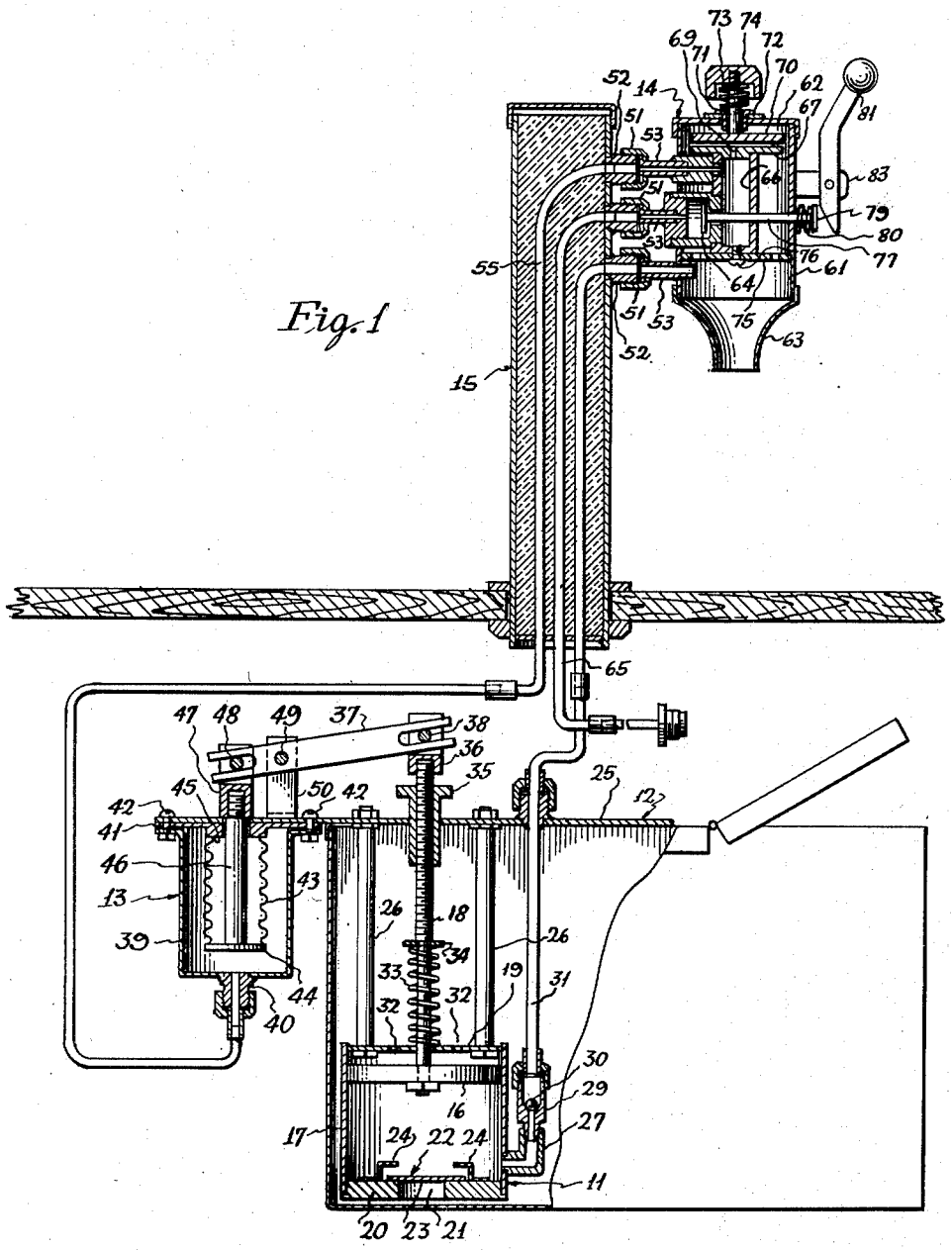
Jan. 16, 1951 N. L. LUSTER 2,538,111

CARBONATED BEVERAGE DISPENSING DEVICE

Filed Oct. 23, 1945 3 Sheets-Sheet 1

Fig. 1



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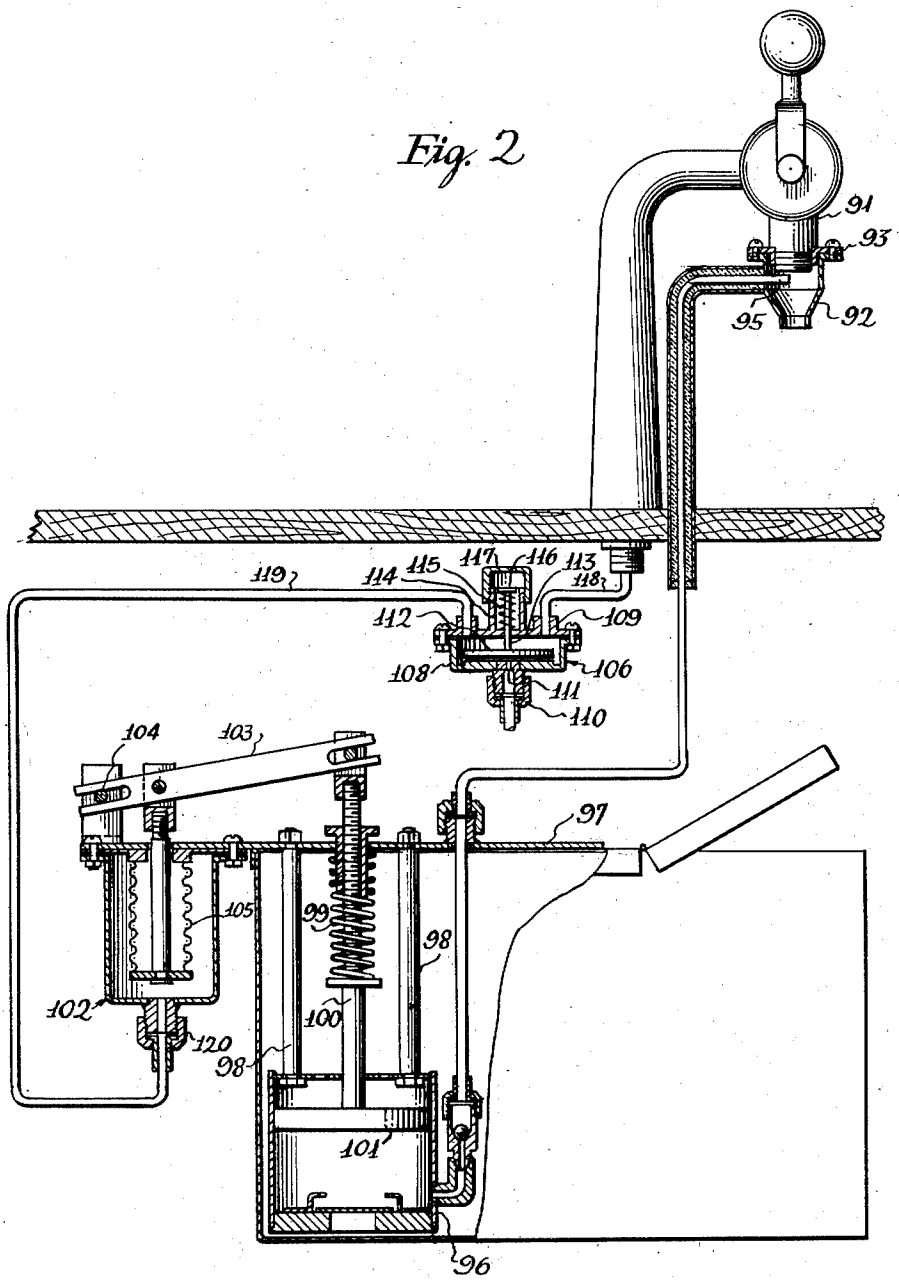
ATTORNEY

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CARBONATED BEVERAGE DISPENSING DEVICE

