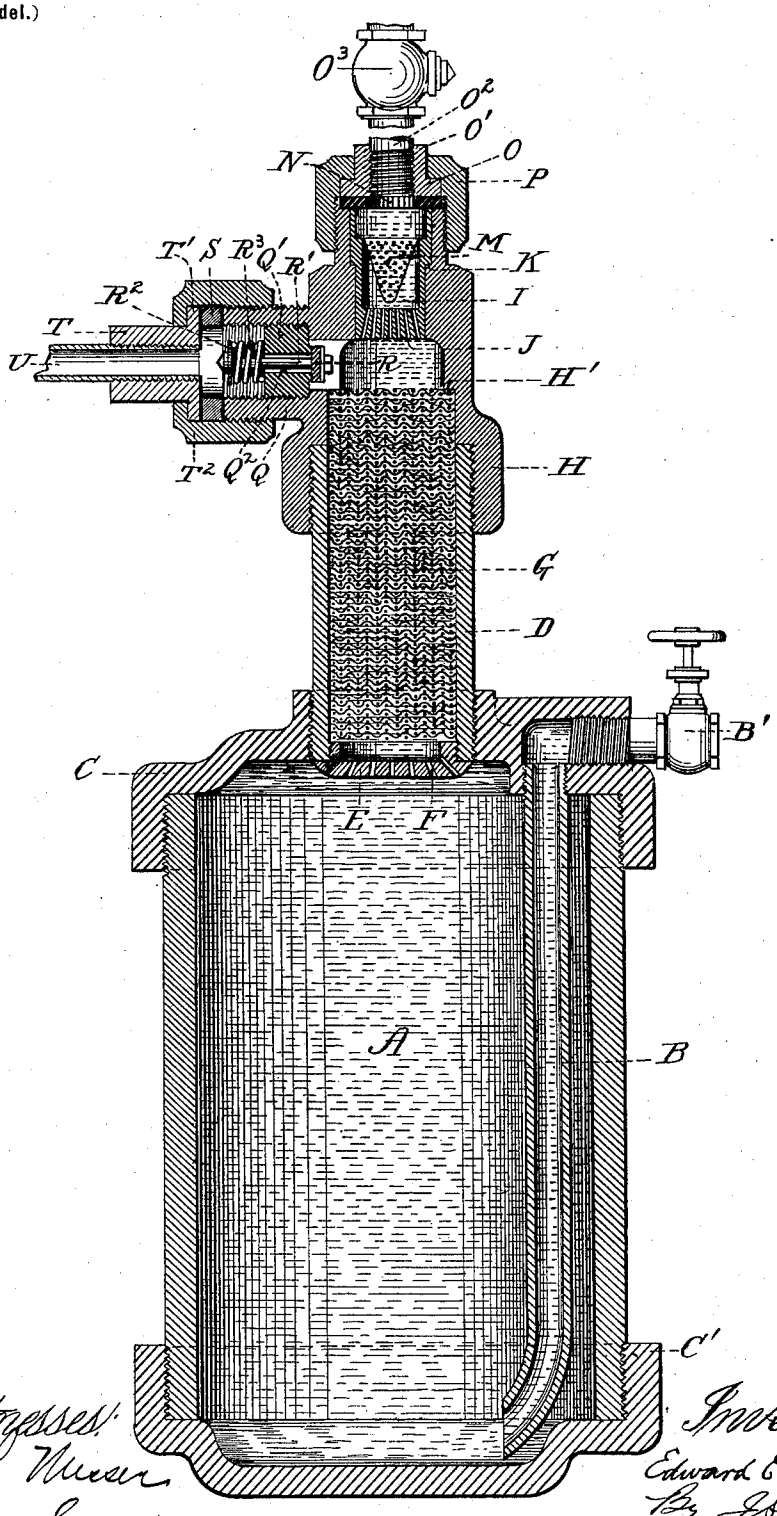
No. 655,727. Patented Aug. 14, 1900.

E. E. MURPHY.

CARBONATING APPARATUS.

(Application filed Feb. 10, 1899.)

(No Model.)



Witnesses:
A. L. Mason
C. N. Stewart.

Inventor:
Edward E. Murphy,
By J. S. Rusk,
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD E. MURPHY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE NEW ERA CARBONATOR COMPANY, OF CHARLESTOWN, WEST VIRGINIA.

CARBONATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 655,727, dated August 14, 1900.

