

March 13, 1945.

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2,371,431

BEVERAGE DISPENSING APPARATUS

Filed Sept. 1, 1942

2 Sheets-Sheet 1

Fig. 1.

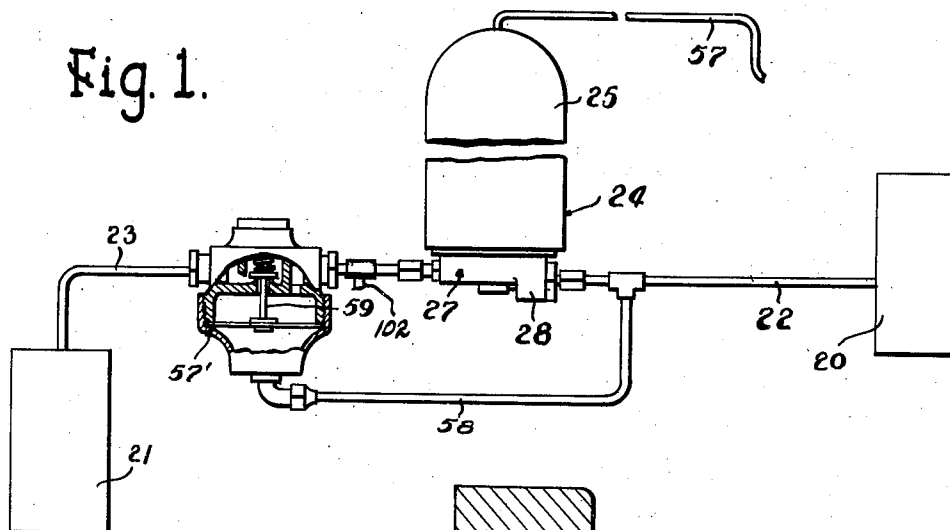


Fig. 2.

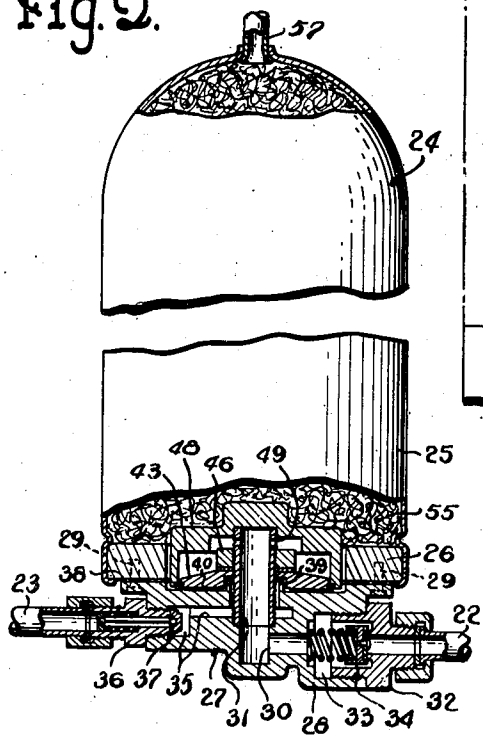


Fig. 3.

