

July 23, 1946.

P. ANDRON ET AL

2,404,679

CARBONATOR

Filed April 4, 1945

3 Sheets-Sheet 1

Fig. 1.

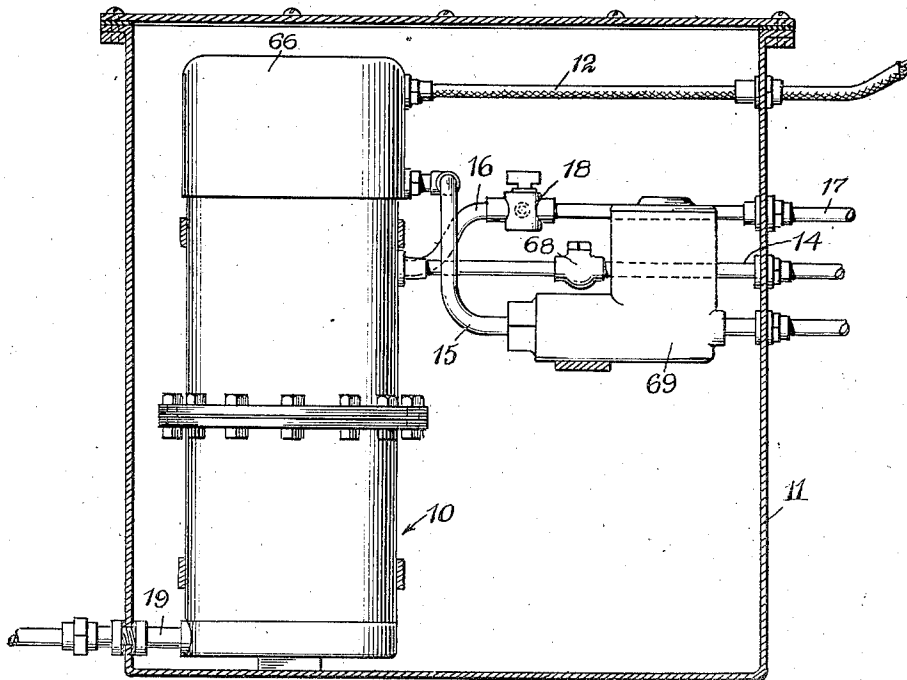
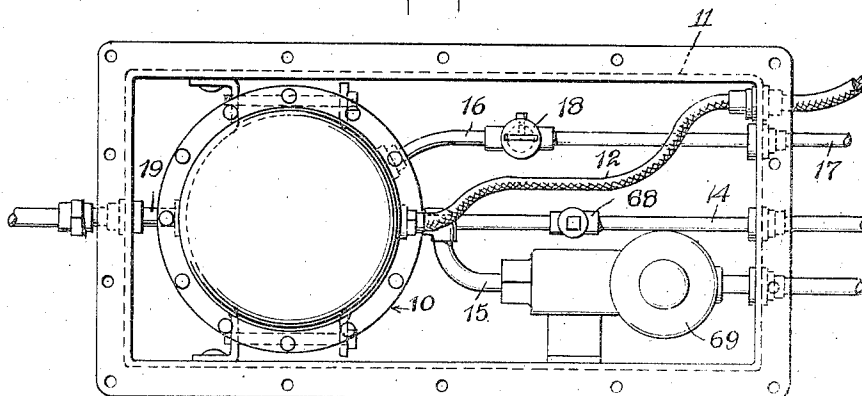


Fig. 2.



INVENTORS
Philip Andron
and Harold Krichman
BY

Munn, Lloyd & Glacum
Attorneys

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Fig. 3.

