

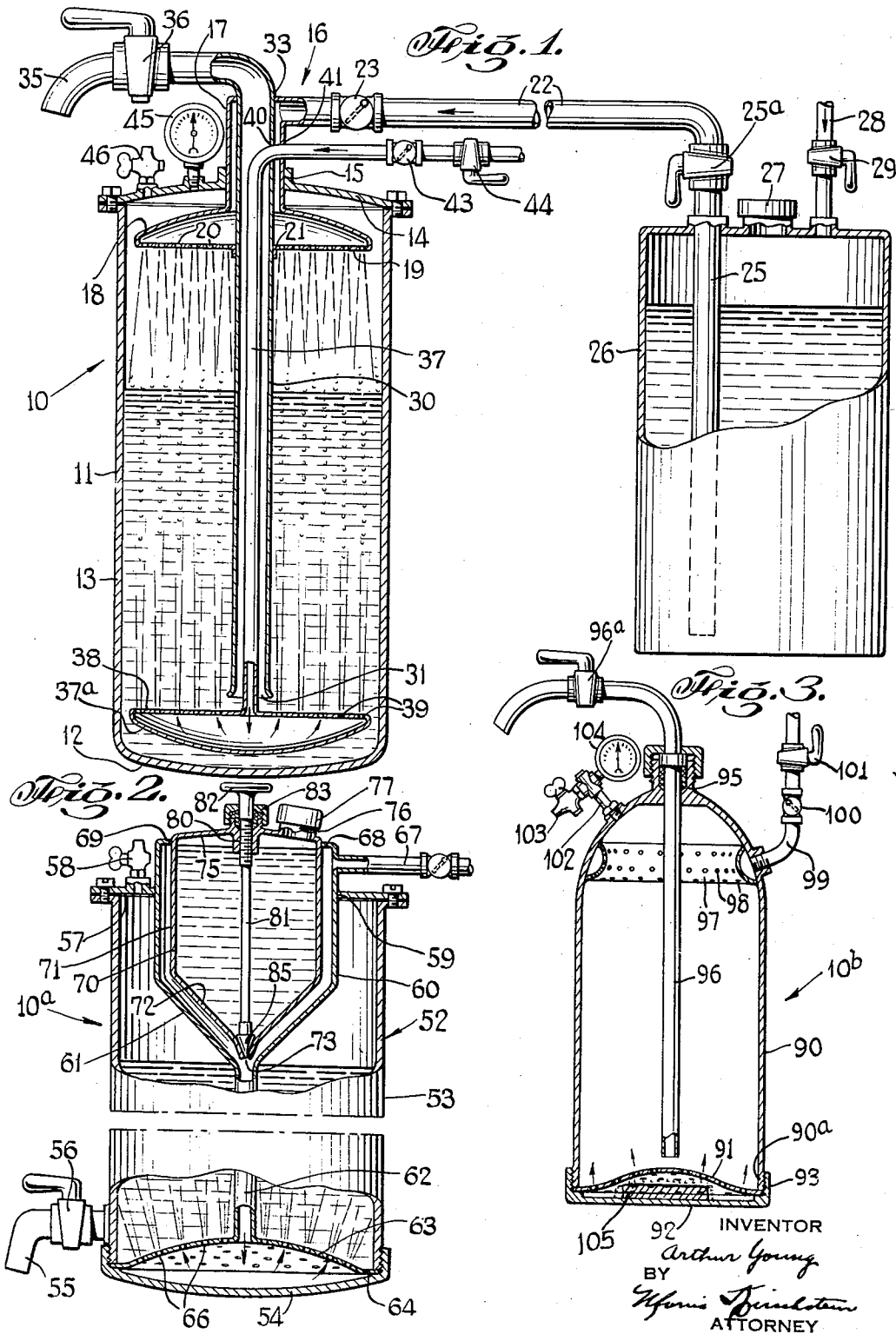
May 18, 1937.

A. YOUNG

2,081,029

LIQUID CARBONATOR AND DISPENSER

Filed Dec. 13, 1933



UNITED STATES PATENT OFFICE

2,081,029

LIQUID CARBONATOR AND DISPENSER

Arthur Young, Brooklyn, N. Y.

Application December 13, 1933, Serial No. 702,102

6 Claims. (Cl. 225—21)

This invention relates to beverage machines, and is particularly directed to a device for, and process of carbonating liquids and dispensing the same.

5 An object of this invention is to provide a device of the character described for carbonating liquid and dispensing the same and including means for spraying the liquid during the carbonating process.

10 Another object of this invention is to provide a device of the character described having atomizing means for injecting carbon dioxide into the liquid to be carbonated.