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Fig. 2



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CARBONATED BEVERAGE DISPENSING DEVICE

Filed Oct. 23, 1945 3 Sheets-Sheet 3

Fig. 3

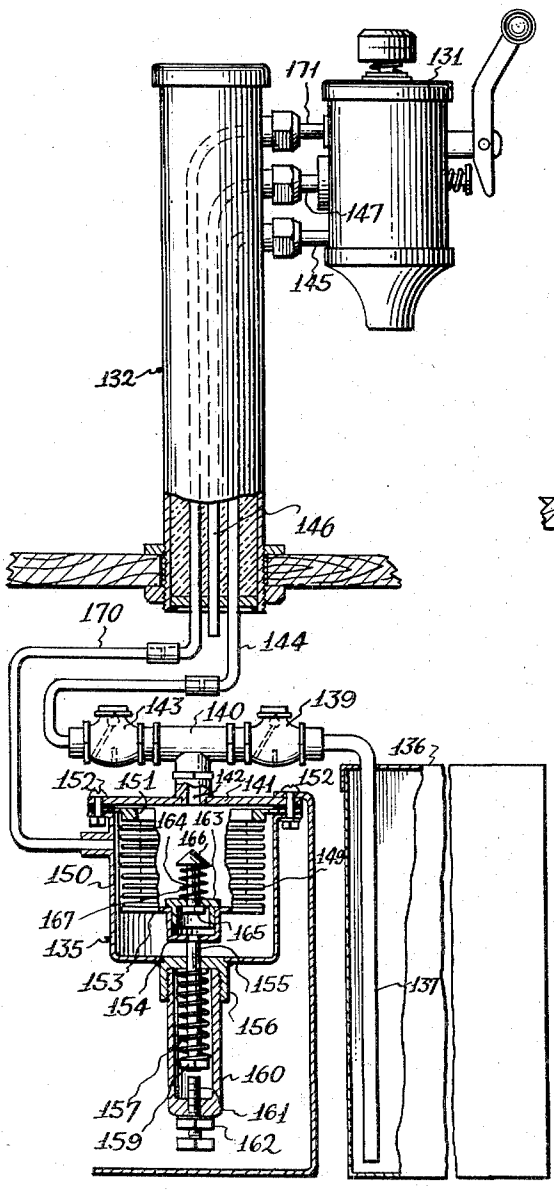
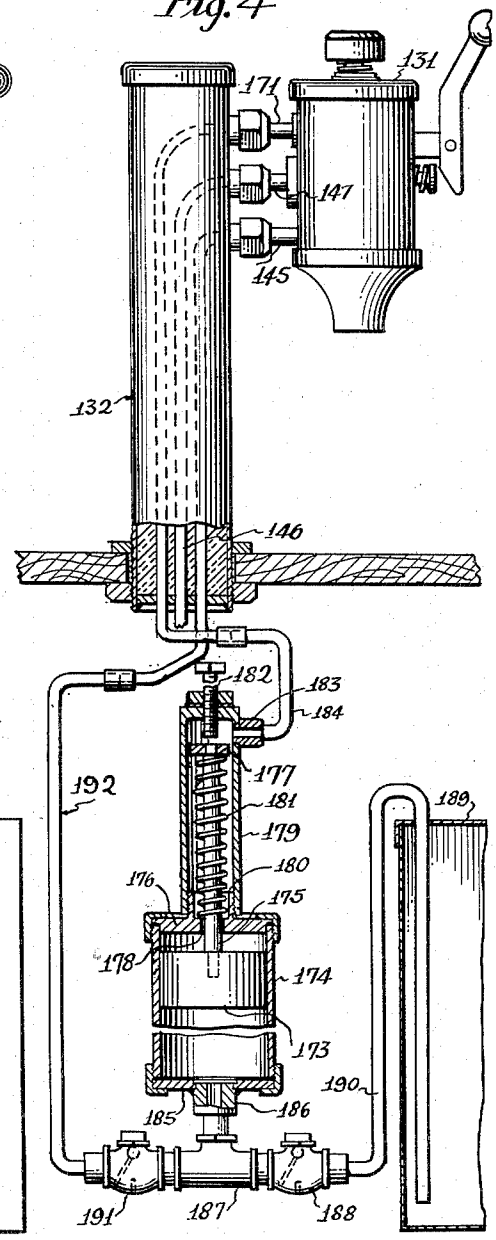


