June 30, 1953 P. KOLLSMAN 2,643,791

APPARATUS FOR DISPENSING CARBONATED BEVERAGES

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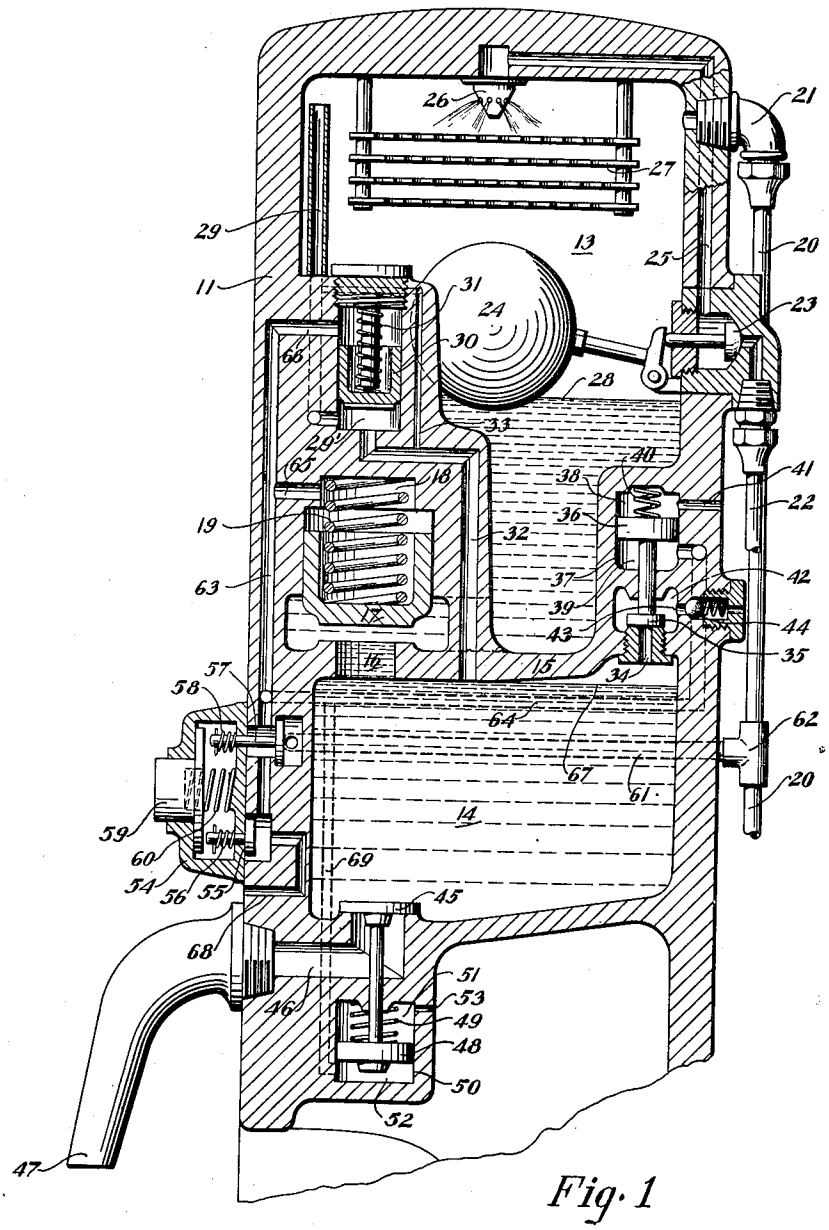