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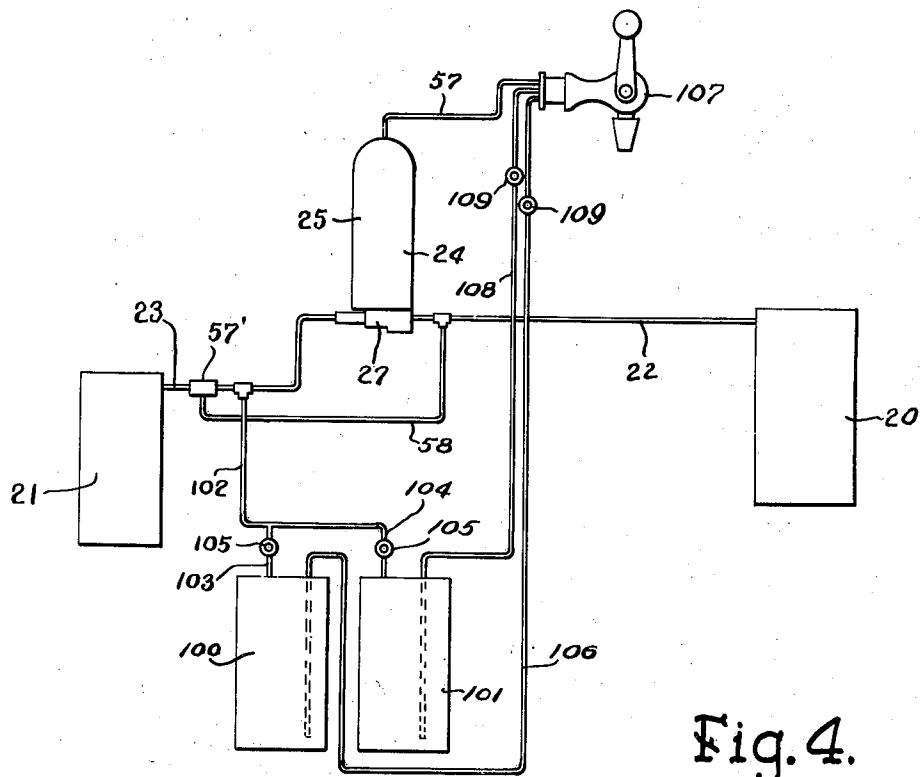


Fig. 4.

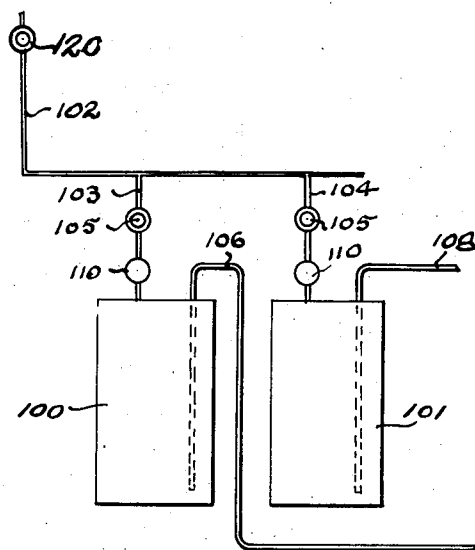


Fig. 5.

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UNITED STATES PATENT OFFICE

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BEVERAGE DISPENSING APPARATUS

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7 Claims. (Cl. 225-19)

This invention relates to apparatus for dispensing drinks and more particularly to apparatus for dispensing mixed drinks consisting of a syrup and carbonated water. This application is a continuation in part of my Patent No. 2,348,791 issued May 16, 1944.

An object of the invention is to provide apparatus for dispensing a beverage syrup and carbonated water in uniform proportions.

Another object of the invention is to provide a beverage dispensing apparatus consisting of a carbonator and a source of syrup in which the flow of syrup is regulated in accordance with the pressure of the carbon dioxide gas passing to the carbonator and the carbon dioxide gas pressure is regulated in accordance with the water pressure whereby the resulting beverage will have uniform proportions of water, carbon dioxide gas and syrup.

Another object of the invention is to provide a beverage dispensing apparatus in which a plurality of syrup receptacles are connected with a carbon dioxide gas line leading to a carbonator so that the flavor of the syrups in the receptacles will not become intermingled.

With the above objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangements of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiments of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, Fig. 1 is a diagrammatic view of apparatus for mixing water and carbon dioxide gas and leads to a dispensing station and to syrup receptacles.

Fig. 2 is a sectional view of the mixing and storage device for the water and carbon dioxide gas.

Fig. 3 is an enlarged fragmentary sectional view of the carbonator.

Fig. 4 is a diagrammatic view of apparatus in which a carbonator and syrup receptacles are associated and connected with a dispensing station.

Fig. 5 is a modified form of the invention, similar to Fig. 4.

Referring now to the drawings by characters of reference, 20 indicates a source of water under pressure as usually provided in towns and cities, or a container under pressure. A carbon dioxide gas container is indicated by numeral 21. A mixing and dispensing device 24 is connected with

the water source by conductor means such as conduit 22 and with the gas container by conductor means such as conduit 23. The device is comprised of a shell 25 having an open end that is spun over a base ring 26, and associated with the shell and base ring is a unit having conductor means and a mixer indicated generally by the numeral 27.