Fig. 4



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Patented Jan. 16, 1951 2,538,111

UNITED STATES PATENT OFFICE

2,538,111

CARBONATED BEVERAGE DISPENSING DEVICE

Norman L. Luster, Chicago, Ill.

Application October 23, 1945, Serial No. 624,066

8 Claims. (Cl. 225—21)

1

This invention relates to improvements in fluid metering devices, and more particularly relates to metering devices for measuring and delivering portions of one fluid to be added to another fluid.

A principal object of my invention is to provide a novel and improved form of fluid metering device for measuring portions of one liquid and delivering said portions into contact with another liquid.

Another object of my invention is to provide an improved device for measuring and delivering portions of flavoring syrup and mixing said syrup with carbonated or plain water.

A more specific object of my invention is to provide an improved apparatus for dispensing beverages by utilizing the energy of the carbonated water being delivered to operate a syrup pump which adds measured portions of syrup to said carbonated water as it is delivered.

A further object of my invention is to provide an improved beverage dispensing device for dispensing mixed beverages, which may be attached to existing carbonated water faucets with only a slight modification of the faucets.

Apparatus for dispensing mixed beverages require that means be provided for measuring portions of the flavoring syrup to be mixed with the water, and that other means be provided for bringing the syrup and water together to form the mixed beverage. Such beverage dispensing devices have heretofore depended upon gravity feed of the flavoring syrup from a vessel mounted above the dispensing faucet, as well as pressure feed of the flavoring syrup from a vessel in which a gas pressure is maintained above the syrup. Still other types of dispensers make use of the injector, or aspirator principle, aspirating the syrup into a jet of water.

Dispensers depending upon gravity feed of the syrup from a vessel mounted above the dispensing faucet require a separate cooling means when used in soda fountains, or else the syrup is delivered warm with the result that foaming is excessive when the syrup mixes with the carbonated water.

Dispensers depending upon pressure feed of the syrup from a vessel in which a gas pressure is maintained have certain disadvantages, in that the vessel containing the syrup must be heavy enough to withstand the gas pressure, and the lid and fittings to the syrup storage vessel must be pressure-tight. Where the vessel is pressure-tight and the storage vessel has been emptied of syrup, the gas which has been used to displace the syrup is wasted when the cover of the storage

2

vessel is unfastened to refill the vessel with syrup and service is interrupted while the syrup vessel is being refilled.

Dispensers which utilize the aspirator principle to bring the syrup into contact with the water may inject the syrup into the uncarbonated water before it flows into the carbonator, or may inject the syrup into the carbonated water as it flows from the carbonator to the delivery faucet. Injecting the syrup into the carbonator has certain disadvantages, however, in that the carbonator can only be used for one type of beverage, and excessive foaming results when the mixed beverage is delivered from the carbonator under relatively high pressure into the delivery faucet at atmospheric pressure.

In carrying out my invention, I remedy the disadvantages of the foregoing types of beverage dispensing devices by providing a syrup pump for pumping flavoring syrup from a storage vessel into a water delivery faucet, and by driving the syrup pump by a pressure responsive device actuated by the pressure of the carbonated water used. In one form of my invention, I subject the pressure responsive device to pressure when the delivery faucet is opened, and relieve pressure from the pressure responsive device when the faucet is turned off. I also operate the pressure responsive device at a relatively high pressure, with a relatively small displacement, so that the carbonated water discharged after the faucet is closed will be relatively small.

While the present invention is illustrated and described in connection with apparatus for dispensing beverages, it will be understood by those skilled in this art that changes may be made to adapt the invention for use in any apparatus where it is desired to utilize the energy of a fluid under pressure to measure and deliver portions of another fluid.