Fig. 1

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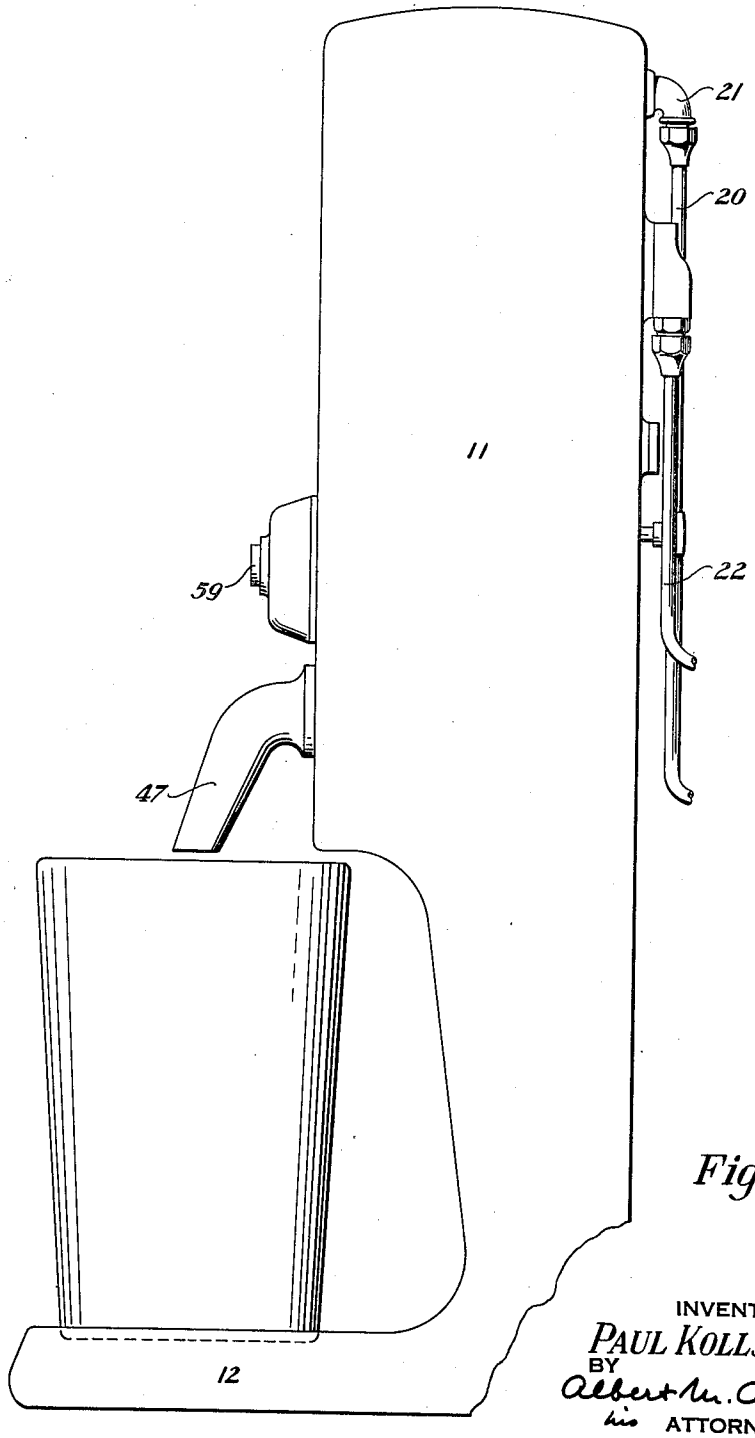


Fig. 2

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APPARATUS FOR DISPENSING CARBONATED BEVERAGES

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5 Claims. (Cl. 222—1)

1

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

Conventional handling and dispensing of carbonated beverages usually involves storage of the carbonated beverage under carbon dioxide pressure and the dispensing or feeding of the beverage into a measuring chamber or a dispensing cup under pressure, whereby the beverage is subjected to a sudden substantial drop of pressure accompanied by turbulence causing a considerable portion of a charge of carbon dioxide to be 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 not relieved until immediately prior to dispensing. Quantities of beverage to be dispensed are measured by the filling and subsequent emptying of a measuring chamber of predetermined volume into which the carbonated beverage is fed. In order to prevent loss of a portion of the charge of carbon dioxide, the measuring chamber is filled with carbon dioxide under pressure before it is filled with the beverage so that the beverage flowing into the chamber under turbulence will not lose part of its charge.

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 an apparatus for practicing the invention.

The invention also consists in certain new and original features of construction and combination of parts, as well as certain combinations of steps, as 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, and taken in connection with the accompanying drawings forming a part thereof, in which:

Fig. 1 is an elevational view, partly in section of a machine for carbonating and dispensing measured quantities of beverage; and

Fig. 2 is an elevational side view of the machine shown in Fig. 1.

In the following description and in the claims, various details will be identified by specific names

2

for convenience. These names, however, are intended to be as generic in their application as the art will permit.

Like reference characters refer to like parts in drawings. In the drawings accompanying, and forming part of, the 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 one shown.

The carbonating and dispensing apparatus shown in the drawings comprises a housing 11 resting on a base 12. In the interior of the housing 11, a carbonating chamber 13 and a beverage chamber 14 are separated by a wall 15 having a valve passage 16 therethrough controlled by a valve member 17 movable in a valve chamber 18 and acted upon by a spring 19.

The carbonating chamber 13 receives carbon dioxide under pressure from a suitable source (not shown) through a carbon dioxide duct 20 leading to a pipe connection 21.

