No. 609,867. Patented Aug. 30, 1898.

C. L. BASTIAN.

CARBONATING APPARATUS.

(Application filed Apr. 24, 1897.)

(No Model.) 2 Sheets—Sheet 1.

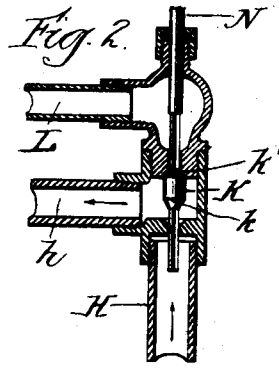


Fig. 2.

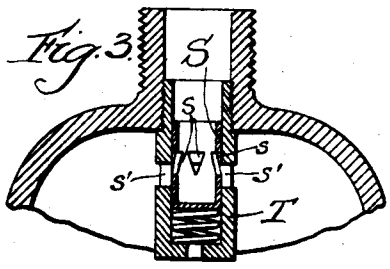


Fig. 3.

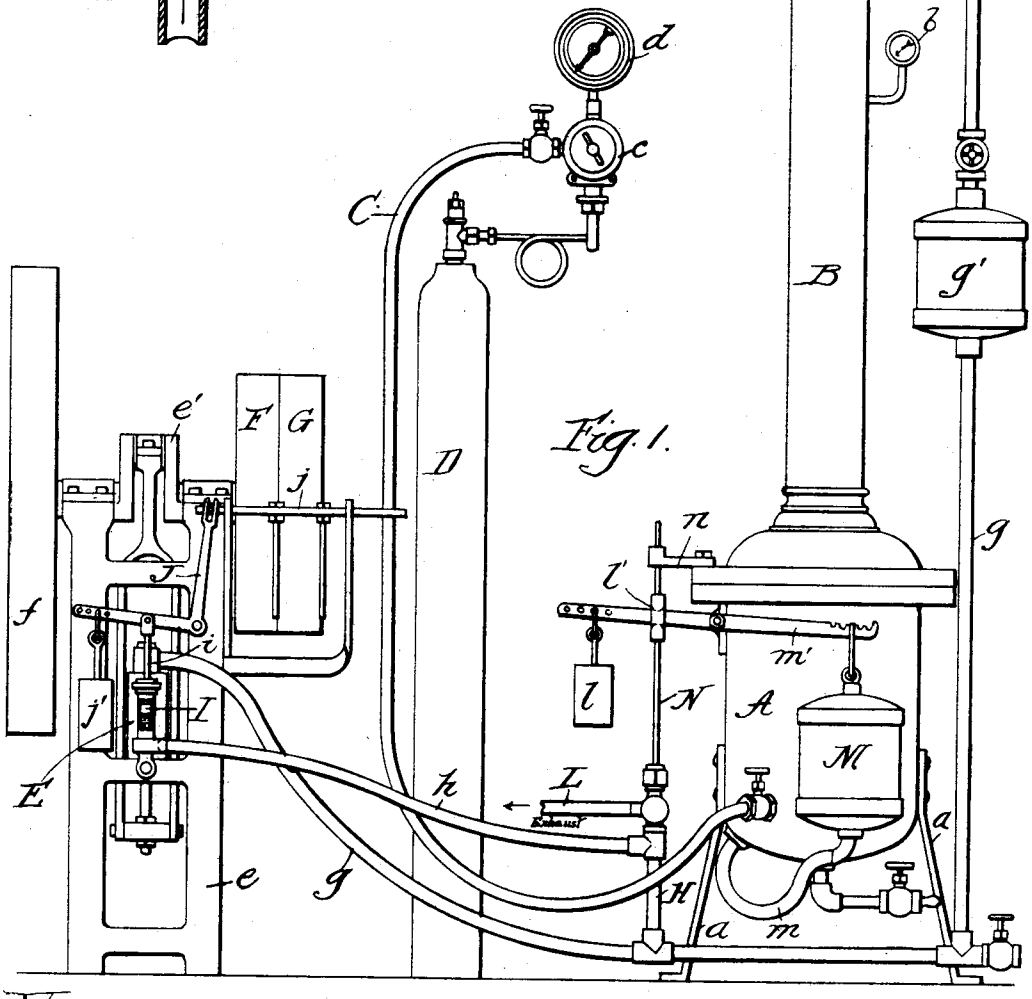


Fig. 1.