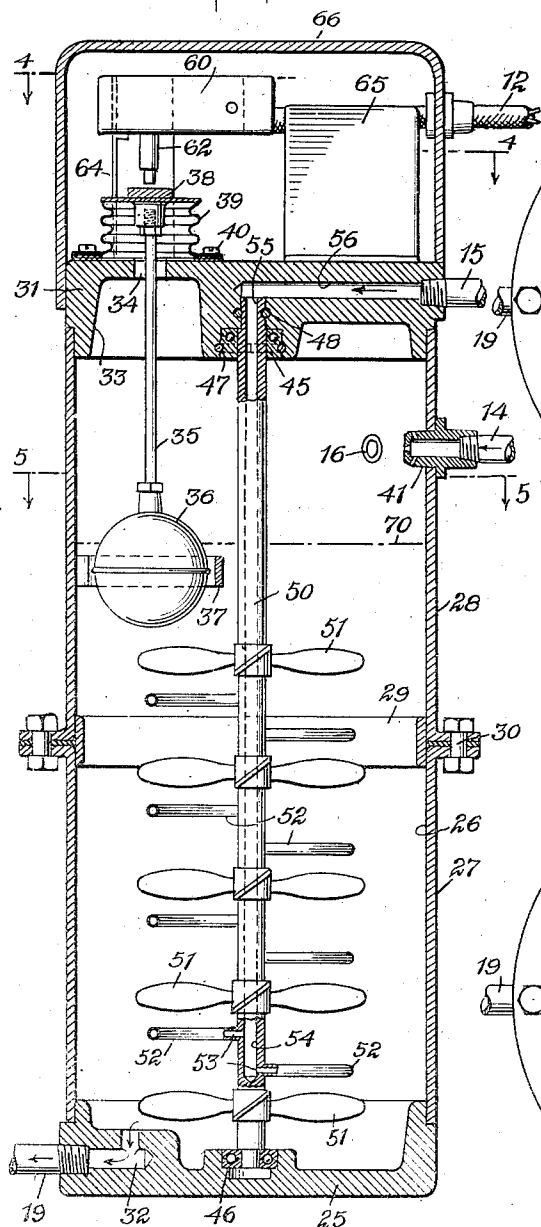


Fig. 4.

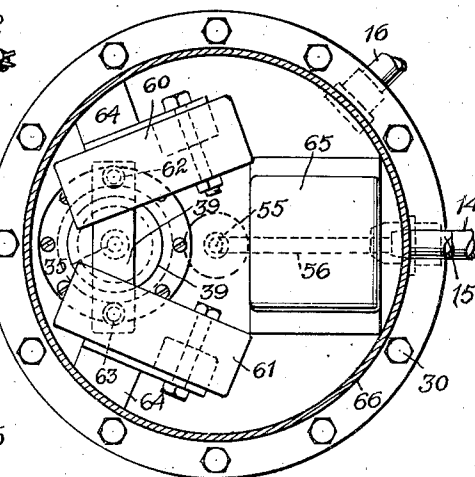
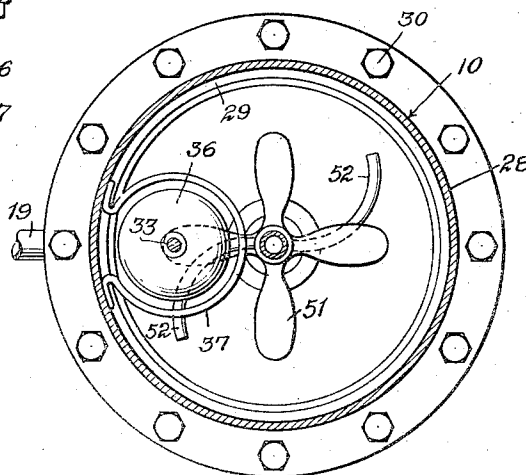


Fig. 5.



INVENTORS
Philip Andron
and Harold Krichman
BY

Munn, Liddy & Glaccum
Attorneys

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Fig. 6.

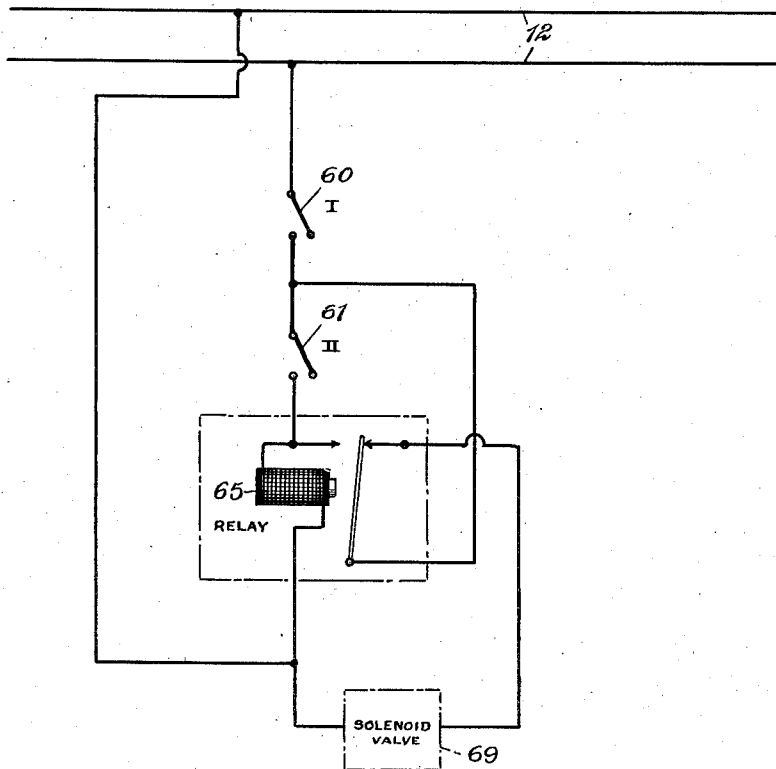
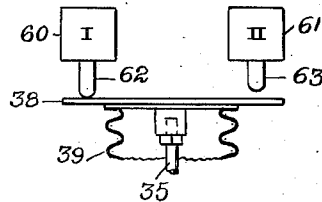


Fig. 7.