Beverage under pressure is supplied from a suitable source (not shown) through a beverage supply duct 22 leading to a valve 23 controlled by a float 24. A further duct 25 extends from the float valve 23 and leads to a nozzle 26 discharging the beverage in the form of a spray against a series of baffles 27 to insure intimate contact of the liquid particles of the beverage with a carbon dioxide in the carbonating chamber 13. The carbonated beverage collects at the bottom of the carbonating chamber 13 and rises to a normal liquid level indicated at 28 maintained by the float valve 23 which controls the supply of beverage from the supply duct 22.

A duct 29 extends from the upper portion of the carbonating chamber 13 from a point outside the reach of the spray of beverage issued by the nozzle 26 to a valve chamber 29' in which the valve member 30 of a pressure supply valve is movable. The valve member 30 is acted upon by a spring 31 and controls a further duct 32 leading to the beverage chamber 14.

The pressure supply valve 30 is bypassed by relatively narrow duct 33 permitting restricted flow of carbon dioxide into the beverage chamber 14 while the valve 30 is closed.

The beverage chamber 14 has a vent port 34 controlled by a valve 35. The vent valve 35 is operable by a servo-piston 36 movable in a servo-cylinder 37 and subdivides the space of the servo-

cylinder into two chambers 38 and 39. The upper chamber 38 contains a spring 40 and is vented to the atmosphere through a passage 41. The vent valve 35 is movable in a valve chamber 42 whence a vent passage 43 controlled by a check valve 44 leads to the atmosphere.

Beverage is dispensed from the beverage chamber by a discharge valve 45 controlling a discharge duct 46 leading to a dispensing spout 47. The discharge valve is operable by a servo-piston 48 acted upon by a spring 49 and movable in a servo-cylinder 50. The servo-cylinder is subdivided by the piston 48 into chambers 51 and 52, the upper chamber 51 being vented by a passage 53.

The several valves are operable by a control valve assembly 54 comprising a vent valve 55 normally held open by a spring 56 and a pressure control valve 57 normally held closed by spring 58. Both valves are operable from the outside by a push button 59 against which a spring 60 bears.

A pressure duct 61 branching off from the carbon dioxide duct 20 at a T-connection 62 leads to the pressure control valve 57. Opening of the pressure control valve 57 causes carbon dioxide under pressure to flow into a control duct 63 having branches 64, 65 and 66 leading to the servo-motor of the vent valve 35 and to the valve chambers of the admission valve 17 and the pressure supply valve 30, respectively.

For an explanation of the operation of the carbonating and dispensing apparatus, it may be assumed that the apparatus is connected to suitable sources of supply, the carbon dioxide duct 20 being connected to a source of carbon dioxide supply under pressure and the beverage supply duct 22 being connected to a source of beverage, likewise under pressure. It may further be assumed that the carbonating chamber 13 be filled with carbonated beverage under pressure up to a level 28 and that the beverage chamber 14 be filled with carbonated beverage up to a level 67. The apparatus is now ready for dispensing beverage, the valves being in the position shown. More particularly, the pressure supply valve 30 is open admitting carbon dioxide under full pressure to the beverage chamber 14. The admission valve 17 is likewise open thereby establishing communication between the beverage filled carbonating chamber and the beverage chamber 14. The vent valve 35 is closed, maintaining the beverage in the beverage chamber 14 under pressure, and the discharge valve 45 is closed shutting off the beverage from the dispensing spout. In the control valve assembly 54, the vent valve is open, establishing communication between the atmosphere and the control duct 63 and its branches through a vent duct 68. The pressure control valve 57 is closed thereby shutting off carbon dioxide under pressure from the control duct 63.

Beverage is dispensed from the apparatus by pressing the push button 59. This causes the vent 55 to close and the pressure valve 57 to open. Carbon dioxide under pressure is now admitted from the pressure duct 61 to the control duct 63 and its branches.

The pressure above the pressure supply valve member 30 rises and becomes equal to the pressure below the valve member. Both pressures cancel out and the spring 31 closes the pressure supply valve 30, thus shutting off further supply of carbon dioxide to the beverage chamber 14 except for a limited flow which passes through the by-pass duct 33.

The pressure above the admission valve member 17 likewise rises and becomes equal to the pressure acting on the other side of the valve member 17 with the result that the admission valve closes shutting off further supply of beverage from the carbonating chamber 13.

Further, carbon dioxide under pressure is admitted to the other side of the servo-piston 36 causing the piston to rise and open the vent valve 35, relieving the carbon dioxide pressure in the beverage chamber 14.