15 Another object of this invention is to provide a highly improved process of carbonating liquid which shall be simple to carry out and produce a highly palatable, thoroughly saturated liquid.

20 A still further object of this invention is to provide a compact and rugged apparatus of the character described, which shall be comparatively inexpensive to manufacture, economical to use, easy to manipulate, smooth and positive in operation, and withal practical and efficient to a high degree.

25 Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

30 In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention,

35 Fig. 1 is a side elevational view of apparatus embodying the invention in cross-section;

Fig. 2 is a partial elevational view of a modified construction with parts in cross-section; and

40 Fig. 3 is a side elevational view, partly cross-sectioned, of an apparatus illustrating another modified construction.

Referring now in detail to the drawing, 10 designates an apparatus embodying the invention for carbonating liquid and dispensing the same. Said apparatus comprises a tank 11, having a bottom wall 12, a cylindrical wall 13 and being closed by a cover 14 at the top, bolted or screwed thereto. The cover 14 is formed with a central opening 15. Supported by said cover 14 is a member 16 having a tubular portion 17 extending through the opening 15 and forming a tight joint therewith. At the bottom end of the tubular portion 17 is a shower or spray head 18 located adjacent the top of the tank 11 and having a bot-

tom wall 19 formed with a plurality of small perforations 20.

For the purpose hereinafter appearing, the bottom wall 19 of the spray head is formed with a central opening 21. Extending from the tubular portion 17 is a horizontal pipe 22 provided with a one way check valve 23; and extending from the pipe portion 22 is a vertical downwardly extending pipe 25 open at the bottom end thereof and projecting into a supply tank 26. The pipe portion 25 is provided with a hand valve 25a exteriorly of tank 26. The tank or vessel 26 may have a tube closed by a cap 27 in the top wall thereof and is provided with an inlet pipe 28 controlled by a hand valve 29. The pipe 28 may be connected to any suitable supply of gas or air pressure.

Extending through the opening 21 in the bottom wall 19 of the spray head 18, is a pipe 30 open at the bottom end 31 thereof somewhat above the bottom wall 12 of the tank 11. The pipe 30 extends axially through the pipe 17 and projects through an opening 33 formed at the top of said pipe 17. Extending from the pipe 30 is a faucet or nozzle 35 provided with a hand valve 36. Extending within the pipe 30 axially thereof, is a smaller pipe 37 at the lower end of which there is provided an inverted spray head 37a located adjacent to said bottom wall 12. Said spray head is formed with a top wall 38 provided with a plurality of perforations 39. The top wall 38 may be located just below the bottom open end 31 of the pipe 30. The pipe 37 extends through suitable openings 40 and 41 in the tubes or pipes 30 and 17, respectively, and is connected to any suitable supply of carbon dioxide gas. A one way check valve 43 and a hand valve 44 may be interposed in the pipe 37 exteriorly of the tank 11.

The top cover 14 of the tank 11 may be provided with a gauge 45 for measuring pressure within said tank and with a pet cock 46.

The operation of the apparatus shown in Fig. 1 will now be described. A supply of liquid, such as milk, is poured into the tank 26 by removing the cap 27. The cap 27 is then closed, as is also the valve 25a, and gas admitted through the pipe 28 by opening the valve 29 until a sufficient pressure head is obtained at the top of the tank 26 above the liquid. The valve 29 is then closed. Carbon dioxide gas is then admitted to the pipe 37 by opening the valve 44, the gas passing to the spray head 37a being sprayed through the apertures 39 and passing through the tank 11 and escaping through the pet cock 46 which is opened, thus creating a current of carbon dioxide

gas within the tank 11 and at the same time expelling the air that may be contained therein. The valve 25a may then be opened to permit the liquid within the tank 26 to be siphoned to the spray head 18. The liquid is then sprayed through the apertures 20 into the tank 11. The liquid being sprayed into the tank is very effectively and efficiently deaerated and carbonated as it comes into contact with the medium of carbon dioxide.

During the above operation the valve 36 is closed. This operation may be continued for some period until the tank 11 has a desired quantity of liquid therein. When sufficient liquid has been fed to the tank, the valve 25a may be closed. If desired, carbon dioxide may still be fed for any suitable period. Thereafter, the pet cock 46 is closed and carbon dioxide fed to the tank under any predetermined pressure that may be desired to carbonate the liquid. Any surplus gas will collect above the surface of the liquid and at the top of the tank 11 and will act as a pressure head for dispensing the carbonated liquid upon opening of the valve 36. The carbonated liquid will then pass upwardly between the tubes 30 and 37, through the nozzle or faucet 35.