Witnesses
Wm. F. Fleming
Wm. O. Belt.

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

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Fig. 5.

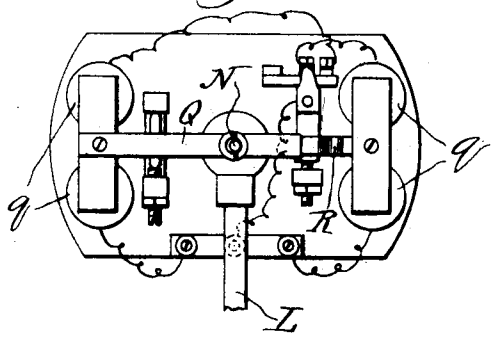


Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES L. BASTIAN, OF CHICAGO, ILLINOIS.

CARBONATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 609,867, dated August 30, 1898.

Application filed April 24, 1897. Serial No. 633,734. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. BASTIAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carbonating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to certain new and useful improvements in carbonating apparatus in which carbonic-acid gas under pressure is combined with water or other liquid to produce a carbonated beverage.

The object of my invention is to provide an apparatus of the character described which will operate and govern itself automatically to regulate the amount of liquid or gas supplied.

Another object of the invention is to cause the liquid to absorb a greater amount of gas than has heretofore been possible with apparatus of this character; and a further object of the invention is to provide suitable means for automatically distributing the liquid in such a manner throughout the mixing-chamber that the gas may penetrate it and be absorbed thereby in large quantities.

My invention also has certain other objects, which will be specifically pointed out and claimed hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of my improved apparatus, showing the same adapted for use, a balanced tank being provided for automatically controlling the supply of liquid to the mixer. Fig. 2 is a detail sectional view of the valve. Fig. 3 is a sectional view of the upper end of the saturating-chamber, showing the distributing device and the wire-gauze within said chamber. Fig. 4 is a side elevation of the apparatus, shown partly in section to illustrate particularly the manner in which the liquid-supply may be automatically controlled electrically. Fig. 5 is a top plan view of the electrical devices connected with the valve-stem, showing the manner in which the same are adapted to operate.

Referring to the drawings, in which like letters of reference denote corresponding parts in all of the figures, the mixer comprises a collecting-tank A, supported in a suitable manner on the legs *a*, and B is a saturating-chamber mounted on the tank and connecting therewith and provided with a pressure-gage *b*. Gas is admitted to the lower part of the collecting-tank through the pipe C, which is connected at its other end in a suitable manner with one or more gas-cylinders D, a regulating-valve *c* and a pressure-gage *d* being located intermediate of the gas-cylinder and the collecting-tank. A pump E is supported in a frame *e* and is operated by a crank-shaft *e'*, journaled in suitable bearings on the frame. This crank-shaft carries a tight pulley F and a loose pulley G on one end and a fly-wheel *f* on its other end. Motion is imparted to the crank-shaft by means of a belt operating on the tight pulley F, this belt being connected with a suitable source of power, and the belt is shifted from the tight to the loose pulley automatically to control the operation of the pump, and thereby regulate the supply of liquid to the mixer. A pipe *g* connects the pump with the top of the saturating-chamber, an air-chamber *g'* being located at a convenient place in this pipe. This pipe *g* is provided with an upward extension H, and a pipe *h* is connected to said extension and to a cylinder *h'*, located adjacent to the pump. A piston I on a piston-rod *i* operates in this cylinder *h'*, and said piston-rod is connected to one arm of a bell-crank lever J, pivoted on the frame *e*, the other arm of said bell-crank being connected to a belt-shipper *j*. This bell-crank is normally held by the weight *j'* so that the belt-shipper will hold the belt on the tight pulley F; but when the piston in the cylinder is forced upward, as hereinafter described, the bell-crank will be operated and the belt shipped to the loose pulley.