The unit 27 is composed of several elements that are associated to connect with the water and gas conduits and mix the water and gas before releasing the mixture to the interior of the storage shell 25. A header or carrier member 28, in the form of a casting, has an upper circular face that is complementary to the base ring 26 and detachably fixed thereto by suitable securing means such as bolts 29. A ring gasket 38 is interposed between the base ring and the carrier before attachment. The carrier is formed with an axial two-diameter opening 30 into the smaller portion of which is screwed a threaded tube 31. Coupling 32 is screwed into a passage 33 that communicates with the bottom of opening 30 and this coupling has the water conduit 22 attached thereto. In the coupling is a spring closed check valve 34. Another passage 35 is provided in the carrier which communicates with the larger diameter portion of opening 30 above passage 33. A coupling 36 is screwed into this passage 35 and has the gas conduit 23 coupled thereto. In the coupling 36 is arranged a spring closed check valve 37. The pressure of the gas and water flowing through the feed conduits 22 and 23 will open the valves 34 and 37.

Surrounding the upper end of the passage 30 in the carrier is a short upstanding outlet flange 39 through which the tube 31 projects. The diameter portion of opening 30 is larger than the tube diameter and thus the gas flows out of the carrier around the tube while the water flows out of the carrier through the tube.

The upper face of the carrier adjacent the flange 39 is recessed to form a flat seat 40 and terminates in an upstanding circular flange 41, and another recess 42 is formed in the top face of the carrier outside of flange 41. A disk or diffuser member 43 is piloted on the thread tube 31 until its face 44 seats against the carrier surface 40 between flanges 39 and 41. This disk serves to guide the gas flowing from the carrier to the mixing chamber 45, and is complementary to and slightly spaced from the carrier flange 39 for this purpose. The disk is positioned against the face 40 of the carrier then nut 46 is screwed on the tube against a gasket ring 47 to secure

the ring member and to seal the disk to prevent gas from entering water from elsewhere but the mixing chamber.

A cap 48 is screwed on the upper end of the tube 31 and is associated with the disk and the carrier to assist in forming the mixing chamber 45 and a water conductor means leading to the chamber. The cap is spaced above the nut 46 and the upper face of the disk forming a space into which water flows through an aperture 49 in the tube. The cap flange 50 closely surrounds the upper peripheral portion of the disk and is spaced above the flange 41 and projects into recess 42. The cap flange is also spaced from the periphery of recess 42 and the base ring through which it projects when assembled, such spaced relation providing an outlet for the mixture leaving the mixing chamber.

The carrier and the elements mounted thereon form a unit structure that can readily be attached to or detached from the base ring, and the parts of the unit can be readily associated or disassociated.

The peripheral face of the disk 43 is divided into upper and lower portions by a circular groove 51 and such portions are formed with grooves 52 and 53 thereacross extending in a direction parallel to the disk axis. The periphery of the upper peripheral portion is formed to bear against flange 50 of the cap and the grooves 52 therein thus form passages through which water sprays into the mixing chamber groove 51. The lower peripheral face portion of the disk fits into and bears against the flange 41 so the grooves 53 therein provide outlet passages for spraying the gas into the mixing chamber groove 51. The grooves 52 and 53 are formed entirely around the disk and are extremely small, the water passages being larger than the gas passages. The relative sizes of such passages are of course designed to provide the relative flow as desired for the constituents of the mixture. The bottom face 44 of the disk is formed with radially extending grooves 54 through which gas must flow to the grooves 53, these grooves 54 are similar in shape to grooves 53.

It will be seen that water and carbon dioxide gas will flow separately under pressure to the mixing chamber 45 and that the water and gas will be separated minutely by grooves 52 and 53 just prior to being released for mixing. Thus finely divided water and gas are released toward each other in groove 51 and a violent turbulence occurs that thoroughly mixes gas and water to a desired extent. As the mixing chamber and outlet to the interior of shell 25 is angular, further intermingling of the gas and water is had before release into the final mixing and storage chamber.

The storage chamber is preferably substantially filled with closely packed material 55, such as stainless steel wool, or other material that will not contaminate the carbonated water and that the carbon dioxide gas has an affinity for. This material attracts carbon dioxide gas in the carbonated water which clings thereto in thousands of small gas bubbles. The greater the amount of material used in the shell, the greater will be the surface that attracts the gas. Thus gas is retained by the material that would otherwise rise to the top of the shell and be expelled as free gas when the faucet is opened. In addition to retaining the carbon dioxide gas in the water until dissolved therein, the steel wool in the shell causes further mixing of the carbo-

nated water passing therethrough, thus assisting in saturating the water with the gas.