These and other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a view in vertical section of a beverage dispensing device constructed in accordance with one form of my invention;

Figure 2 is a view in partial vertical section of a modified form of beverage dispensing device constructed in accordance with my invention, showing the device connected with a conventional delivery faucet;

Figure 3 is a view in partial vertical section showing another modified form of beverage dispensing device constructed in accordance with

my invention, and showing the syrup pump outside of the syrup container and actuated directly by the water under pressure; and

Figure 4 is a view somewhat similar to Figure 3, but showing a piston in place of the diaphragm pump shown in Figure 3.

Referring now in particular to Figure 1 of the drawings, the beverage dispenser illustrated therein includes a syrup pump 11, a syrup storage vessel 12, a syrup pump actuating device 13, and a faucet 14 mounted on a draft arm 15.

The syrup pump 11 includes a piston 16 movable within a cylinder 17 and having a piston rod 18 extending from said piston through a top cover plate 19 for said cylinder. A bottom plate 20 having a central opening 21 therein is secured to the bottom of said cylinder, and with a check valve 22 closes the bottom of said cylinder when said piston makes its down stroke.

The check valve 22 consists of a circular disk 23 adapted to close the central opening 21. Said disk is confined in position over said opening by means of a plurality of spaced retaining members 24, 24, secured to the top of the plate 20 and having portions spaced upwardly from and extending inwardly over the top of said disk. On the upward stroke of the piston 16, said disk will be lifted from said opening through said bottom plate to permit said piston to draw syrup within said pump chamber in an obvious manner.

The pump 11 is herein shown as being suspended from a top 25 of the storage tank 12 on a plurality of rods 26, 26 secured to the top closure plate 19 at their lower ends and secured to the top of said storage tank at their upper ends.

An elbow 27 is connected with and communicates with a wall of the cylinder 17 adjacent the lower end thereof, and has a fitting 29 connected to its upper end, which has a check valve 30 therein. Said check valve is herein shown as being a well known form of ball check valve, but may be of any other form desired. A pipe 31 extending through the top of the tank 12 and through the draft arm 15 connects said check valve with the faucet 14, to supply syrup thereto from the pump 11.

The top 19 of the syrup pump is provided with a plurality of openings 32, 32 therein, to allow syrup leaking by the piston 16 and piston rod 18 to flow out of and into said cylinder on the upper side of said piston, as said piston moves up and down within said cylinder.

A spring 33 encircles the lower portion of the piston rod 18 and is interposed between the top 19 of the cylinder 17 and a collar 34, which abuts and is held from upward movement along said rod by means of a shouldered portion thereof. Said spring serves to return the piston 16 to its upper position within the cylinder 17. The upper portion of said piston rod is threaded and has a flanged sleeve 35 threaded thereon, which serves as an adjusting nut to limit downward movement of said piston rod and said piston within said cylinder. Said adjusting nut slides freely in the top 25 of the syrup storage tank 12. A fitting 36 is threaded on the upper end of said piston rod and has a slotted upper end which is open at its top, to receive an actuating lever 37. A pin 38 passes through the slotted portion of said fitting in a direction transverse to said lever and fits in an open slotted end of said lever, as shown.

The syrup pump actuating device 13 includes a cylindrical housing 39 having a closed bottom except for a fitting 40, arranged to permit fluid under pressure to pass therein. The upper end of said housing is flanged and is closed by a circular plate 41 abutting the bottom of a projecting portion of the cover 25 of the syrup storage tank. A suitable packing ring or gasket is interposed between the top of the flanged portion of said housing and the underside of said plate. Said housing and plate are secured to the bottom of said projecting portion of said cover by means of machine screws and nuts 42, 42.

A bellows 43 is contained within the housing 39. The lower end of said bellows is closed by a circular plate 44, which may be brazed or soldered thereto. The upper end of said bellows is secured to and depends from an annular depending lug 45 formed integrally with the plate 41. A rod 46 is rigidly attached to said plate 44 and extends upwardly therefrom and is extensible from said housing through the top of the projecting portion of the cover 25 of the tank 12. The upper end of rod 46 has a fitting 47 threaded thereon, the upper end of which is slotted to receive the opposite end of the lever 37 from the fitting 36. A pin 48 extending through the slotted portion of said fitting serves to connect said lever to said fitting. A pin 49 mounted in a support 50 extending upwardly from the cover 25 for the syrup storage tank, serves as a fulcrum for said lever 37. Downward travel of said rod 46 is limited by the fitting 47 engaging the top of the cover 25.

Thus when carbonated water enters the housing 39 under pressure, the bellows 43 will be compressed and the rod 46 will move upwardly, to move the piston 16 downwardly within the cylinder 17, through the lever 37, and pump syrup past the check valve 30 and through the pipe 31 to the faucet 14.

The delivery faucet 14 is mounted on the draft arm 15 by means of shouldered connecting nuts 51, 51, threaded on vertically spaced pipe fittings 52, 52 extending outwardly from said draft arm. Said nuts have inwardly extending flanged portions engaging the flanges of fluid conduits 53, 53, suitably secured to said faucet and communicating therewith. Said draft arm may be of any well known form and is no part of my present invention so is not herein shown or described in detail.