A double-seating wing-valve K is arranged to operate in the extension H, and when it is pushed upward the conical end *k* is raised from its seat to allow the passage of liquid from the pipe extension H to the pipe *h*, and the conical end *k* is forced to its seat to prevent the liquid from passing up and out through the exhaust-pipe L, and when the valve is allowed to descend the conical end *k'* is lowered from its seat to permit the liquid in the pipe extension H to flow up and

exhaust through the pipe L, while the conical end *k* is seated to prevent the further passage of liquid into the pipe *h* from the pipe extension H. This valve may be operated by different means, and in Fig. 1 I have shown a balanced tank for this purpose. This tank M is connected by a pipe *m* with the lower end of the tank A, and it is hung on one end of a lever *m'*, pivoted on the tank A, the other end of said lever being provided with a weight *l*. The weighted end of the lever passes through a yoke *l'* on the stem N of the valve K, and said stem is maintained normally in a vertical position by a guide *n* on the collecting-tank. With this embodiment of my invention it will be observed that as the liquid rises in the collecting-tank A it will also rise to a corresponding level in the balanced tank M, and when the proper level has been reached, which is regulated by the weight *l*, the balanced tank will overcome said weight and rock the lever *m'*, thereby raising the valve K and its conical end *k* from its seat and seating its conical end *k'*. This change of position of the valve will allow the liquid forced by the pump through the pipe *g* to pass up through the extension H and into the pipe *h* and cylinder *h'*, forcing the piston therein upward and moving the bell-crank lever J to ship the belt from the tight pulley F to the loose pulley G. The parts will be maintained in this position until the liquid in the collecting-tank A and the balanced tank M has lowered sufficiently to permit the weight *l* to raise the balanced tank into its normal position, whereupon the valve K will be lowered and its conical end *k* seated to prevent the further passage of liquid upward through the extension H to the pipe *h* and unseating the conical end *k'* to permit the liquid forced out of the cylinder *h'* and the pipe *h* by the descent of the piston in said cylinder, under the influence of the weight *j'*, to escape into the exhaust-pipe L. When the piston in the cylinder *h'* descends, the bell-crank lever is of course moved to ship the belt from the loose to the tight pulley, which will set the pump in operation again. This operation is automatically repeated as the level of the liquid in the collecting-tank changes.

The valve K can be operated electrically to accomplish the same result in the manner shown in Fig. 4. In this construction a float O is arranged within the collecting-tank on an arm *o*, pivotally supported on a transverse shaft *o'*, said arm being provided with lateral extensions P P', which are arranged to engage spring-controlled contact devices *p p'*. The valve-stem is connected to the spring-controlled armature-lever Q of the magnet *q*, and when the circuit connected with this magnet is closed, as shown, by the rise of the float O the armature on said lever will be attracted to its magnet and the trip-lever R engaged with said armature-lever to hold the same in this position. When the float in the tank is lowered to its normal position, the circuit just described is broken, and the armature carried by the trip-lever is attracted by its magnet, the armature-lever being thereby disengaged from the trip-lever to permit the valve K to resume its normal position. Various other forms of electrical devices may be employed for this purpose without departing from the spirit of my invention.

