No. 657,882. Patented Sept. 11, 1900.

E. E. MURPHY.

CARBONATING APPARATUS.

(Application filed Apr. 15, 1899.)

(No Model.)

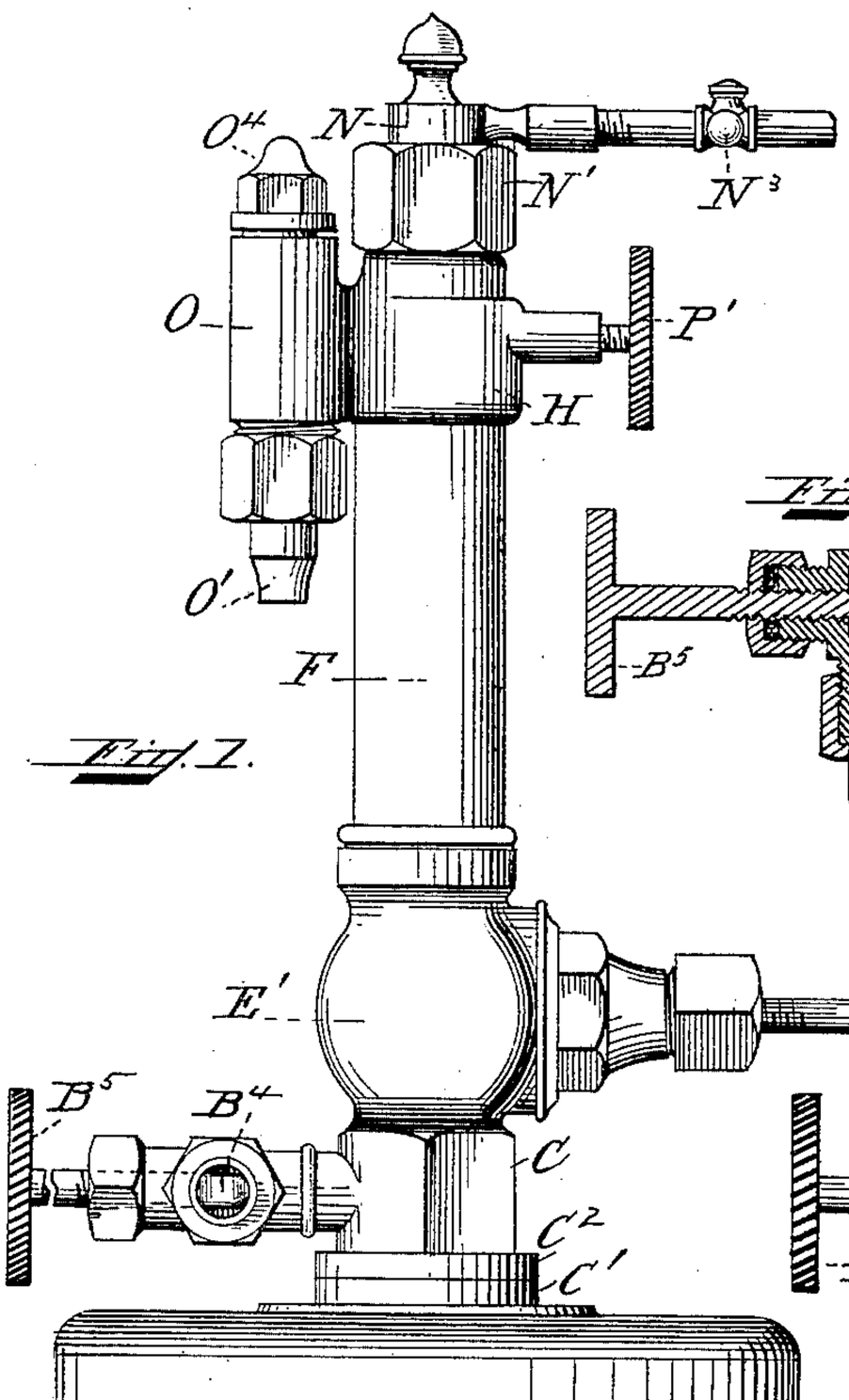

Fig. 1.