Application filed February 10, 1899. Serial No. 705,154. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. MURPHY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Carbonating Apparatus, of which the following is a specification.

This invention relates to method of and apparatus for carbonating water and other liquids.

The object of this invention is to provide a simple and efficient automatic apparatus which shall produce a thorough mechanical combination of the liquid and the carbonic-acid or other gas and in which the carbonating operation is controlled directly by the accumulation of the carbonated liquid, automatically ceasing when a predetermined quantity has been accumulated and automatically starting when the accumulation is reduced.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

The drawing represents a vertical sectional view of an apparatus embodying my invention.

In the drawing, A represents a reservoir or receptacle for the carbonated liquid produced by the apparatus to be described. This reservoir is provided with a suitable distributing outlet-pipe B, through which the carbonated liquid is drawn for use and which is controlled by a suitable valve B'. The reservoir A is provided with upper and lower heads C C', which are screwed onto the exterior of said reservoir. In the opening in the head C there is screwed the lower end of a liquid and gas mixing tube D, and in the lower end of said tube there is secured by screw-threads a perforated spray-cap E, having diverging outlet-perforations F. Within said mixing-tube is a metallic sponge G, consisting of a series of layers of wire-cloth through which the gas and liquid pass downwardly and by means of which the liquid is minutely subdivided in order to facilitate the mechanical combination of the liquid and gas. This sponge rests at its lower end on the cap E and is held in a compact body by the spray-head H, which is screw-threaded onto the mixing-tube D and has an annular shoulder H', which bears against the upper end of the metallic sponge G and holds said sponge in a compact body. On the upper part of said spray-head is located a detachable spray-nozzle I, having a series of diverging perforations J, and the nozzle is supported in said head by resting on the annular shoulder K of said head. Within said nozzle and resting on the shoulder L thereof is a strainer M. On the upper ends of the spray-head H and nozzle I is a packing N, of any suitable material, and resting on said packing is the tailpiece O of the union O', into which is screw-threaded the liquid-supply pipe O^2, provided with a suitable check-valve O^3. The union-cap P is screw-threaded onto the exterior of the upper end of the spray-head H and holds the parts in the position shown, also making a water-tight joint. Located on one side of the spray-head H is a nose Q, externally and internally screw-threaded, and screwed into said ends is a valve-seat Q', having a passage Q^2, controlled by the valve R, mounted on the valve-stem R'. On the rear end of said valve-stem is a washer R^2, and between said washer and the valve-seat is a coiled spring R^3, adapted to assist in operating the valve R to close the passage Q as the apparatus fills with water. Against the end of the nose Q is a suitable packing S, and resting on said packing is the tailpiece T' of the union T, into which is screw-threaded the gas-supply pipe U. The union-cap T^2 is screw-threaded onto the exterior of the nose Q and holds the parts in the position shown and makes a gas-tight joint.

In operation the liquid-supply pipe is connected to a high-pressure service-pipe of, say, under one hundred and seventy-five or two hundred pounds pressure, and the gas-supply pipe is connected to a gas-supply tank of, say, from one hundred and twenty-five to one hundred and fifty pounds pressure. To prepare the apparatus for actual use, gas is first supplied through the pipe U and drives out all the air from the apparatus, and water or other liquid is then admitted to the pipe O^2, and the liquid being cut up by the sponge G at once causes the absorption of the gas until the apparatus is entirely filled with the carbonated liquid up to the perforations J of the spray-nozzle I, when all the admitted gas is absorbed and at which time the entire apparatus is un-

der the initial water-pressure and the valve R, controlling the gas-supply, is closed, due to the liquid-pressure. Now when the carbonated liquid is drawn off through the pipe B, the spray I being so constructed as to retard the admission of the water, the carbonated liquid is drawn off faster than the same amount of water can be supplied in the same period of time, thereby providing room for the entrance of more new gas, which enters by the opening of the valve R, which valve is opened on account of the gas-pressure behind it, which is then greater than the pressure within the tube D, which pressure at that instant has been reduced by the drawing off of the carbonated liquid. Now the gas-pressure equalizing, the valve R closes and the water continuing to flow in through the nozzle I produces a greater pressure than the gas-pressure and holds closed the valve R before the water-level has reached said valve, which remains closed as the water rises and fills the tube, and the valve is maintained in its closed position by the aid of the spring R^3 and the rising water and consequent increased pressure in the tube D as the tube fills.