INVENTORS
Philip Andron
and Harold Krichman
BY
Munn, Liddy & Glaccum
Attorneys

UNITED STATES PATENT OFFICE

2,404,679

CARBONATOR

Philip Andron, Brooklyn, N. Y., and Harold
Krichman, Bayonne, N. J.

Application April 4, 1945, Serial No. 586,536

6 Claims. (Cl. 261—93)

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This invention relates to a carbonator and more particularly to a compact automatic device which will carbonate water or other liquid for use in soda fountains or otherwise.

An object of the invention is to provide a carbonator which is automatic in its operation and which will be self-operating.

A further object is to provide a carbonator which will thoroughly mix the gas with the liquid so as to continuously supply carbonated liquid as it is needed.

A further object is to provide a device of the character described which will operate only when required but which, when once actuated will always be ready for further operation.

Other objects and advantages of our invention will appear from the accompanying drawings, in which—

Fig. 1 is a side elevation of a carbonator embodying our invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a cross sectional view in elevation showing the operation of the carbonator;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a cross sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a diagram showing the circuit and switches involved; and

Fig. 7 is a detail view showing the manner of operating the micro-switches.

Referring more particularly to the drawings, the carbonator 10 may be encased in a suitable covering 11 with the provision for current furnished by the cable 12; for furnishing water by means of the line 14, and for furnishing gas under pressure by means of the line 15. A further line 16 leads to a conventional safety valve at the end thereof, 17. The line 16 is also provided with a three-way cock valve 18 which when in one position will connect the carbonator to the safety valve, and which, in the other position will connect the carbonator to the atmosphere. An outlet 19 is provided at the bottom of the carbonator for drawing off the carbonated liquid.

The carbonator 10 is preferably made up of a base casting 25, a chamber 26 which may be made of two sections of tubing 27 and 28 suitably fastened together with the gasket 29 therebetween by means of bolts 30. Another casting 31 is provided, and the tubular sections 27 and 28 are suitably affixed to the castings 25 and 31 by means of soldering or otherwise. The casting 25 is provided with an opening 32 communicating with the outlet 19. The casting 31 is provided with a

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chamber 33 having an opening therein, 34, through which extends the float rod 35 supporting the float 36 within the protecting bracket 37. On the other end of the float rod 35 is mounted the contact member 38 and this extends through the bellows 39 fixed at 40 to the casting 31. A water inlet coupling 41 is provided to receive the tubing 14.

Mounted in the casting 31 are stainless steel ball bearings 45 and similar bearings 46 are mounted in the casting 25. Bearings 45 are held in place by the snap ring 47. Mounted in the bearings 45 and 46 is a stainless steel tubing 50 and a rubber gasket 48 is placed about the top of this tubing to prevent gas from passing over the outside thereof. Mounted on the tubing 50 are a plurality of agitators 51. Preferably these are four-bladed sheet metal agitators and may be mounted on the outside of the tubing 50 in any conventional manner. On the lower half of the tubing 50 are mounted a series of arcuate tubular members 52 communicating with the inside of the tube 50 and having an inner bore 53 considerably smaller than the inner bore 54 of the tube 50. The top 55 of the tube 50 communicates with the bore 56 in the casing 31 which, in turn, communicates with the gas inlet 15.

Mounted above the bellows 39 and the contact member 38 of the float rod 35 are a pair of micro-switches 60 and 61 having dependent contact points 62 and 63, the contact point 62 being somewhat lower than the contact point 63. The micro-switches 60 and 61 are supported by suitable brackets 64. Also mounted above the casting 31 is a relay 65. A suitable cap or cover of metal or plastic 66 is provided to cover this mechanism. Mounted in the water line 15 is a check valve 68 and in the gas intake line 15 is mounted a solenoid valve 69.

When it is desired to put the unit into operation, the three-way valve 18 is opened to allow communication between the chamber 25 and the outside atmosphere. Water is then let into the water line 14 and the three-way valve closed so as to provide communication between the chamber and the relief valve only. As the water level rises the float 36 will rise until the contact member 38 closes the micro-switch 60, thus energizing the circuit and opening the solenoid valve 69 to allow the gas to enter through the inlet 15 into the center of the tube 50. The gas will naturally force its way through the arcuate spinner tubes 52 thus causing the tube 50 to rotate in the bearings 45 and 46 and to rotate with it the agitators 51 insuring a thorough mixing of the liquid.