The delivery faucet 14 is herein shown as comprising a cylindrical body 61 closed by a top cover 62 and having a delivery spout 63 depending from the lower end thereof. A valve 64 is provided to admit carbonated water under pressure, supplied through a pipe 65 connected with the central fitting 51 and conduit 53, to a chamber 66 of said faucet, herein shown as extending in the direction of the longitudinal axis of said body. A disk 67 is suitably secured to the upper end of said chamber and has a central orifice 69 leading from from said chamber to the underside of a disk 70 mounted on the lower end of a rod 71. Said rod is slidably mounted in a guide member 72 mounted in the top cover 62. A spring 73 encircles the upper portion of said rod and is interposed between the top of said guide member and a spring retaining member 74 threaded on the upper end of said rod, so said spring will yieldably hold said disk in spaced apart relation with respect to the disk 67.

A plate 75 is mounted within the cylindrical body 61 and is secured to the bottom of the chamber 66 by means of a machine screw 76. Said plate is apertured to permit carbonated water to pass from said body and mix with syrup pass-

ing through the pipe 31 and entering said body beneath said plate through the lower fitting 52.

The valve 64 is operated by means of a valve rod 77 extending through the walls of said chamber and through the body 61. A head 79 is provided on the outer end of said valve rod. A spring 80 encircles said rod and is interposed between the outside of said body and said head to urge said valve into a closed position. An operating lever 81 is pivoted to a support member 83 intermediate its ends. Said support member extends outwardly from the outer wall of the body 61 and may be secured thereto as by welding. The lower end of said operating lever is adapted to engage the head 79 on the end of said valve rod, upon movement of the hand grip of said handle away from said body, to move said valve rod against the spring 80 and open said valve.

When the valve 64 is opened by operation of the lever 81, carbonated water will pass into the chamber 66 and out said chamber, through the conduit 53, fitting 52, and a pipe 55 extending through the draft arm 15 and connected with the fitting 40. From thence it flows to the inside of the housing 38 to compress the bellows 43 and operate the syrup pump 11, in the hereinbefore described manner. Carbonated water will also pass through orifice 69 and flow between the disks 67 and 70 in a thin circular sheet and out through the apertured plate 75 where it is mixed with the syrup supplied through the pipe 31, and is discharged with the syrup through the spout 63.

As the pressure in the chamber 66 increases, the velocity of the thin film of carbonated water will increase with a resultant lowering of pressure between said disks, causing the disk 70 to be forced closer to the disk 67 against the spring 73, by atmospheric pressure on the top of said disk 70. Thus an increase in pressure will tend to constrict the opening between said disks and thereby maintain the rate of flow of the carbonated water relatively constant. The diameter of the disks 67 and 70, the weight of the disk 70, the size of the orifice 69, and the strength of the spring 73 may be varied to provide the desired rate of flow of the carbonated water. The carbonated water will thus be delivered from a region of high pressure to one of atmospheric pressure in the form of a thin film moving with low velocity. This favors the retention of carbon dioxide gas in solution.

When the valve 64 is closed, the disk 70 will be held above the disk 67 by the spring 73, allowing carbonated water displaced by the expanding bellows 43 to freely flow from the bellows housing 39 through the conduit 55 into the chamber 66, and out of said chamber through the orifice 69. This flow of water between the disks 67 and 70 tends to remove any foreign particles or sediment which may have become lodged therebetween.

The modified form of beverage dispenser shown in Figure 2 is adapted to be applied to a well known form of faucet 91 of a type commonly used in soda fountains. A spout 92 is attached to an adapter 93 threaded on the lower end of said faucet and depends therefrom. A syrup conduit 95, leading from a pump 96 suspended in a syrup storage tank 97 on supporting rods 98, 98, is connected with and extends within said spout to supply syrup thereto as fluid, such as carbonated water, is discharged therefrom. A spring 99 encircling a piston rod 100 of said pump is provided to move a piston 101 of said pump downwardly, while an actuator 102 is provided to move said piston upwardly through a lever 103. Said actuator is connected to said lever on the same side of a fulcrum 104 for said lever as said lever is connected to said piston rod, so that contraction of bellows 105 of said actuator effected by the fluid under pressure entering said actuator, will lift the piston 101 instead of depress it, as in Figure 1. Said pump and actuator are otherwise the same as shown in Figure 1, so need not herein be described further.

A valve 106 is provided to supply carbonated water under pressure to the actuator 102 and to the faucet 91. Said valve comprises a cylindrical body 108 closed at its lower end and having a flanged top closed by a cover plate 109. A gasket is interposed between said flange and cover to prevent leakage. A fitting 110 is secured to the bottom of said body of said valve to admit fluid under pressure, such as carbonated water, thereto, through an orifice 111. A disk 112 is mounted within said body just above said orifice and has a guide rod 113 guided within said cover and extending upwardly therefrom. An integrally formed upwardly extending cylindrical wall portion 114 of said cover encircles said rod. A spring 115 is interposed between the top of said cover and a head 116 of said rod, to hold said disk in spaced apart relation with respect to the bottom of said body. A cap piece 117 threaded on said cylindrical wall portion serves to cover said guide rod and spring. A pipe 118 leads from said cover and extends through the draft arm supporting the faucet 91, to supply carbonated water to said faucet. A pipe 119 leads from said cover and is connected with a fitting 120 connected with the bottom of the actuator 102, for supplying carbonated water to said actuator, to contract the bellows 105 of said actuator and move the piston 101 upwardly against the spring 99, to draw syrup into said pump.

