioxide under pressure; suction means

for drawing beverage into said device; means forming a passage for said beverage through said device including a plurality of chambers and means for carbonating said beverage; valves in said passage; carbon dioxide pressure operated means for feeding the beverage through said passage; and carbon dioxide pressure operated means for operating certain of said valves.

9. A beverage dispenser comprising, in combination, a pumping chamber; a beverage chamber; a passage between said pumping and said beverage chamber; a beverage supply duct leading from a source of beverage to said pumping chamber; pumping means for feeding beverage from said source through said supply duct into said pumping chamber; a gas pressure operated servo-motor for actuating said pumping means; means for supplying CO₂ under pressure to said beverage chamber; and means operated by the beverage pressure for moving beverage from said pumping chamber into said beverage chamber.

10. A beverage dispenser comprising, in combination, a pumping chamber; a beverage chamber; a movable piston, one face of the piston being acted upon by fluid in said pumping chamber, another face of the piston of larger area than said one face being acted upon by fluid in said beverage chamber; a passage between said pumping and said beverage chamber; a check valve in said passage barring flow of fluid from said beverage chamber into said pumping chamber; a beverage supply duct leading from a source of beverage supply to said pumping chamber; gas pressure operated means for moving said piston in one direction to reduce the volume of the beverage chamber; means for supplying CO₂ under pressure to said beverage chamber, the CO₂ pressure moving said piston in the opposite direction.

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