Lastly, carbon dioxide under pressure flows into the servo-motor chamber 52 of the discharge valve through a branch duct 69 and acts on the underside of the servo-piston 48 causing the piston to rise and the discharge valve 45 to open.

Carbonated beverage now flows slowly through the discharge spout 47, the rate of discharge being controlled by admission of additional carbon dioxide flowing through the by-pass duct 33, past the pressure supply valve 30. No air is admitted into the beverage chamber 14 since the check valve 44 prevents entry of air into the vent valve chamber 42.

After the flow of beverage has ceased, the push button 59 is released. At this time, the beverage chamber 14 is completely filled with carbon dioxide gas. Release of the push button 59 causes the vent valve 55 of the control valve assembly 54 to open and the pressure control valve 57 to close. Further supply of carbon dioxide is now shut off and the control duct 63 is vented to the atmosphere through the vent duct 68. The discharge valve 45 closes and the vent valve 35 closes likewise under the action of their respective springs 49 and 40. The pressure now begins to rise in the beverage chamber 14 due to the continued flow of carbon dioxide throgh the by-pass duct 33. After a certain rise in pressure, the pressure supply valve 30 opens admitting full pressure to the beverage chamber 14. This pressure now acts on the underside of the valve 17 of the admission valve and causes the admission valve to open. Carbonated beverage now flows into the beverage chamber 14 by gravity, the carbon dioxide gas in the chamber being displaced into the carbonating chamber both through ducts 32, 39 and through the open valve passage 16. Since the beverage flowing into the beverage chamber 14 is not subjected to any drop in pressure, it loses none of its carbon dioxide charge in spite of the turbulence caused by the flow through the passage 16.

The drop of the liquid level 28 in the carbonating chamber 13 causes the float 24 to drop and the float valve 23 to open. Beverage under pressure is now admitted from the beverage supply duct 22 through the duct 25 to the nozzle 26 where it issues in the form of a spray and becomes carbonated. After the normal liquid level 28 is reestablished, the float valve 23 closes and interrupts the flow of beverage into the carbonating chamber 13. The apparatus is now ready for the next discharge of carbonated beverage.

It is, of course, not necessary that the entire carbonation process take place in the carbonating chamber 13. Pre-carbonated beverage may be fed into the apparatus which will then automatically replace any loss of carbon dioxide which may have occurred previously, thus insuring that only fully carbonated beverage is dispensed from the apparatus.

The invention thus provides the method of and apparatus for carbonating, handling and dispensing carbonated beverages in such manner

that the carbon dioxide charge of the beverage is fully retained. The carbonating of the beverage and the filling of the beverage chamber 14 takes place under pressure, whereby loss of a portion of the carbon dioxide charge is prevented. The beverage is dispensed from the apparatus only after it has assumed a quiescent state and is discharged at a controlled low rate of flow to maintain turbulence of the beverage at a minimum. Entry of air into the emptying beverage chamber is prevented by a continued supply of carbon dioxide into it.

The invention is not restricted to the particular form of apparatus illustrated in the drawings, but may be embodied in various other forms. For example, the carbonating and the beverage chamber may be differently arranged with respect to each other, may be located side by side, or the beverage chamber above the carbonating chamber. Also, it is not indispensable that the beverage be discharged from the beverage chamber by gravity. It may be discharged by reduction of the volume of the beverage chamber in which event the beverage chamber would be constructed as a chamber of variable volume.

While in the illustrated embodiment of the apparatus, carbonated beverage is fed into the beverage chamber by gravity under the pressure which is equal to the liquid column from the discharge passage 16 to the normal liquid level 28, filling of the beverage chamber 14 can be accelerated by gas pressure on the liquid in the carbonating chamber 13 in which event a gas pressure differential would be maintained between the chambers 13 and 14. This pressure need not be great in order to shorten the filling time of the beverage chamber 14 appreciably. Since even under such pressure filling the beverage chamber 14 is under substantial pressure with respect to the atmosphere, turbulence of the carbonated liquid rushing into the beverage chamber 14 does not lead to loss of the carbon dioxide charge.

It is of course not necessary to maintain the beverage chamber 14 under pressure of carbon dioxide although this is a very convenient way of doing it. The pressure can likewise be exerted by any other gas, for example, by air. It is also evident that the gas which fills the beverage chamber immediately before filling of the chamber with carbonated beverage, be it carbon dioxide, air, or any other gas, need not be displaced into the carbonating chamber 13 through the passage 16 at the top of the beverage chamber 14. The passage 16 could manifestly be in any other wall of the beverage chamber 14 and the gas therein be displaced into some other space or chamber whence it is returned upon emptying of the beverage chamber.