The admission of gas to the mixing-tube F is not due to the flow of water into the mixing-chamber, but its admission is controlled by the withdrawal of a certain volume of carbonated liquid, which causes a reduction of the pressure in the mixing-tube below the initial gas-pressure, so that the gas under its own pressure opens the valve R and passes into the mixing-tube at that instant, where it mixes with the water passing down through said sponge contained in said mixing-chamber.

The mixing-tube D is of much less diameter than the reservoir A, so that the slightest withdrawal of the carbonated liquid will empty the tube D and cause the admission of new gas and liquid. The check-valve O^3 is for the purpose of preventing a loss of gas in the event of a break in the liquid-supply pipe.

I do not limit myself to the arrangement and construction shown, as the same may be varied without departing from the spirit of my invention.

In a divisional application filed November 27, 1899, Serial No. 738,341, the method of charging liquids with gas is described and claimed.

Having thus ascertained the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber for the gas and liquid in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said mixing-chamber and adapted to open automatically by the pressure of the gas upon a reduction of pressure in the mixing-chamber below the gas-pressure to admit gas which flows into the mixing-chamber by its own pressure independently of the flow of the liquid, and means operating to allow the gas to fill the mixing-chamber before it is filled with the liquid.

2. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber for the gas and liquid in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said mixing-chamber and adapted to open automatically by the pressure of the gas upon a reduction of pressure in the mixing-chamber below the gas-pressure to admit the gas which flows into the mixing-chamber by its own pressure independently of the flow of the liquid, means for subdividing and combining the gas and liquid, and means operating to allow the gas to fill the mixing-chamber before it is filled with the liquid.

3. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber for the gas and liquid in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said mixing-chamber and adapted to open automatically by the pressure of the gas upon a reduction of pressure in the mixing-chamber below the gas-pressure to admit the gas which flows into the mixing-chamber by its own pressure independently of the flow of the liquid, means through which the gas and liquid are forced under pressure for subdividing and mechanically combining the same, and means operating to allow the gas to fill the mixing-chamber before it is filled with the liquid.

4. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber for the gas and liquid in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said mixing-chamber and adapted to open automatically by the pressure of the gas upon a reduction of pressure in the mixing-chamber below the gas-pressure to admit the gas which flows into the mixing-chamber by its own pressure independently of the flow of the liquid, a wire sponge through which the gas and liquid are forced under pressure for subdividing and combining the same, and means

operating to allow the gas to fill the mixing-chamber before it is filled with the liquid.

5. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said chamber and adapted to open automatically by the pressure of the gas to admit the gas upon a reduction of the pressure in said chamber below the gas-pressure, and means for retarding the flow of the liquid from the liquid-inlet pipe into the mixing-chamber to allow the gas to fill the mixing-chamber before it is filled with the liquid.

6. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said chamber and adapted to open automatically by the pressure of the gas to admit the gas upon a reduction of the pressure in said chamber below the gas-pressure, means for retarding the flow of the liquid from the liquid-inlet pipe into the mixing-chamber, and means in said mixing-chamber for subdividing and combining the gas and liquid.

7. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said chamber and adapted to open automatically by the pressure of the gas to admit the gas upon a reduction of the pressure in said chamber below the gas-pressure, and a nozzle having a restricted outlet to retard the flow of the liquid from the liquid-inlet pipe into the mixing-chamber.

8. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said chamber and adapted to open automatically by the pressure of the gas to admit the gas upon a reduction of the pressure in said chamber below the gas-pressure, a nozzle having a restricted outlet to retard the flow of the liquid from the liquid-inlet pipe into the mixing-chamber, and a strainer located in said nozzle.

9. In a carbonating apparatus, a liquid-inlet pipe for supplying liquid under pressure, a gas-inlet pipe for supplying gas under less pressure than that on the liquid, a mixing-chamber for the gas and liquid in constant open communication with the liquid-supply under initial liquid-pressure and normally filled with gas and liquid, a valve normally closing said gas-inlet pipe by the pressure in said mixing-chamber and adapted to open automatically by the pressure of the gas upon a reduction of pressure in the mixing-chamber below the gas-pressure to admit the gas which flows into the mixing-chamber by its own pressure independently of the flow of the liquid, and means for retarding the flow of the liquid from the liquid-inlet pipe into the mixing-chamber to allow the gas to fill the mixing-chamber before it is filled with the liquid.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of January, A. D. 1899.

EDWARD E. MURPHY.

Witnesses:
C. A. STEWART,
A. L. MESSER.