Sept. 7, 1954 F. H. DEXTER 2,688,339

DISPENSING MIXING VALVE

Filed May 11, 1950

Fig. 3.

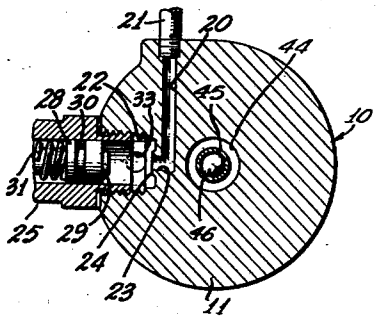


Fig. 4.

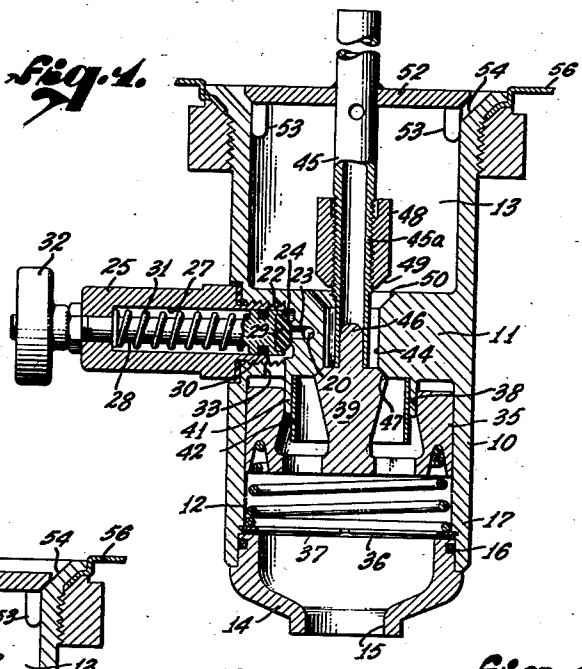


Fig. 2.

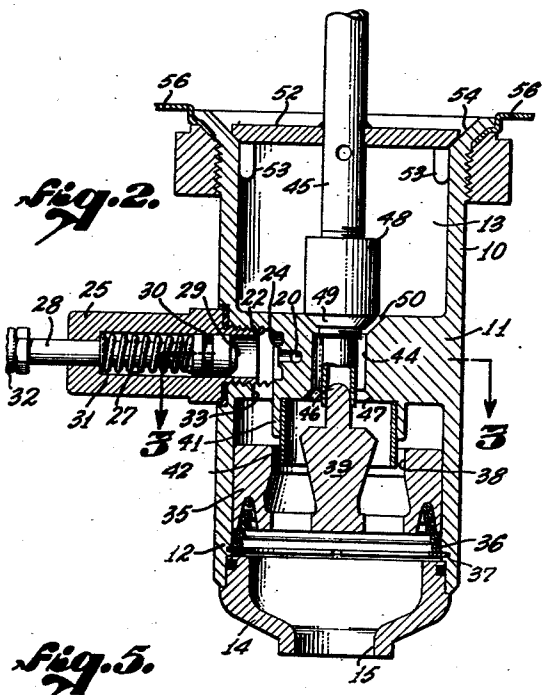


Fig. 4.

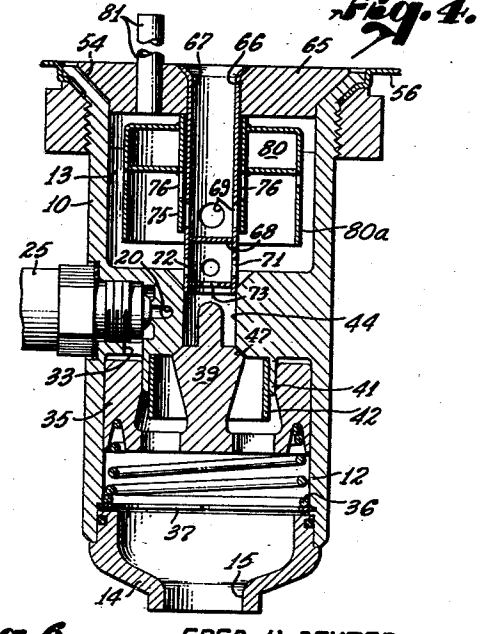


Fig. 5.