A suitable outlet from the shell 25 is provided. A dispensing faucet 107 is connected to the interior of the storage and final mixing chamber by conduit 57. The faucet may be fixed to the shell or arranged remotely therefrom.

The quantity of water flowing to the mixing device in prior carbonators varies with the pressure in the feeding conduit and as the carbon dioxide gas usually remains constant as to pressure, difficulty has been had in maintaining desired proportions of water and gas in the mixture constant. To eliminate this undesirable condition, it is proposed to automatically control the gas flow through the mixing device in accordance with the water flow through the device. To this end a valve 57' is interposed in conduit 23 and consists of a valve 59 attached to diaphragm 60. A conduit 58 leads from conduit 22 to the side of the diaphragm opposite the valve to thus subject the diaphragm to the pressure of water flowing to the mixing device. The valve 59 is normally urged toward its seat by a spring and by pressure of the carbon dioxide gas, so that when the outlet faucet for the storage chamber is closed the valve is seated thereby shutting off gas flow to the mixing device. Upon relieving pressure in the storage chamber, by drawing off some of the carbonated water, pressure between the valve device and the mixing device is relieved to thus allow the diaphragm to unseat the valve under pressure of the water in conduit 58.

In the embodiments of the invention shown, the carbonator device is used with two sources of syrup to provide a mixed drink at the faucet, but it will be understood that one or more sources of syrup can be utilized. A pair of closed receptacles 100 and 101 for containing syrup are connected with the gas feed line 23 between pressure valve 57' and the mixing unit carrier 27 by a main conduit 102 and branch conduits 103 and 104, as shown in Fig. 4. Valves 105 are arranged in the branch conduits for the purpose of shutting off gas flow to the receptacles when desired. The upper surfaces of the syrup in the receptacles is thus subjected to the pressure of the gas in the feed line as regulated by the valve 57' under control of the water pressure.

An outlet conduit 106 for syrup in receptacle 100 extends from adjacent the bottom thereof to dispensing faucet 107 and a similar outlet conduit 108 leads from the bottom of receptacle 101 to the faucet. A control valve 109 is disposed in each of these syrup outlet conduits. The faucet is valved in any conventional manner to dispense carbonated water alone or with syrup from either one of the conduits 106 or 108.

The pressure of carbon dioxide gas on the syrup in the receptacles will cause the syrup to flow through the faucet with the carbonated water when the faucet is opened for a selected mixture. The carbon dioxide gas in conduit 102 will act to compensate for any gas pressure drop at the carbonator mixing device which may be caused by lag in the opening of valve device 57'. Thus gas stored in conduit 102 to cause flow of the syrup to the faucet can be utilized for maintaining gas pressure at the mixing device so that uniformity of gas flow to water flow into the storage receptacle will result.

In order to dispense syrup in uniform quantities with the carbonated water, the compensating valve 57' can be taken advantage of by con-

necting the pressure line 102 for the syrup between such valve and the mixing device for the carbonated water as shown in Fig. 4. Thus, the gas pressure on the syrup supply chosen for dispensing corresponds to the gas pressure when entering the mixing unit, and they both vary in accordance with the water pressure. In this manner a uniform mixture of carbonated water and syrup will be dispensed at the faucet regardless of water pressure fluctuations. With this apparatus a palatable, constant proportion mixture of syrup and carbonated water is always available.

As shown in Fig. 5 the branch conduits 103 and 104 are provided with check valves 110 which can be similar to check valves 34 or 37. These valves are arranged to normally close the conduits so that syrup flavor can not escape from one receptacle to the other or from either receptacle into the gas in the main pressure conduit going to the carbonator. Thus, there will be no intermingling of the flavors of different syrups.

As shown in Fig. 5 the conduit 102 can be connected with conduit 23 between the valve 57' and the carbonator and with such arrangement the valves 105 function to shut off the gas flow to the receptacles when desired. The conduit 102 can be connected to conduit 23 between the valve 57' and the source of gas supply 21, and with such connection arranged in conduit 102 the valves 105 are formed to regulate the gas pressure flowing to the receptacles whereby a similar or different pressure can be had in the receptacles.