The apparatus can, of course, be combined or equipped with means for chilling the beverage or with insulating means for preventing transfer of heat to the various chambers of the apparatus supplied with chilled beverage.

These and various other additions and modifications, as well as numerous other changes, omissions and substitutions will readily occur to persons skilled in the art and do not involve a departure from the teaching or the scope of this invention.

What is claimed is:

1. A beverage dispenser comprising, in combination, a supply chamber for beverage under CO_2 pressure; a beverage chamber below said supply chamber; an admission valve between said chambers for admitting beverage from said supply chamber into said beverage chamber by gravity; a dispensing spout; a discharge valve between said beverage chamber and said spout; a vent valve for relieving pressure from said beverage chamber to the atmosphere, a supply duct for CO_2 under pressure; a pressure supply valve between said duct and said beverage chamber; a restricted passage bypassing said supply valve to admit a restricted flow of CO_2 into said chamber while said pressure supply valve is closed; and means for operating said admission, discharge, vent and supply valves in timed relationship.

2. A beverage dispenser comprising in combination, a beverage chamber; a supply passage leading to said chamber from a source of beverage supply; an admission valve in said supply passage; an outlet passage leading from said chamber to the atmosphere; an outlet valve in said outlet passage; a gas supply passage leading to said chamber from a source of gas under pressure; a pressure supply valve in said pressure supply passage; means for admitting gas into said chamber at a controlled rate, while said pressure supply valve is closed; and means for operating said admission, outlet and pressure supply valves in timed relationship.

3. The method of dispensing a measured volume of carbonated beverage from a source containing carbonated beverage under CO_2 pressure, the method comprising, charging a beverage chamber with CO_2 to a pressure not less than the beverage pressure; then establishing communication between said chamber and said source and draining beverage into said chamber from said source by gravity, while simultaneously displacing CO_2 from said chamber to said source while maintaining the pressure in said chamber substantially constant; sealing said chamber with respect to said source; relieving pressure from said chamber to the atmosphere after the beverage has assumed a quiescent state; then draining said beverage from said chamber by gravity, and simultaneously admitting gas into said chamber at a controlled rate to a point above the fluid level in said chamber, thereby controlling the rate of beverage discharge from said chamber.

4. A beverage dispenser comprising, in combination, a supply chamber for beverage under CO_2 pressure; a beverage chamber below said supply chamber; an admission valve between said chambers for admitting beverage from said supply chamber into said beverage chamber by gravity; a dispensing spout; a discharge valve between said beverage chamber and said spout; a vent valve for relieving pressure from said beverage chamber to the atmosphere; a supply duct for CO_2 under pressure, said supply duct leading into said supply chamber; a pressure supply valve between the upper CO_2 filled portion of the supply chamber and said beverage chamber; a restricted passage bypassing said supply valve to admit a restricted flow of CO_2 into said beverage chamber while said pressure supply valve is closed; and means for operating said admission, discharge, vent and supply valves in timed relationship.

5. A beverage dispenser comprising, in combination, a supply chamber for beverage under CO_2 pressure; a beverage chamber below said supply chamber; a pressure actuable, normally open, admission valve between said chambers for admitting beverage from said supply chamber

into said beverage chamber by gravity; a dispensing spout; a pressure actuable, normally closed, discharge valve between said beverage chamber and said spout; a pressure actuable, normally closed, vent valve for relieving pressure from said beverage chambers to the atmosphere; a supply duct for CO_2 under pressure, said supply duct leading into said supply chamber; a pressure actuable, normally open, pressure supply valve between said supply chamber and said beverage chamber; a restricted passage bypassing said supply valve to admit a restricted flow of CO_2 into said beverage chamber while said pressure supply valve is closed; a normally closed manually actuable control valve for controlling flow of CO_2 under pressure from said supply duct; an operating passage leading from said control valve to said pressure actuable valves for moving said valves into their respective opposite positions

with regard to their normal positions; a normally open manually actuable vent valve for venting said operating passage; and a joint manually operable element for moving said control valve and said last named vent valve into their respective opposite positions in consecutive order, first said vent valve and then said control valve.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
260,766	Matthews	July 11, 1882
976,688	Pindstofte	Nov. 22, 1910
2,039,564	Smith	May 15, 1936
2,167,123	Meyer	July 25, 1939
2,380,884	Von Stoeser et al.	July 31, 1945