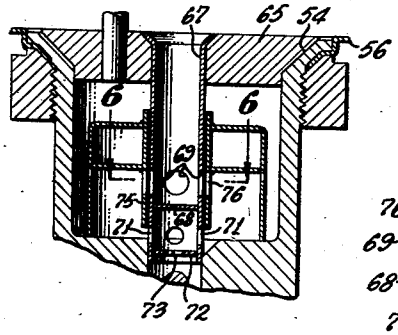
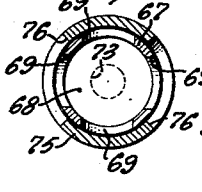


Fig. 6.



FRED H. DEXTER,
INVENTOR.

HUEBNER, BEEHLER, WORREL,
HERZIG & CALDWELL,
ATTORNEYS.

BY Herbert A. Huebner

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DISPENSING MIXING VALVE

Fred H. Dexter, Monrovia, Calif.

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8 Claims. (Cl. 137—604)

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My invention relates to a dispensing valve and has particular reference to a valve adapted to mix and dispense carbonated beverages, and is particularly useful in connection with carbonated and sweet water beverage dispensers such as the type illustrated in my copending application Serial No. 88,651, filed April 20, 1949, for a Low Pressure Carbonator.

In soft drink or carbonated beverage dispensers, it is highly desirable to mix a prepared syrup with carbonated water at the time of dispensing. It is therefore necessary to provide a valve which simultaneously dispenses carbonated water and the desired flavoring syrup through a common orifice or chamber and in a turbulent manner so that a complete and thorough mixing occurs. It is therefore one of the objects of my invention to provide a mixing valve for dispensing soft drink beverages, which is automatic in dispensing the proper amount of flavored syrup along with the carbonated water, and which automatically meters the amount of syrup being introduced into the carbonated water to produce a drink of the proper strength and consistency.

My invention can assume either one of two forms, that is, a slug type dispenser, or a continuous flow dispensing valve. By slug type, I means a valve which, when turned on to dispense a carbonated beverage, will permit the dispensing of a measured quantity of syrup for each drink, and when the measured amount has been dispensed, no further syrup can flow therefrom.

This valve also insures a quality drink because when the supply of CO_2 is depleted, the syrup valve will not open, thereby informing the operator to replace the CO_2 tank insuring the correct CO_2 pressure in the drink. Most other dispensers will continue to operate with CO_2 depleted from the carbonated water.

In large, busy, soft drink establishments, it is sometimes more economical from the standpoint of time, for the operator to dispense drinks by means of a continuous flow from the mixing dispensing valve. It is therefore also among the objects of my invention, to provide a continuous flow valve which meters a continuous flow of syrup dependent upon the volume of water being dispensed therefrom.

Most soft drink syrups or flavors are comparatively sticky, viscous fluids. A valve used for the dispensing thereof must therefore be frequently cleaned. It is a further object of my invention to provide a mixing valve for the dispensing of such drinks, which may be readily disassembled by an inexperienced operator in order to clean the same.

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Other and further objects and advantages will become apparent from the drawings and specifications relative thereto.

In the drawings:

Figure 1 is a sectional side elevation of a mixing dispensing valve of the slug type embodying the principles of my invention.

Figure 2 is a view similar to Figure 1, showing the same valve in open operating position.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

Figure 4 is a sectional side elevation of a continuous flow valve embodying the principles of my invention.

Figure 5 is a fragmentary sectional view similar to Figure 4, showing the continuous flow valve in open operating position.

Figure 6 is a sectional view taken on line 6—6 of Figure 5.

In the following description of my invention, I will first describe means for opening and controlling the flow of carbonated water and syrup into the mixing chamber and through the valve, which said means is common to both the slug type and continuous flow dispensing valves. Reference will then be made to mechanism for obtaining the slug dispensing and continuous flow dispensing.

The valves include a cylindrical housing 10 having a partition or diaphragm 11 disposed therein, thereby dividing the interior of the housing 10 into chambers 12 and 13. A nozzle 14 having a restricted opening 15 is secured to the lower end of the housing 10 by any suitable means and contains an O-ring gasket 16. The wall of the nozzle 14 is of sufficient thickness that when placed inside the shell 10 as illustrated, a shoulder 17 is defined.

The housing 10 and diaphragm 11 are formed with a bore 20 threaded at its outer end to receive a water supply pipe 21.

The diaphragm 11 is also formed with a threaded radial bore 22 and a bore 23 communicating between the bore 22 and the bore 20. The inner extremity of the bore 22 is formed with a peripheral flange 24 which, as will be seen, acts as a valve seat. A valve housing 25 is in threaded engagement with the bore 22 and is formed with a bore 27 which is adapted to receive a plunger 28.