With the last mentioned connection of conduit 102 with conduit 23, the valves 105 can be shut off valves and a valve 120 is arranged in conduit 102 to regulate the gas pressure in the syrup receptacles, which pressure would of course be the same in both receptacles.

What I claim is:

1. In a carbonator system, a dispensing receptacle having an outlet faucet connected therewith, a mixing device for water and carbon dioxide gas in open communication with the receptacle, a source of water under pressure, conduit means connecting the source of water with the mixing device, a source of carbon dioxide gas under pressure, conduit means connecting the source of gas with the mixing device, pressure responsive valve means in the gas conduit means operating to open upon pressure reduction in the receptacle to regulate gas flow in accordance with the pressure of water flowing to the mixing device, and gas storage means connected with the gas conduit between the valve means and the mixing device, the gas in said storage means flowing to said mixing device in case of lag in opening of the valve means when there is a drop of pressure in the receptacle.

2. In a carbonator system, a dispensing receptacle having an outlet faucet connected therewith, a mixing device for water and carbon dioxide gas, a source of water under pressure in open communication with the mixing device, a source of carbon dioxide gas under pressure, conduit means connecting said source of gas with said mixing device, automatic valve means in said conduit operating to maintain gas flow to the mixing device in accordance with the pressure of water flowing to the mixing device, and means maintaining a constant gas flow to the mixing device during valve opening lag.

3. In a beverage dispensing device, a carbonator, a plurality of syrup containers, a faucet connected with the carbonator and operable to select

the flow of syrup from the desired container and the carbonator, a conduit leading from the gas inlet side of the carbonator and branching to the syrup containers for moving the syrup to the faucet, and check valves in the branching conduit whereby syrup flow therethrough from one container to the other is eliminated.

4. In a beverage dispensing device, a carbonator, means through which water under varying pressure flows to the carbonator, conduit means through which carbon dioxide gas flows to the carbonator, valve means in the conduit means responsive to pressure in the water means regulating the gas flow into the carbonator in a constant ratio to water flow into the carbonator, a syrup receptacle, a faucet, means connecting the faucet with the carbonator, means connecting the receptacle with the faucet, and a conduit means connecting the receptacle with the means through which the gas flows between the carbonator and the valve means whereby the syrup and carbonated water will flow in constant proportions through the faucet when open.

5. A drink dispensing system comprising a carbonator, a carbon dioxide gas conductor connected to the carbonator, water conductor means connected with the carbonator, means influenced by water pressure regulating the pressure of gas in the gas conductor flowing into the carbonator, a plurality of syrup containers, conduit means connecting the interiors of the containers with the pressure regulated portion of the gas conductor, check valves in the conduit means, and a faucet connected with the carbonator and the containers and operable to permit flow from the carbonator and any one of the containers, the flow from the containers being induced by the pressure of the gas in the conductor means whereby uniformity of the proportions of syrup and carbonated water will result.

6. In a beverage dispensing device, an instantaneous carbonator, means for supplying water under variable pressure to the carbonator, a source of carbon dioxide gas under pressure, conduit means connecting the gas source with the carbonator, a pressure regulating valve in the conduit means under control of the water pressure, a syrup receptacle, a conduit connecting the interior of the receptacle with the interior of the gas conduit means intermediate of the source of gas supply and the valve, a valve in the conduit for regulating the pressure of gas in the receptacle, and dispensing means connected with the carbonator and the syrup receptacle.

7. A drink mixing system comprising a carbon dioxide gas feeding conductor means, a conductor means for water under varying pressure, a pressure regulating valve in the gas feeding means, a connection leading from the water conductor means to said valve for controlling the rate of gas flow in accordance with the pressure of water in the conductor means, a mixer into which the gas and water conductor means empty, means forming a carbonated water storage chamber connected with the mixer, a syrup supply receptacle, a connection between the receptacle and the valve controlled portion of the gas conductor means whereby the syrup in the receptacle is maintained under gas pressure as regulated by the water pressure, a dispensing faucet, and connections leading from the chamber and the receptacle to the faucet.

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