It should here be noted that the inside of the bottom of the body 108 is finished in the form of a disk conforming to said disk 112 so that the same constant flow characteristics will be attained when fluid passes through the orifice 111 between the disk 112 and inside of the bottom of said body as when passing through the orifice 69 of the disk 67 shown in Figure 1.

When the delivery faucet 91 is opened, the pressure on the inside of the actuator 102 will be relieved to an extent sufficient to allow carbonated water to discharge from said actuator through pipe 119 and through the chamber of valve 106 where it will join the carbonated water flowing into said chamber through the orifice 111 and past the disk 112. It also flows through the pipe 118 to said delivery faucet. At this time the bellows 105 will expand by the action of spring 99 on the piston rod 100. As the piston rod 100 and piston 101 are moved downwardly by said spring 99, syrup will be forced through the conduit 95 into the delivery spout 92, and will flow out of said spout with the carbonated water in the manner described in connection with the embodiment of my invention shown in Figure 1.

When the faucet 91 is closed, carbonated water will flow through orifice 111, through the constriction beneath the disk 112, through conduit 119, and into the actuator 102, to compress the bellows 105 and cause lever 103 to lift the piston 101 and draw syrup into the syrup pump.

In the modified form of my invention shown in Figure 3, a faucet 131 is shown as being mounted on a draft arm 132. Said faucet is similar in construction to the faucet 14 shown in Figure 1 and is mounted on said draft arm in the same

manner the faucet 14 is mounted on the draft arm 15, so said faucet and its mounting on said draft arm need not herein be shown or described in detail.

A syrup pump 135 is herein shown as being located outside of a storage tank 136 for the syrup and as being connected thereto by means of a pipe 137 extending into said tank near the bottom thereof. Said pipe communicates with a check valve 139, which is connected with said pump on the suction side thereby by means of a T-fitting 140, connected with a closure member 141 for the upper end of said pump and communicating therewith through a passageway 142. A check valve 143 is connected with said T on the pressude side of said pump. A pipe 144 connects said last mentioned check valve with a conduit 145, communicating with the lower end of said faucet 131, for supplying syrup thereto, to be mixed with carbonated water entering said faucet through a pipe 146 and conduit 147.

The pump 135 includes a bellows 149 enclosed in a housing 150. The upper end of said bellows is secured to a flanged ring 151 and depends therefrom. The flanged portion of said ring rests on an upper flanged portion of said housing and the upper end thereof is abutted by the closure member 141 communicating with the T 140. Suitable gaskets are interposed between the flanged portion of said ring and the flanged portion of said housing and said cover. Machine screws and nuts 152 are provided to secure said cover and ring to said housing.

A plate 153 having a depending cup-shaped or cylindrical center portion 154 has a rod 155 secured to and depending therefrom. Said rod is guided in a cylindrical member 156 secured to and depending from the bottom of said housing. A spring 157 encircles said rod and is interposed between the bottom of said cylindrical member 156 and a nut 159 on the end of said rod, to urge said bellows into an extended position. A cylindrical housing 160 is threaded in the lower end of said cylindrical member and encloses said spring and rod. An adjusting screw 161, threaded in the lower end of said cylindrical housing and held in position by a lock nut 162, is provided to limit downward movement of said rod and bellows.

The cup-shaped portion 154 is internally threaded and has a flanged cylindrical member 163 threaded therein. The top of said cylindrical member is closed and has a rod 164 slidably mounted therein, and retained therein by means of a nut 165 threaded on the lower end thereof.

A valve 166, herein shown as being of a conical form and adapted to be seated in the passageway 142, extends from the upper end of said rod. A spring 167, interposed between the top of said cylindrical member 163 and said valve, is provided to hold said valve and rod in an extended position. Said valve is adapted to close the passageway 142 when the bellows 149 is at the end of its compression stroke.

A pipe 170 connects the inside of the housing 150 with a conduit 171 connected with the valve 131, for supplying fluid under pressure, such as carbonated water, to the inside of said housing to compress the bellows 149, when said valve 131 is open, in the same manner as has been described before in connection with Figure 1.

When the valve 131 is open, the bellows 149 will be contracted by fluid under pressure entering the housing 150 through the pipe 170. If said bellows has been previously filled with syrup, the syrup inside of said bellows will be forced out through check valve 143, pipe 144 and conduit 145 into the delivery spout, and will flow out of said spout with the carbonated water, the check valve 139 being closed by the pressure of the syrup exerted thereagainst.

The compression of bellows 149 continues until valve 166 reaches its seat in the end of the passageway 142, and prevents further passage of syrup out of the bellows. When this occurs, the syrup inside the bellows assumes a pressure nearly equal to the pressure exerted by the carbonated water on the outside of the bellows, since the syrup is a virtually incompressible liquid.

Thus it is apparent that if the syrup pump is arranged so that any air which may be drawn into the bellows, is expelled at the beginning of the compression stroke, then a relatively thin-walled, flexible bellows may be used, since it is never subjected to more than a small part of the pressure of the carbonated water.