The plunger 28 has a resilient valve face 29 and an O-ring packing 30 and is urged into engagement with the valve seat 24 by means of a coil spring 31. A handle 32 is threadedly engaged in the end of the plunger 28 so that the operator may grasp the handle 32 and pull the plunger

outwardly to thereby open communication from the water pipe 21 to the interior of the bore 22.

A bore 33 communicates between the bore 22 and the under surface of the diaphragm 11.

A valve member designated generally 35 is slidably disposed in the chamber 12 and is biased in an upward direction by means of a coil spring 36. A snap ring 37 is disposed adjacent the lower end of the housing 12 against which the spring 36 abuts. The valve member 35 is formed with a cylindrical valve portion 38 and a valve 39.

The diaphragm 11 is formed with a cylindrical valve seat 41 adapted to fit within the valve portion 38 with sufficiently small clearance to prevent the natural flow of fluids therethrough. A frictionally retained, removable sleeve 42 is disposed inside the valve seat 41. The sleeve 42 is intended to eliminate turbulence in the flow of carbonated water and syrup as much as possible so that such drinks as Coca-Cola may be dispensed without excessive foaming or the creation of a "head." In other drinks, such as root beer, it is desirable to create a "head." The sleeve 42 would therefore be removed for such drinks.

The diaphragm 11 is also formed with an axial bore 44 through which extends a hollow valve stem 45. The valve stem 45 is slidably engaged over an axial boss 46 which acts as a guide for the valve 49. The bore 44 communicates between the chambers 13 and 12. The bore 44 is also formed with a valve seat 47 against which the valve 39 is adapted to seat to shut off the flow of syrup from the chamber 13 through the bore 44 into the dispensing chamber 12.

The valve stem 45 is formed with a threaded section 45a which receives in threaded engagement a metering plug 48. Vertical positioning of the plug 48 by means of the threaded engagement changes the clearance between a face 49 of the plug 48 and a seat 50 concentric with the bore 44 and therefore controls the rate of flow of the relatively viscous syrup trapped in the chamber 13.

The valve stem 45 is provided with a valve plate 52 having guides 53 and adapted to seat against a valve face 54 forming a part of the upper end of the body 10.

Upon raising the valve member 35 to a closed position, the valve 39 seats against the valve face 47 and contacts the lower end of the stem 45, urging it upwardly to thereby permit the syrup to flow into the chamber 13, which thus contains a measured or predetermined slug of syrup.

Upon urging the plunger 28 outwardly, communication is established between the conduit 21 and the upper surface of the annular valve member 35. Pressure of the water urges the valve member 35 downwardly against the bias of spring 36 to open communication into the dispensing chamber 12 and to open communication between the chamber 13 and the dispensing chamber 12, so that the carbonated water and syrup will be simultaneously dispensed.

Upon the downward movement of the valve 39, the stem 45 is permitted to drop downwardly so that the valve plate 52 closes the upper end of the chamber 13 so that syrup contained in a syrup tray shown partially as 56, will be shut off, to thereby limit the size of the slug of syrup which can be dispensed in a given drink to that quantity contained in the chamber 13.

The continuous flow type valve is shown in Figures 4 and 5. The automatic flow valve arrangement is identical with the slug type previously described and similar numerals indicate similar parts. The principal difference lies in the elimination of the valve stem 45, metering valve 48 and the valve plate 52, and the substitution therefor of a continuous flow valve.

The continuous flow valve comprises a stationary plate 65 gravitationally disposed in sealing engagement with the valve face 54 of the housing 10. The plate 65 is formed with an axial bore 66 through which is disposed a tube 67. The tube 67 is formed with a diaphragm 68 adjacent the lower end thereof and with a plurality of apertures 69 positioned above the diaphragm 68. Syrup flowing from the tray 56 may travel downwardly through the tube 67 and out the apertures 69 into the chamber 13.

The tube 67 is also formed with apertures 71 positioned below the diaphragm 68. An orifice plate 72 is disposed in the end of the tube 67, and has an orifice 73 formed therein. Fluid, therefore, contained in the chamber 13, may flow downwardly into the dispensing chamber 12 through the apertures 71 and the orifice 73 and through open seat 47 when the valve 39 is in open position.

It should be understood that the restriction of the orifice 73 is greater than the restriction of the apertures 69 and 71, so that unless otherwise restricted, syrup may flow into the chamber 13 faster than it can flow out the orifice 73.