It will be noted that the liquid is not agitated with my improved process, which is therefore particularly suitable for carbonating milk, coagulation or formation of cream or butter being effectively prevented. It will be understood, however, that other liquids besides milk may be carbonated and dispensed with my improved method and apparatus.

In Fig. 2 there is shown a modified form of apparatus 10a. The apparatus 10a comprises a tank 52 having a cylindrical wall 53 to the bottom end of which there is screwed a bottom wall 54. Adjacent the bottom of the cylindrical wall 53 may be located an outlet faucet 55 provided with a valve 56. The top of the cylindrical wall 53 may be closed by a cover 57, screwed or bolted thereto. The cover 57 may be provided with a pet cock 58 and is formed with a central opening 59. Extending through said opening 59 is a chamber 60 having a cylindrical portion and a conical wall 61 at the bottom end thereof communicating with an axial pipe 62, at the bottom end of which there is provided a plate 63. The peripheral portion 64 of said plate may be attached to the bottom edge of the cylindrical wall 53 by the bottom wall 54. Said plate 63 may be formed with a plurality of perforations or small openings 66 for the purpose hereinafter set forth. Extending from the member 60 exteriorly of the tank 52 is a pipe 67 connected to any suitable supply of carbon dioxide gas. The vessel 60 may furthermore be formed with a top wall 68 having a central opening 69. Extending through said opening 69 and fixed to said top wall 68 is a vessel 70 having a cylindrical wall 71 and a conical wall 72 concentric with the member 60. The conical wall 72 is formed with an opening 73 at the bottom end thereof located adjacent the top end of the pipe 62. The vessel 70 is furthermore provided with a top wall 75 having a tubular screw threaded inlet opening 76 to which there may be screwed a cap 77.

Said top wall 75 is furthermore formed with an axial or central tubular internally screw threaded portion 80 and screwed within said opening is a stem 81 having a handle 82 at the top end thereof. A packing joint 83 serves to prevent leakage between the stem 81 and the tubular member 80. At the bottom end thereof,

said stem 81 is provided with a conical valve head 85 adapted to close the opening 73 at the bottom end of the conical wall 72. The operation of the device shown in Fig. 3 will now be described.

Liquid such as milk is inserted in the chamber 70 through the tubular opening 76. During this time, the valve stem 81 has been screwed in such position that the valve head 85 closes the opening 73. The valve 56 is also closed during this operation. The valve controlling the pipe 67 may then be opened to feed carbon dioxide gas through said pipe and between the members 70 and 60, the carbon dioxide gas passing to the pipe 62 and into the chamber formed between the plate 63 and the bottom wall. The gas passes upwardly through the apertures 54 and into the tank. The valve stem 81 may then be turned to unseat the valve head 85 and permit liquid to pass downwardly through the opening 73. The carbon dioxide gas flowing past the opening 73, mixes with the liquid, producing an atomizing effect and thoroughly carbonating the liquid. The liquid and gas then pass through the pipe 62 into the chamber below the plate 63 and through the apertures 66 into the tank.

After a suitable quantity of liquid has been exhausted from the tank 70, the valve 81 may be turned to closing position. The carbon dioxide gas may, however, be continued to be fed for any suitable length of time. The pet cock 58 should be open during the above operation to permit a free circulation of the gas and expel all the air in the tank.

The pet cock may then be closed and the carbon dioxide gas fed for a further period under any predetermined increased pressure. Surplus pressure will produce a pressure head at the top of the tank. Thereafter, the supply of carbon dioxide gas may be shut and the carbonated liquid dispensed by opening the valve 56. Liquid may be fed under pressure to vessel 70 in same manner as the liquid is fed as shown in Fig. 1.

In Fig. 3 there is shown a modified form of carbonating device 10b. The device 10b comprises a tank 90 having an externally screw threaded lower edge portion 90a. Screwed to said screw threaded portion 90a is a bottom cover 92 having an internally screw threaded flange 93 screwed to said screw threaded edge 90a. There is also clamped to the lower edge of the tank 90 by said cover 92, a dome-shaped plate 91 disposed within said tank and having the edges thereof clamped to the lower edge 90a by said bottom cover 92. The top of the tank may be formed with a neck 95 having a central opening provided with a suitable packing joint. Extending through the opening in the neck 95 is a tubular member 96 extending out of the tank and having a nozzle or faucet portion provided with a faucet valve 96a.