In the event that the valve 166 does not seat perfectly and permits a slight leakage of syrup into the passageway 142, the bellows 149 will continue to contract slowly and compress the spring 167 until the faucet 131 is turned off. This additional contraction of the bellows is limited by the fact that the rate of flow of syrup into the delivery faucet is adjusted by choosing a suitable size for the orifice in syrup conduit 145, so that the syrup normally stops flowing just before faucet 131 is turned off. Thus the bellows continues to contract slowly after valve 166 reaches its seat for a short time only, in the case where a perfect seal is not formed. If valve 166 were rigidly attached to the bellows end plate 153, then the bellows would have to withstand the full pressure of the carbonated water when said valve rested on its seat without forming a perfect seal. This follows from the fact that even a slight leak of syrup out of the bellows would relieve the internal pressure if the bellows were held in a fixed position.

When the faucet 131 is turned off, pressure in the pipe 171 will be relieved and the bellows 149 will be expanded by the spring 157, forcing carbonated water out of housing 150 through pipe 170 and out through the delivery spout of said faucet. This water will be equal in volume to the volume of the syrup just delivered. When the carbonated water flows into the bellows housing 150, its pressure is not appreciably reduced, and therefore it loses little gas from solution. When it flows out of said housing after the faucet 131 is turned off, its flow is caused by the relatively low pressure imparted to it by the action of spring 157 on the bellows 149, and the water therefore is discharged through the faucet with a minimum of agitation, which is the condition favoring retention of gas in solution when the pressure is reduced. The rate at which this carbonated water is discharged through the faucet after the faucet has been turned off, may be made to coincide approximately with the rate at which the foam on the mixed beverage subsides, so that the glass is automatically filled if the faucet is turned off when the foam is near the top of the glass.

As the bellows 149 expands, check valve 143 will close and check valve 139 will open, thus causing said bellows to draw syrup from the tank 136 through pipe 137 and check valve 139 into said bellows, to complete the cycle.

In Figure 4 of the drawings a piston pump has been substituted in place of the diaphragm pump shown in Figure 3. The faucet and the fluid con-

nections thereto are the same as shown in Figure 3 so the same part numbers will be applied where the parts are the same as in Figure 3.

The syrup pump is herein shown as including a piston 173 movable within a cylinder 174. A piston rod 175 extends from the upper end of said piston through an enlarged opening 178 in a closure member 176 for the piston rod end of said cylinder. A retaining nut 177 is threaded on the upper end of said piston rod. Said piston rod is enclosed by a housing member 179, which is threaded in a cylindrical boss 180 extending upwardly from said closure member. A spring 181 encircles said piston rod and is interposed between said closure member 176 and said nut 177, to urge said piston 173 towards the upper end of its cylinder. An adjusting screw 182 is threaded in the head end of the cylinder 179 and is adapted to be engaged by said nut 177 to limit upward movement thereof.

A fitting 183 is secured to and enters the housing member 179 near its upper end and is connected with the upper conduit 171 of the faucet 131 through a pipe 184, for supplying fluid under pressure, such as carbonated water, to said housing member and the cylinder 174 and piston 173, past the nut 177 and through the enlarged opening 178, when the faucet 131 is turned to an on position.

The head end of the cylinder 174 is closed by a closure member 185, herein shown as having a fitting 186 suitably mounted in the central portion thereof and communicating with the inside of said cylinder. A T 187 connects said fitting with a check valve 188 on the suction side of said pump. Said check valve is connected with a syrup storage tank 189 by means of a pipe 190. Said T also connects said fitting with a check valve 191 on the pressure side of said pump, which is connected with the lower conduit 145 leading to the faucet 131, by means of a pipe 192, for supplying a measured amount of syrup to said faucet.

Assuming the cylinder 174 to be filled with syrup, when the faucet 131 is opened, fluid under pressure, such as carbonated water, will be supplied to the piston rod end of the cylinder 174 through the passageway 178, to move the piston 173 downwardly along said cylinder. This will close the check valve 188 and open check valve 191 and supply a measured quantity of syrup to the faucet 131, which mixes with the carbonated water as it comes out of said faucet in the manner described in connection with Figures 1 and 3.

While I have herein shown and described a number of forms in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiments illustrated, excepting as they may be limited in the appended claims.

I claim as my invention:

1. In a beverage dispensing device, a pump, a pressure responsive device, an operative connection from said pressure responsive device to said pump, to actuate said pump, a syrup storage tank, a fluid connection from said syrup storage tank to said pump, a valve including a dispensing faucet having a chamber, a fluid connection to said valve to supply carbonated water under pressure thereto, means selectively operable to open said valve to supply carbonated water to said chamber, a fluid connection from said chamber to said pressure responsive device to supply carbonated water under pressure thereto, to actuate said pressure responsive device and operate said pump to deliver a measured quantity of syrup, a fluid connection from said pump to said faucet, to deliver syrup thereto, and a connection from said chamber to said faucet to deliver carbonated water thereto to mix with the syrup delivered by said pump including an orifice leading from said chamber and a valve disk moved towards said orifice upon increase in pressure in said chamber and providing a constant flow control valve from said chamber.