A flow control float valve is provided, which comprises a sleeve 75 disposed circumferentially around the tube 67 for free sliding engagement and is formed with apertures 76 adapted to register with the apertures 69 when the float valve is in a down position.

A float 80 is secured to the sleeve 75; as the chamber 13 fills with syrup, the float 80 raises the sleeve 75 so that the apertures 76 no longer register with the apertures 69 to thereby control the rate of flow of fluid or syrup through the tube 67 into the dispensing chamber 12. A constant head is therefore maintained at all times in the chamber 13 so that the rate of flow through the orifice 73 is constant.

A vent tube 81 extends upwardly from the plate 65 to permit the escape or return of air into the chamber 13 during dispensing or refilling operations. It will be understood that the tube 81 extends upwardly above the surface of the syrup in the tray 56, and that the operator need only grasp the tube 81 and lift upwardly in order to remove the constant flow valve assembly for cleaning purposes. It is not even necessary to remove the syrup from the tray.

The float 80 is formed with a downwardly directed annular skirt 80a which acts as a stop to prevent closing of the aperture 71 by the sleeve 75.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

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

1. A valve for mixing and dispensing carbonated drinks or the like, comprising a housing having a diaphragm dividing said housing into syrup and mixing chambers, valve controlled inlet means for admitting carbonated water under pressure into said mixing chamber, said dia-

phragm being formed with an axially disposed aperture defining a communication between the said syrup and mixing chambers and a downwardly directed concentric annular flange, valve means movable between open and closed positions reciprocally disposed in said mixing chamber and responsive to the pressure of said carbonated water to open or close the said communication between the syrup and mixing chambers, discharge means from said mixing chamber, said syrup chamber having an opening to communicate with a source of syrup, and a second valve means responsive to the position of said first valve means to open communication with said syrup supply when said first valve means is in closed position and to close said communication when said first valve is in open position, said second valve means comprising a valve plate positioned to control said opening and having a downwardly direct stem adapted to abut against said first valve means and to move cooperatively therewith.

2. A valve for mixing and dispensing carbonated drinks or the like, comprising a housing having a diaphragm dividing said housing into syrup and mixing chambers, valve controlled inlet means for admitting carbonated water under pressure into said mixing chamber, said diaphragm being formed with an axially disposed aperture defining a communication between the said syrup and mixing chambers and a downwardly directed concentric annular flange, valve means movable between open and closed positions reciprocally disposed in said mixing chamber and responsive to the pressure of said carbonated water to open or close the said communication between the syrup and mixing chambers, discharge means from said mixing chamber, said syrup chamber having an opening to communicate with a source of syrup, a second valve means responsive to the position of said first valve means to open communication with said syrup supply when said first valve means is in closed position and to close said communication when said first valve is in open position, said second valve means comprising a valve plate positioned to control said opening and having a downwardly directed stem adapted to abut against said first valve means, and a metering plug in threaded engagement with said stem positioned adjacent said diaphragm aperture to adjustably meter the flow of syrup therethrough.

3. A valve for mixing and dispensing carbonated drinks or the like, comprising a cylindrical housing having a diaphragm dividing said housing into upper and lower chambers, valve controlled inlet means for admitting carbonated water under pressure into said lower chamber, second inlet means for supplying syrup to said upper chamber, said diaphragm being formed with an axially disposed aperture defining a communication between the said upper and lower chambers and a downwardly directed concentric annular flange, an annular skirt disposed in frictional engagement with said annular flange and extending downwardly therefrom to control turbulence of water flowing through the valve, valve means having an annular upwardly directed shoulder, reciprocally disposed in said lower chamber responsive to the pressure of said carbonated water against said shoulder to open or close the said communication between the syrup and mixing chambers, discharge means from said mixing chamber, said syrup chamber having an opening to communicate with a source of syrup,

a second valve means responsive to the position of said first valve means to open communication with said syrup supply when said first valve means is in closed position and to close said communication when said first valve is in open position, said second valve means comprising a valve plate positioned to control said opening and having a downwardly directed stem adapted to abut against said first valve means, and a metering plug in threaded engagement with said stem positioned adjacent said diaphragm aperture to adjustably meter the flow of syrup therethrough.