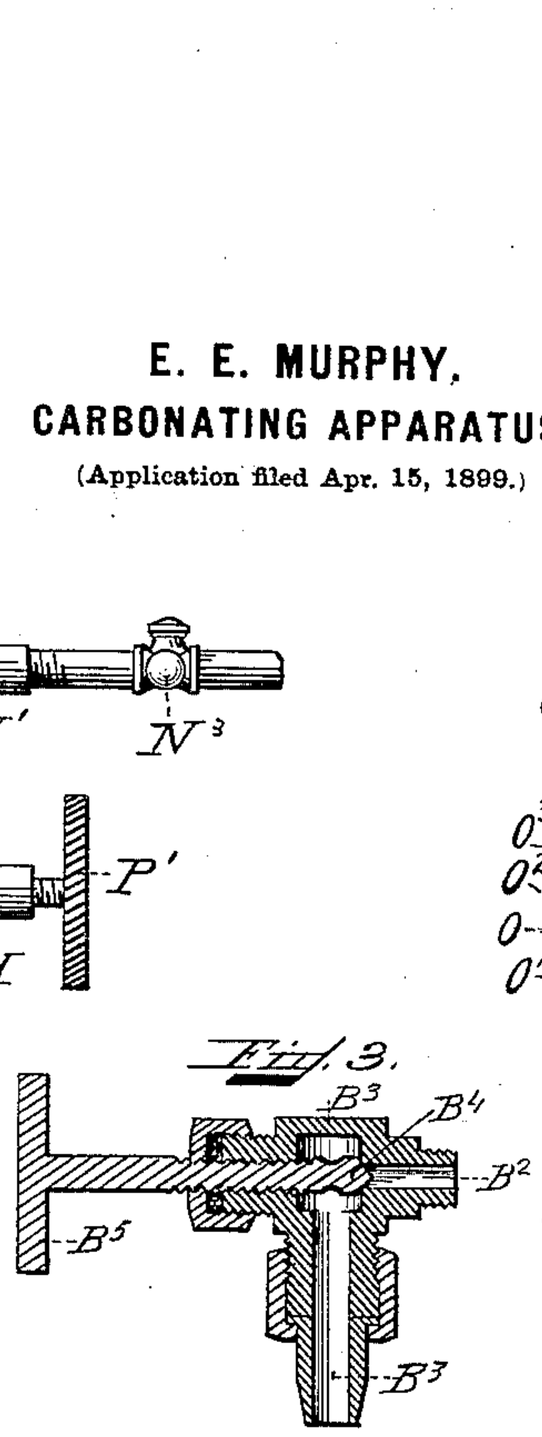

Fig. 3.

