Dec. 6, 1932. J. F. DAWSON 1,889,886

CARBONATING DEVICE

Filed April 16, 1931

Fig. 1.

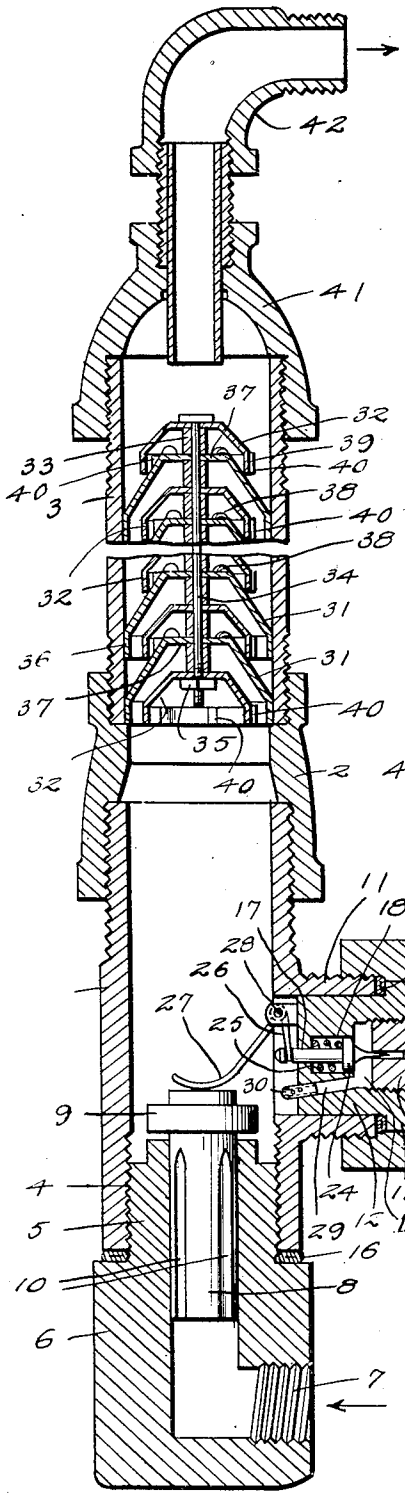



Fig. 2.

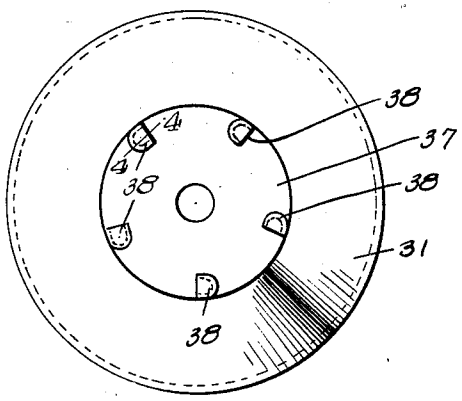



Fig. 3.

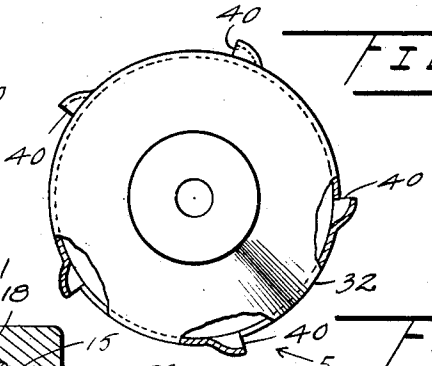
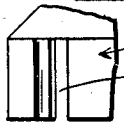



Fig. 4.




Fig. 5.




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# UNITED STATES PATENT OFFICE

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## CARBONATING DEVICE

Application filed April 16, 1931. Serial No. 530,706.

This invention relates to improvements in carbonating devices and pertains particularly to a combined carbonator and mixing valve.

The primary object of the present invention is to provide a carbonating device which automatically operates, as the pressure is reduced at an outlet, to open a valve for the introduction of gas thereinto as the water is admitted, the entrance of water to the mixing device actuating the valve controlling the admission of gas.

Another object of the invention is to provide a carbonator device having a water valve and a gas valve with a connection between the two valves whereby the gas valve is actuated by and upon the movement of the water valve, the water valve being in turn actuated by the pressure of water thereagainst.

Still another object of the invention is to provide a carbonator in which an improved means is employed for agitating the gas and water to obtain the thorough commingling thereof and solution of the gas in the water.

A still further object of the invention is to provide an improved water and gas mixer and valve structure for a carbonator in which the valve structure is of relatively simple but rugged design so that the failure of any part thereof is unlikely to occur.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Figure 1 is a view in longitudinal section through the carbonator structure embodying the present invention.

Figure 2 is a view in top plan of one of the baffle or agitating cones.

Figure 3 is a view in top plan of another of the baffle or agitating cones, portions thereof being broken away.