2. In a beverage dispensing device, a pump, a pressure responsive device, an operative connection from said pressure responsive device to actuate said pump on its suction stroke, yieldable means for actuating said pump on its pressure stroke upon the release of pressure from said pressure responsive device, a syrup storage tank, a fluid connection from said syrup storage tank to said pump, a constant delivery valve, a fluid connection to said valve to supply carbonated water thereto, a connection from said valve to said pressure responsive device to supply carbonated water under pressure thereto upon opening of said valve, to actuate said pressure responsive device and actuate said pump on its suction stroke, a fluid connection leading from said pump for delivering a measured amount of syrup, and another fluid connection from said valve for supplying carbonated water to be mixed with said syrup including a faucet selectively operable to release carbonated water from said valve.

3. In a beverage dispensing device, a pump, a pressure responsive device, an operative connection from said pressure responsive device to actuate said pump on its suction stroke, yieldable means for actuating said pump on its pressure stroke upon the release of pressure from said pressure responsive device, a syrup storage tank, a fluid connection from said syrup storage tank to said pump, a dispensing faucet having a valve contained therein for controlling the flow of carbonated water, a fluid connection to said valve to supply carbonated water thereto, a connection from said valve to said pressure responsive device to supply carbonated water under pressure thereto upon opening of said valve, to actuate said pressure responsive device and actuate said pump on its suction stroke, a fluid connection from said pump to said faucet for delivering a measured amount of syrup thereto, and another fluid connection from said valve to said faucet for supplying carbonated water thereto, to be mixed with said syrup including an orifice and a valve disk normally urged away from said orifice and moving towards said orifice to restrict the flow of fluid therefrom upon the increase in pressure of fluid passing through said orifice.

4. In a fluid pump, a housing, a flexible bellows mounted within said housing, yieldable means for expanding said bellows, a fluid passageway leading into an end of said housing and the inside of said bellows through one end thereof for supplying fluid to said bellows upon expansion thereof by said yieldable means, another fluid passageway leading into said housing for admitting fluid under pressure thereto to the outside of said bellows to contract said bellows and cause said bellows to expel fluid therefrom, and means for

measuring the volume of fluid pumped by said bellows including a valve mounted within said bellows for engagement with said passageway leading to the inside of said bellows, upon a predetermined contraction of said bellows.

5. In a fluid pump, a housing, a flexible bellows mounted within said housing, yieldable means for expanding said bellows, a fluid passageway leading into an end of said housing and the inside of said bellows through one end thereof for supplying fluid to said bellows upon expansion thereof by said yieldable means, and another fluid passageway for admitting fluid under pressure thereto to the outside of said bellows to contract said bellows and cause said bellows to expel fluid therefrom, and means for measuring the volume of fluid pumped by said bellows including a valve mounted within said bellows in the end thereof opposite from said passageway leading into said bellows, for engagement with said passageway upon contraction of said bellows a predetermined amount, and yieldable means for holding said valve in an extended position and adapted to yield upon engagement of said valve with said passageway.

6. A faucet for dispensing beverages or the like including a casing, a valve chamber within said casing and having a wall with an outer flat surface, an inlet port leading into said chamber, an outlet orifice leading through said wall, a valve for controlling the passage of fluid from said inlet port through said outlet orifice, a member mounted in juxtaposition to said flat outer surface of said wall and with said wall forming a passageway for fluid passing through said orifice, for movement towards and from said flat outer surface of said wall, to constrict or enlarge said passageway, and yieldable means for urging said member to move in a direction away from said wall, and fluid under pressure passing through said orifice causing said member to move towards said wall against said yieldable means by the difference in pressure of fluid passing between said member and wall and atmospheric pressure on the outside of said member as the velocity of fluid passing through said orifice increases and reduces pressure between said wall and said member below pressure on the outside of said member, causing pressure on the outside of said member to move said member towards said wall, to maintain a relatively constant flow of fluid regardless of the pressure of fluid in said inlet port.

7. In a faucet for dispensing beverages or the like, a casing, a valve chamber within said casing, an inlet port leading into said chamber, a disk closing one end of said chamber, an orifice leading from said chamber through said disk, a valve for admitting fluid through said inlet port into said chamber, and a disk disposed parallel to said first mentioned disk in closely spaced relation with respect thereto and mounted for movement towards and from said first mentioned disk to constrict or permit an increased amount of fluid to pass through said orifice dependent upon the pressure of fluid within said chamber, said movable disk being moved towards said stationary disk by the difference in pressure of fluid passing between said disks and the pressure of fluid on the outside of said movable disk as the velocity of fluid passing through said orifice increases, to maintain a relatively constant flow of fluid regardless of the pressure of fluid within said chamber.

8. In a faucet for dispensing beverages or the like, a casing, a valve chamber within said casing, an inlet port leading into said chamber, a disk closing one end of said chamber, an orifice leading from said chamber through said disk, a valve for admitting fluid through said inlet port into said chamber, another disk parallel to said first mentioned disk, mounted for movement towards and from said first mentioned disk to constrict or permit an increased amount of fluid to pass through said orifice, dependent upon the pressure of fluid within said chamber, said movable disk being moved towards said stationary disk by the difference in pressure of fluid on the outside of said disk, as the velocity of fluid passing through said orifice increases, to maintain a relatively constant flow of fluid regardless of the pressure of fluid within said chamber, and yieldable means for urging said movable disk in a direction away from said stationary disk.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
921,870	Muth	May 18, 1909
1,654,004	Lind	Dec. 27, 1927
2,427,429	Waite et al.	Sept. 16, 1947