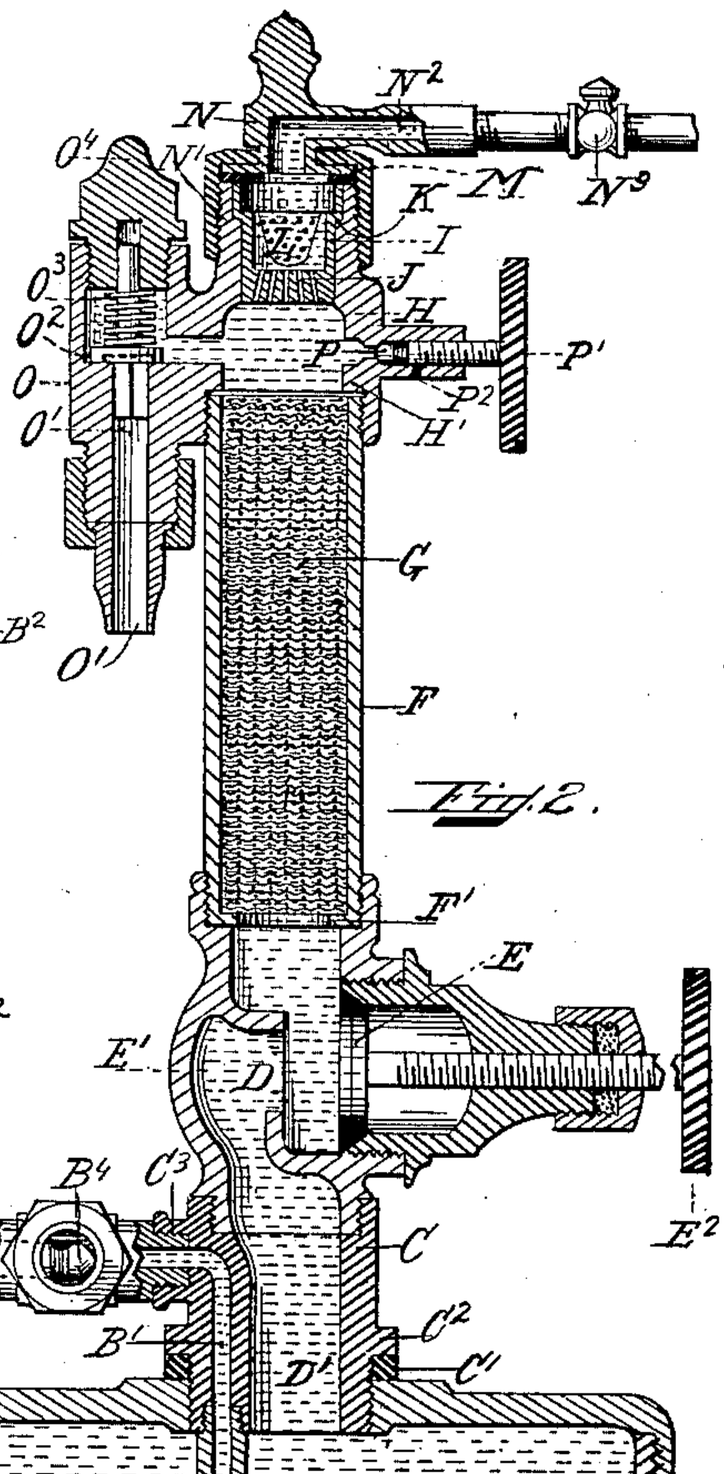

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

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

CARBONATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 657,882, dated September 11, 1900.

Application filed April 15, 1899. Serial No. 713,099. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. MURPHY, of Somerville, in the county of Middlesex 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 apparatus for carbonating water or 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.

In the accompanying drawings, which illustrate a construction embodying my invention, Figure 1 is a side elevation. Fig. 2 is a vertical sectional view of an apparatus embodying my invention. Fig. 3 is a detail sectional view showing the outlet for the carbonated liquid and the valve controlling said outlet.

Like letters of reference refer to like parts throughout the several views.

A represents a reservoir or receptacle for the carbonated liquid produced by the apparatus to be described. A suitable outlet distributing-pipe B extends down into said reservoir and is connected at its upper end to the outlet-passage B′ in the coupling C, which is screwed into the top of the reservoir A, with a suitable bushing C′ between the top of the reservoir and the annular flange C^2 on said coupling. This passage B′ communicates with the passage B^2 of the chamber B^3, which is screwed into the coupling C at C^3. The passage B^2 communicates with the outlet B^3 of said chamber, and communication between said passage B^2 and the outlet B^3 is controlled by the valve B^4, having a suitable handle B^5. Into the top of the coupling C is screwed the valve-casing E′, having a passage D, controlled by the valve E, having a suitable operating-handle E^2. This passage communicates with the passage D′ in the coupling C, and through said passage the liquid and gas mixed in the mixing-chamber pass to the storage-reservoir A. In the upper end of the valve-casing E′ is screwed the lower end of the liquid and gas mixing tube F, and within said tube is a metallic sponge G, composed of layers of wire-cloth, by means of which the liquid and gas are minutely subdivided in order to facilitate their mechanical combination. This sponge at its lower end rests on the annular flange F′ and is held in a compact body by the annular flange H′ of the spray-head H, which is screwed onto the upper end of the mixing-tube F. In the upper part of said spray-head is located the detachable spray-nozzle I, having a series of diverting-perforations J, and said nozzle is supported in said head by resting on the annular shoulder K of said head, and supported in said nozzle is a strainer L. On the upper ends of said spray head and nozzle is an annular packing M of any suitable material and against which rests the head N, held on the spray-head H by the union N′. In the head N is the inlet water-passage N^2, controlled by the check-valve N^3. Located on one side of the spray-head is the nose O, communicating with the interior of said head and having an inlet-passage O′ for the gas-supply and controlled by the valve O^2, having a flexible face to adapt itself readily to its seat, and acting against said valve is a coiled spring O^3, adapted to assist in operating the valve O^2 to close the passage O′ as the apparatus fills with water. The cap O^4 is screwed into the top of the nose O and has an opening in which the upper end of the stem of the valve O^2 moves, and against said cap also rests the upper end of said spring O^3. The valve E is for the purpose of shutting off between the mixing-chamber F and the reservoir A at any time when desired without interfering with the distribution of the carbonated liquid.