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As the gas pressure, which is normally introduced at about 75 pounds to the square inch, increases, it will prevent the entry of more liquid through the inlet 14 in view of the fact that the pressure of the gas is greater than that of the water. This will close check valve 68 and prevent the gas from forcing its way out through the water line. As the pressure of the gas increases within the chamber, the bellows 39 are expanded until the contact 63 of the micro-switch 61 is contacted, thus closing the switch 61 bringing into operation the relay which will, in turn, close the solenoid valve and shut off the gas pressure. The carbonator is at this point fully charged.

As the carbonized liquid is drawn off through the outlet 19 and the water level falls, the gas pressure will likewise fall. Upon the falling of the water pressure the float 35 will drop out of contact with the contact element 62 of the switch 60. As the gas pressure falls, more water will be able to pass through the check valve into the container, thus raising again the float valve to actuate the micro-switch 60 which, in turn, will open the solenoid valve and allow more gas to enter. The operation, therefore, will be continuous and the carbonator will always be charged as long as the unit is in operation.

It will be appreciated that many variations, refinements and modifications of our invention may be made without departing from the basic invention, and that several different circuits may be employed to produce the same results.

We claim:

1. In a carbonator a chamber, a tubular member rotatably mounted in said chamber extending throughout the length of said chamber, agitators on said tubular member, arcuate tubular spinner members mounted on said tubular member spaced throughout its length and communicating with the center thereof, means for introducing water into said chamber, means for introducing gas into said chamber under pressure through said tubular member and said spinners, a valve controlling said gas introducing means, means operated by the level of the water in said chamber to open said valve, additional means operated by the pressure in said chamber to close said valve and means for closing the water introducing means to prevent the escape of gas when the gas reaches a predetermined pressure.

2. In a carbonator a chamber, a tubular member rotatably mounted in said chamber, agitators on said tubular member, arcuate tubular spinner members mounted in said tubular member and communicating with the center thereof, means for introducing water into said chamber, means for introducing gas into said chamber under pressure through said tubular member and said spinners, a valve controlling said gas introducing means, a float in said chamber, a bellows in said chamber, a pair of contacts mounted above said float and said bellows and operated thereby, one of said contacts actuating the circuit to open said gas valve when said float reaches a predetermined position and the other of said contacts actuating a circuit to close said gas valve when the pressure in said chamber reaches a predetermined point to operate said bellows.

3. In a carbonator a chamber, an opening in the top of said chamber, a bellows on said opening, a float having a float rod extending through said bellows, a circuit, a relay in said circuit, a

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valve controlled by said circuit, a pair of switch members in said circuit, means for introducing gas into said chamber under pressure controlled by said valve, one of said switch members being operated by said float rod to open said valve and the other of said switch members being operated by said bellows to close said valve.

4. In a carbonator a chamber, a pipe introducing water into said chamber, a check valve in said pipe to prevent the escape of gas from said chamber when the pressure of gas is greater than the pressure of water in said pipe, means for introducing gas into said chamber under pressure, a valve controlling said gas introducing means, a circuit controlling the operation of said valve, an opening in said chamber, a bellows on said opening, a float having a float rod extending through said bellows, a pair of switch members in said circuit, one of said switch members actuating said circuit to open said valve, the other of said switch members actuating said circuit to close said valve, the first of said switch members being closed by said float rod when said float reaches a predetermined position and the second of said switch members being closed when the gas in said chamber reaches a predetermined pressure, each of said switch members being open when the pressure in said chamber falls below a predetermined point.

5. In a carbonator a chamber, a pipe introducing water into said chamber, a check valve in said pipe to prevent the escape of gas from said chamber when the pressure of gas is greater than the pressure of water in said pipe, means for introducing gas into said chamber under pressure, a valve controlling said gas introducing means, a circuit controlling the operation of said valve, an opening in said chamber, a bellows on said opening, a float having a float rod extending through said bellows, a pair of switch members in said circuit, one of said switch members actuating said circuit to open said valve, the other of said switch members actuating said circuit to close said valve, the first of said switch members being closed by said float rod when said float reaches a predetermined position and the second of said switch members being closed when the gas in said chamber reaches a predetermined pressure, each of said switch members being open when the pressure in said chamber falls below a predetermined point, and the float moves downwardly in said chamber.

6. In a carbonator a chamber, an opening in the top of said chamber, a bellows on said opening, a float having a float rod extending through said bellows, means for introducing gas into said chamber, a valve controlling said means, a circuit operating said valve, a relay in said circuit, a pair of switch members positioned under said bellows, said switch members having contacts depending therefrom, one of said switch members having longer contact than the other so that it is operated by said float rod when said float rises in said chamber, said switch member actuating said circuit to open said valve, said second switch member having a contact to close said switch when the pressure in said chamber operates said bellows, said second switch member operating said relay to close said valve.

PHILIP ANDRON.
HAROLD KRICHMAN.