Fixed within the tank 90 adjacent the top thereof is an annular member 97 of curved cross-section, having the edges thereof fixed to the inner surfaces of the tank and forming therewith an annular chamber. The member 97 may be formed with a plurality of small perforations 98. Extending from the tank 90 is a pipe 99 communicating with the chamber formed by the curved plate 97. The pipe 99 may be provided with a one way check valve 100 and a hand controlled valve 101 and may be connected to any suitable supply of liquid to be carbonated. There may also be attached to the upper end of the tank 90 a pipe 102 carrying a

pet cock 103 and a pressure gauge 104. There may be inserted within the chamber formed between the bottom cover 92 and the dome-shaped plate 91 a piece of frozen carbon dioxide 105.

5 The operation of the device will now be described. The liquid passes from the pipe 99 into the annular chamber formed by the plate 97. The liquid is then sprayed into the tank by passing through the apertures 98. The piece of frozen carbon dioxide or dry ice may be inserted within the tank by first removing the cover plate 92 and placing the block of dry ice on said cover and then screwing the cover to the bottom of the tank for clamping the plate 91 in position. As the dry ice evaporates or gasifies, the carbon dioxide gas will pass through the apertures in the plate 91 for carbonating the liquid sprayed into the tank through the apertures 98. During this operation, the pet cock 103 is preferably open to permit a free current of carbon dioxide gas to pass through the tank and to eliminate the air within the tank. When the desired amount of liquid has been sprayed into the tank, the supply of liquid may be closed by operating the valve 101. Thereafter the pet cock 103 may be closed to permit a pressure head to be built up at the top of the tank. The carbonated liquid may then be siphoned and dispensed from the tank by opening the valve 96a.

30 The term "liquid" used in this specification is intended to cover all liquid, semi-liquid, plastic and pasty materials, for example creams, such as ice-cream, custards, and the like substances.

It will thus be seen that there is provided a device and method in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In combination a tank, a spray head at the top of the tank having a bottom apertured wall, means for feeding liquid to said spray head comprising a tube partially in said tank communicating with said top spray head, a spray head at the bottom of the tank having a top apertured wall, means for feeding carbon dioxide gas to said second mentioned spray head comprising a second tube partially in said tank communicating with said bottom spray head, and a third tube extending into said tank and terminating in an open end adjacent the bottom of the tank, said second tube being disposed within said third tube, and a faucet connected to the upper end of said third member exteriorly of said tank.

2. In combination a tank, a spray head in the tank having an apertured wall, means for feeding liquid to said spray head comprising a tube partially in said tank communicating with said

spray head, another spray head in the tank having an apertured wall, means for feeding carbon dioxide gas to said second mentioned spray head comprising a second tube partially in said tank communicating with said second spray head, a third tube extending into said tank and terminating in an open end adjacent the bottom of the tank said second tank being disposed axially within said third tube, and said tank having a pet cock adjacent the top thereof.

3. In combination a tank, a tubular member extending into the tank through the top thereof and connected to a liquid supply, a spray head at the lower end of said tubular member, a second tubular member extending into said tank disposed within said first tubular member and terminating in an open end adjacent the bottom of the tank, a faucet connected to the upper end of said second tubular member, exteriorly of said tank, and means for feeding carbon dioxide gas to said tank, said last named means comprising a third tubular member axially disposed within said second tubular member.

4. A tank having a bottom wall and a cylindrical side wall, a cover adapted to serve as a top wall for said tank, a central opening in said cover, a member on said cover having a tubular portion extending through said opening and forming a tight joint therewith, a spray head in said tank disposed adjacent said cover and communicating with said tubular portion, means for supplying a liquid to said tubular portion, a second spray head, means for supplying a gas to said second spray head comprising a second tube, and a third tube having an open end thereof disposed adjacent said bottom wall and having adjacent the other end thereof a dispensing nozzle, said second tube being disposed axially within said third tube.

5. The method of deaerating and carbonating a liquid which consists of placing a chamber in communication with the atmosphere through an open vent, spraying said liquid into said chamber, so directing a current of carbon dioxide at a pressure slightly above atmospheric, into said chamber and through said spray as to remove the air from the liquid and sweep said air from the chamber through the open vent, then closing said vent, and continuing to pass carbon dioxide into said chamber through the liquid accumulated therein until a predetermined pressure is reached.

6. The method of preparing a beverage for dispensing, which consists of placing a vessel provided with a valved discharge tube in communication with the atmosphere through an open vent, closing the valve in said discharge tube, spraying a liquid into said vessel, so directing a current of carbon dioxide at a pressure slightly above atmospheric into said vessel and through said spray as to remove the air from the liquid and sweep said air from the vessel through the open vent, then closing said vent, and continuing to pass carbon dioxide into said vessel through the beverage accumulated therein until pressure sufficient to force the beverage through the discharge tube is reached.

ARTHUR YOUNG.