In operation the liquid-supply pipe is connected to a high-pressure pipe under from one hundred and seventy-five to two hundred pounds pressure, and the gas-supply is connected to a gas-supply tank of, say, 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 passage O′ and drives out all the air from the apparatus through the pipe B and the outlet B^3, after which the valve B^4 is shut off to close the outlet and the gas is allowed to reach the pressure required. Water or other liquid is then admitted through the water-inlet N^2 under the pressure above stated, which is above the gas-pressure, and the liquid being cut up by the sponge at once causes the absorption of the gas in the tube on the passage of the liquid to the reservoir until the apparatus is entirely filled with carbonated liquid up to the perforations J in the nozzle I, when all the admitted gas is absorbed and at which time the entire apparatus is under the initial water-pressure and the valve O^2, controlling the gas-supply, is closed by the gradually-increasing gas and water pressure due to the operation of filling the apparatus with carbonated water. Now when the carbonated liquid is drawn off through the pipe B, the spray-nozzle I being so constructed as to retard the admission of water, the carbonated liquid is drawn off faster than the same amount of water can be supplied in the same period of time through said nozzle, thereby providing room for the entrance of more new gas which enters by the opening of the valve O^2, which valve is opened on account of the gas-pressure behind it, which is then greater than the pressure within the tube F, which pressure at that instant has been reduced by the drawing off of the carbonated liquid. Now the water continuing to flow in through the nozzle I produces a greater pressure than the pressure of the gas admitted to the mixing-chamber by the drawing off of the carbonated water and closes the valve O^2 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 means of the spring O^3 and the rising water and consequent pressure in the tube F as said tube fills. The mixing-tube F is of much less diameter than the reservoir A, so that by partially or entirely emptying said tube the reduction of pressure, owing to the reduction of volume, will cause the admission of new gas by reason of the gas-pressure being sufficiently great to open the valve O^2 and pass into the tube F. As the water continues to flow in through the nozzle it passes down into the tube F and mixes with the gas previously admitted to said tube, and as the volume of water increases the pressure increases and closes the gas-valve O^2. As the tube F gradually fills the increase in volume increases the pressure, and thereby closes the valve O^2 as soon as the pressure exceeds the gas-pressure. The admission of the gas to the 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 pressure in the mixing-tube below the initial gas-pressure, so that the gas under its own pressure passes into the mixing-tube at that instant where it mixes with the water passing down through said sponge contained in the mixing-tube.

The check-valve N^3 is for the purpose of preventing loss of gas in the event of a break in the liquid-supply pipe.

The valve P, having a suitable handle P′, controls the air-inlet P^2, through which air is allowed to escape from time to time by operating the valve P.

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.

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, means operating to allow the gas to fill the mixing-chamber before it is filled with the liquid, a passage establishing communication between the mixing-chamber and the storage-reservoir, a valve controlling said passage, an outlet for the carbonated liquid from the storage-reservoir, and a valve controlling said outlet.

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 gas which flows into the mixing-chamber by its own pressure independently of the flow of the liquid, means for retarding the flow of the liquid from the liquid-supply pipe into the mixing-chamber to allow the gas to fill the mixing-chamber before it is filled with the liquid, a passage establishing communication between the mixing-chamber and the storage-reservoir, a valve controlling said passage, an outlet for the carbonated liquid

from the storage-reservoir, and a valve controlling said outlet.

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 for subdividing and combining the gas and liquid, means for retarding the flow of the liquid from the liquid-supply pipe into the mixing-chamber to allow the gas to fill the mixing-chamber before it is filled with the liquid, a passage establishing communication between the mixing-chamber and the storage-reservoir, a valve controlling said passage, an outlet for the carbonating liquid from the storage-reservoir, and a valve controlling said outlet.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 30th day of March, A. D. 1899.

EDWARD E. MURPHY.

Witnesses:

A. L. MESSER,

V. M. MACLELLAN.