4. A valve for mixing and dispensing carbonated drinks, comprising a housing having a diaphragm dividing said housing into syrup and mixing chambers, inlet means for admitting carbonated water under pressure into said mixing chamber, said diaphragm being formed with an axially disposed aperture defining a communication between the said mixing and syrup chambers, valve means reciprocally disposed in said mixing chamber responsive to the pressure of said carbonated water to open or close the said communication between the syrup and mixing chambers, discharge means from said lower chamber, a tube extending upwardly from said diaphragm, through said syrup chamber and being in open communication at its upper end with a source of syrup, said tube being formed with a metering orifice at its lower end in communication with said diaphragm aperture, a second diaphragm disposed in spaced relation above said metering orifice, and radial apertures above and below said second diaphragm, a sleeve valve slidably disposed concentric with said tube and being adapted to control the flow of syrup through the apertures above said second diaphragm, and a float secured thereto, responsive to the level of fluid in said upper chamber adapted to position said sleeve valve on said tube to control the flow of syrup into said syrup chamber.

5. A valve for mixing and dispensing carbonated drinks or the like, comprising a housing having a diaphragm dividing said housing into syrup and mixing chambers, valve controlled inlet means for admitting carbonated water under pressure into said mixing chamber, said diaphragm being formed with an axially disposed aperture defining a communication between the said syrup and mixing chambers and a downwardly directed concentric annular flange, an annular skirt in removable frictional engagement with the interior of said flange and extending downwardly therefrom to control turbulence of carbonated drinks being dispensed, valve means reciprocally disposed in said mixing chamber responsive to the pressure of said carbonated water to open or close the said communication between the syrup and mixing chambers, discharge means from said lower chamber, a tube extending upwardly from said diaphragm, through said syrup chamber and being in open communication at its upper end with a source of syrup supply, said tube being formed with a metering orifice at its lower end in communication with said diaphragm aperture, a second diaphragm disposed in spaced relation above said metering orifice, and radial apertures above and below said diaphragm, a sleeve valve slidably disposed concentric with said tube and being adapted to control the flow of syrup through the apertures above said second diaphragm, and a float secured thereto, responsive to the level of fluid in said upper chamber adapted to position said sleeve valve.

6. A mixing valve comprising in combination,

a housing forming a mixing chamber closed at one end by a partition, said partition having a bore therethrough, the side of said partition opposite said chamber being adapted to receive first fluid, said bore providing a passage for said first fluid through said partition into said chamber, a piston slidably mounted in said chamber, a valve carried by said piston adapted to selectively open and close said bore to the passage of first fluid in accordance with movement of said piston, bias means urging said piston toward said partition thereby to urge said valve into bore-closing position, and means for admitting second fluid to the face of said piston facing said partition, whereby pressure of said second fluid moves said piston against the bias, thereby to open said bore and admit first fluid into said mixing chamber.

7. A mixing valve comprising in combination a housing forming a mixing chamber closed at one end by a partition, said partition having a bore therethrough, the side of said partition opposite said chamber being adapted to receive first fluid, said bore providing a passage for said first fluid through said partition into said chamber, a piston slidably mounted in said chamber, a valve carried by said piston adapted to selectively open and close said bore to the passage of first fluid in accordance with movement of said piston, bias means urging said piston toward said partition thereby to urge said valve into bore-closing position, means for admitting second fluid to the face of said piston facing said partition, whereby pressure of said second fluid moves said piston against the bias, thereby to open said bore and admit first fluid into said mixing chamber, passage means communicating between said piston face and said mixing chamber to pass second fluid into said mixing chamber, and discharge means from said mixing chamber effective to discharge from said mixing chamber a mixture of said fluids when second fluid pressure is applied to said piston face.

8. In combination in a mixing valve, a housing forming a mixing chamber closed at the top by a partition and having a discharge opening at the bottom to emit a mixture of carbonated water and syrup, said partition having a bore therethrough, means for containing syrup against the upper surface of said partition, said bore providing a passage for syrup into said mixing chamber, a cylindrical flange depending from said partition into said chamber circumjacent the axis of said bore, a piston having an annular portion reciprocable in the annular space between said flange and said housing and having a central portion forming a valve adapted to close said bore when said piston is in its upper position, a spring urging said piston upwardly thereby to bias said valve to closed position, and passage means in said partition communicating with said annular space and adapted to supply carbonated water under pressure to said annular space thereby to depress said piston against the bias, to a point where said annular portion is below said flange, thereby admitting carbonated water to said mixing chamber there to mix with syrup admitted to said mixing chamber upon opening of said bore by the depression of said piston.

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