Figure 4 is a detailed sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a fragmentary view of the cone shown in Figure 3 looking in the general direction of the arrow.

Referring now more particularly to the drawing, wherein like numerals of reference indicate corresponding parts throughout the several views, the numeral 1 indicates the main body portion of the valve portion of the carbonator device.

This, as shown, is a cylindrical body which is exteriorly threaded at its upper end for connection therewith of the coupling 2 which joins the valve body 1 with the cylinder 3. The lower end of the body 1 is interiorly threaded, as indicated at 4, and this has extended thereinto the reduced portion 5 of a casting 6. The casting 6 has a passage opening through one side and interiorly threaded, as at 7, and extending longitudinally therethrough to and through the end of the reduced portion 5 which terminates within the body 1. The inner end of this passage has slidably mounted therein the valve plug 8 which is limited in its inward movement by the collar 9 which surrounds the end thereof which is positioned within the body 1. This plug 8 has the flutes or passages 10 formed from its lower end in the face thereof, to a point adjacent the collar 9 so that when the plug is down in the passage 7 the flutes will be covered, but when it is raised they will extend beyond the upper end of the portion 5 of the casting and permit fluid to pass into the body 1.

Intermediate its ends the body 1 has an angularly directed, exteriorly threaded, nipple 11 into which is extended a needle valve carrier 12, the outer end of which is flanged, as at 13, to limit its inward movement. This carrier 13 is secured in position by the collar 14 which surrounds the nipple and forces the flange 13 inwardly against the end of the nipple. A suitable packing or gasket 15 is interposed between the flange 13 and the end of the nipple, as illustrated, and there is also a gasket interposed between the lower end

of the body 1 and the shoulder portion of the casting 6 which abuts thereagainst, as indicated at 16.

The carrier 12 has a longitudinally extending passage therethrough which, at its inner end, is relatively narrow, as indicated at 17, while intermediate its ends it is slightly enlarged, as indicated at 18, and at its outer end it is still larger, forming the chamber 19. The wall of the chamber 19 is interiorly threaded to receive the threaded reduced end 20 of the gas inlet nipple 21, the outer end of which is reduced slightly and threaded, as indicated at 22, to facilitate the coupling of a gas pipe thereto. The inner end of the passage through the nipple 21 is reduced, as indicated at 23.

Extending through the inner end portion 17 of the passage through the valve carrier 12 is the stem of a needle valve, which is indicated generally by the numeral 24. The point of this valve enters the reduced end of the passage 23 and intermediate its ends this stem is enlarged to fit snugly in the portion 18 of the passage through the carrier. A spring 25 located in the portion 18 of the valve carrier normally projects the needle valve to seated position in the passage 23. The inner end of the needle valve stem is engaged by a finger 26 which forms a part of an actuating lever 27. This actuating lever 27 is pivotally mounted, as at 28, upon the inner end of the body 12 and it extends downwardly and is curved adjacent its free end for contact with the top of the reciprocable valve plug 8. A gas passage 29 is formed through the body 12 from the chamber 19 into which the gas is allowed to escape by the needle valve to the interior of the body 1, the inner end of this passage being covered by a finely apertured body 30 which tends to thoroughly disperse the gas in the water with which the body 1 is filled.

Within the cylinder 3 there are located a series of frusto-conical bodies of alternately large and small diameter, the larger bodies being indicated by the numerals 31 while the smaller bodies are indicated by the numerals 32. These alternately large and small bodies are separated by spacing members 33 and are held in unitary relation by a rod 34, the upper end of which has a head against which the upper cone body presses, while upon the lower end is a nut 35 which retains the members in place thereon.

The larger bodies 31 have straight lower edge flange portions 36 which are of an exterior diameter to snugly fit in the cylinder 3 and the flat tops 37 thereof are each provided with a circular series of outlet ports 38 which are arranged to all discharge in the same direction. The smaller bodies 32 are each provided with a straight lowered portion 39 which rests upon the sloping top of a larger body disposed therebeneath. The straight bottom flange portions of the smaller cone bodies 32 are provided with a series of vertical covered outlet ports 40 all of which are arranged to discharge in the same direction and their direction of discharge is opposite to the direction of discharge of the ports 38 of the larger bodies.

The upper end of the cylinder 3 has a suitable reducing coupling 41 connected therewith with which is connected a coupling 42 to which may in turn be attached a lead-off pipe (not shown).

From the foregoing description it will be seen that when the pressure is reduced within the cylinder 3 or the valve body 1, the pressure of water entering the passage 7 will cause the valve plug 8 to lift until the flutes 6 are uncovered so that the water may flow into the body of the carbonator.

This lifting of the plug 8 will cause the actuation of the lever 27 and consequently the opening of the needle valve 24 thus permitting gas to enter through the nipple 21 and the passage 29 to mix with the water in the valve body. As the mixed gas and water flows upwardly through the cylinder 3 it will be violently whirled back and forth as it passes through the ports 38 and 40 of the alternate large and small bodies 31 and 32, so that the complete mixing of gas with the water will be obtained.

Having thus described the invention, what is claimed is:

1. In a carbonator of the character described, a water and gas mixing mechanism, comprising a hollow body having a water inlet and a gas inlet, a movable valve body controlling the water inlet, a needle valve controlling the passage of gas through the gas inlet, said needle valve being spring actuated and having a stem, a pivotally mounted lever engaging said water inlet valve, connecting means between said lever and said stem whereby the latter is retracted upon the movement of the water valve against the lever, and a lead-off from the body having agitating baffles therein.

2. In a carbonator of the character described, a gas and water mixing receptacle having a pair of inlet ports, a reciprocable plug body controlling the admission of water into the receptacle through one of said ports, the other port being designed for the admission of gas into the receptacle, a body positioned in the said other port and having a passage longitudinally therethrough, a needle valve reciprocably mounted in said passage, a coupling connected at one end in the outer end of said body passage and having a bore therethrough into the end of which the needle valve extends, spring means normally urging said needle valve into said bore to close the same, a lever oscillatably mounted upon the inner end of said body and having connection with said needle valve, said

lever being in engagement with said plug whereby upon movement of the plug the needle valve will be unseated, said body having a second passage therein for passing the gas from the outer end of the first passage into the receptacle, and lead-off means for said receptacle.

3. In a carbonating device, an elongated chamber having an inlet and an outlet, a plurality of substantially frusto-conical bodies arranged in nested relation in said chamber and concentric therewith, alternate ones of said bodies being of an overall diameter to snugly position in the chamber, the other of the bodies being of materially less diameter and each having a depending annular flange resting upon the top of the next lowest body, each of said alternate bodies having a series of outlets through its top opening into an overlying body and directed circumferentially thereof, each of said annular flanges having outlet openings therethrough, and an element disposed at one side of each of said annular flange outlet openings and directed circumferentially of the adjacent body to cause fluid passing therethrough to travel in a circular path.

4. In a carbonating device, a gas and water mixing chamber comprising an elongated body of circular cross section and having inlet and outlet openings, a plurality of substantially frusto-conical bodies disposed concentrically in said elongated body, each being of overall diameter to snugly fit within the elongated body and each having a circular series of openings through its top, fluid guiding means for said last mentioned openings arranged to direct fluid flowing therethrough in a circular path about the longitudinal axis of the body, a second series of substantially frusto-conical bodies of materially less diameter than the first mentioned series of bodies and each having a depending annular flange resting upon the top of one of the first mentioned bodies, each of said flanges having an outlet opening therethrough, means overlying each of said outlet openings for directing fluid passing therethrough in a circular path, a connecting member passing concentrically through said frusto-conical bodies, and spacing elements surrounding said connecting member and disposed between the frusto-conical bodies.

5. An improved carbonator of the character described, comprising a chamber having an inlet and an outlet, a plurality of baffle members disposed in said chamber between the inlet and the outlet, alternate ones of said baffles completely partitioning the chamber, said baffles being of circular outline, certain of said baffles having ports therethrough in an annular formation and relatively close to the radial centers of the baffles, the others of said baffles having ports therethrough adjacent their peripheries, means covering each of the ports of each baffle for directing fluid passing through the port in a circular path in the chamber and said means upon certain of the baffles being directed oppositely to those upon the other baffles to effect the continued reversal of flow of liquid passing through the chamber.

6. An improved carbonator of the character described, comprising a chamber having an inlet and an outlet, a plurality of baffle members disposed in said chamber between the inlet and the outlet, alternate ones of said baffles completely partitioning the chamber, said baffles being of circular outline, certain of said baffles having ports therethrough in an annular formation and relatively close to the radial centers of the baffles, the others of said baffles having ports therethrough adjacent their peripheries, means covering each of the ports of each baffle for directing fluid passing through the port in a circular path in the chamber, said means upon certain of the baffles being directed oppositely to those upon the other baffles to effect the continued reversal of flow of liquid passing through the chamber, and a pair of valves disposed at the inlet of said chamber and one thereof controlling the admission of gas thereinto and the other controlling the admission of water.

7. A valve structure for a carbonating device, comprising a hollow body having a water inlet and a gas inlet, a movable valve body coutrolling the water inlet, a needle valve controlling the passage of gas through the gas inlet, said needle valve being normally spring pressed to closed position and having a stem, a pivotally mounted lever having contact with said water inlet valve to be oscillated by the movement of the same in one direction, and connecting means between said lever and said needle valve stem whereby the opening movement of the lever against the said spring means is obtained upon the opening of the water inlet valve.

In testimony whereof I hereunto affix my signature.

JAMES F. DAWSON.