In order that the liquid may be discharged in the saturating-chamber in the form of a spray and in order also to regulate the discharge of liquid, I provide a regulating device, which consists of a spring-pressed cylinder S, having angularly-shaped openings *s* therein, arranged to register with square-shaped openings *s'* in an inclosing cylinder T, located at the end of the pipe *g* in the upper end of the saturating-chamber. The liquid flowing through the pipe *g* will pass through the openings *s s'*, any number of which may be provided, and be distributed into the saturating-chamber, and it will be observed that as the pressure of the liquid increases or diminishes the cylinder S will adjust itself to bring a greater or less area of the openings *s* into register with the openings *s'*, thereby relieving the pressure in the pipe *g*. Many different means may be employed for promoting the saturation of the liquid with the gas, and one very desirable method of accomplishing this end consists in allowing the liquid to pass through wire-gauze or similar material U, arranged within the saturating-chamber in the form of a roll or otherwise. The liquid will pass through this gauze in the form of a very thin film, thereby allowing the gas to attack the same in the most favorable condition for a complete saturation.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through the supply-pipe to the mixer, a belt-shipper, devices for operating said belt-shipper and a valve device controlled and operated by the level of the liquid in the mixer for permitting the liquid to flow from the supply-pipe and operate said belt-shipper by direct pressure of the liquid, substantially as described.

2. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid from the supply-pipe to the mixer, a belt-shipper and devices for operating the same, a pipe connection between the belt-shipper-operating devices and the liquid-supply pipe and means automatically operated for permitting liquid from the supply-pipe to pass through said pipe connection to actuate the belt-shipper-operating devices by direct pressure of the liquid to ship the belt, substantially as described.

3. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through said supply-pipe to the mixer, a belt-shipper, means for operating the belt-shipper, a pipe connection between said belt-shipper-operating means and the liquid-supply pipe, a valve in said connection and a balanced tank having a pipe connection with the mixer and adapted to be automatically operated by the quantity of liquid therein to actuate the valve, thereby permitting liquid from the supply-pipe to flow into the belt-shipper-operating means and operating the same to stop the pump, substantially as described.

4. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through said supply-pipe to the mixer, a belt-shipper and means for operating the same, a pipe connection between the belt-shipper-operating means and the liquid-supply pipe, a double-seating wing-valve in said pipe connection and means for automatically operating said valve to allow liquid to pass from the supply-pipe to the belt-shipper-operating means to ship the belt and stop the pump and then allow the liquid to flow to an exhaust again shipping the belt to start the pump, substantially as described.

5. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through said supply-pipe to the mixer, a belt-shipper and means for operating the same, a pipe connection between said belt-shipper-operating means and the liquid-supply pipe, a double-seating wing-valve located in said pipe connection, an exhaust-pipe above said valve, the conical lower end of said valve being adapted to prevent the passage of liquid from the supply-pipe to said pipe connection when seated and the conical upper end of said valve adapted to prevent the passage of liquid from the pipe connection to the exhaust-pipe when seated and allow the liquid in said pipe connection to pass to said exhaust-pipe when the conical lower end of said valve is seated, and means for automatically operating said valve to control the operation of the pump, substantially as described.

6. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through the supply-pipe to the mixer, a belt-shipper and means for operating the same, a pipe connection between said belt-shipper-operating means and the liquid-supply pipe, a valve in said pipe connection and means for automatically operating said valve to permit the liquid by its pressure to actuate the belt-shipper-operating means to stop the pump temporarily, substantially as described.

7. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through said supply-pipe to the mixer, a belt-shipper, a bell-crank lever connected with said belt-shipper, a cylinder, a piston-rod connected to said bell-crank lever and carrying a piston operating in said cylinder, a pipe connection between the cylinder and the liquid-supply pipe, a valve in said pipe connection and means for automatically operating said valve to allow liquid to flow from the supply-pipe under pressure through the pipe connection to the cylinder and force the piston therein upward to ship the belt temporarily, substantially as described.

8. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through said supply-pipe to the mixer, a belt-shipper, a bell-crank lever connected with said belt-shipper, a cylinder, a piston-rod connected to said bell-crank lever and carrying a piston operating in said cylinder, a pipe connection between the cylinder and the liquid-supply pipe, a double-seating wing-valve located in said pipe connection, an exhaust-pipe above said valve and means for automatically operating the valve to control the operation of the pump, the conical lower end of said valve being adapted when seated to prevent the flow of liquid from the supply-pipe to the cylinder, while the liquid in said cylinder and the pipe connection is flowing to the exhaust-pipe, and the conical upper end of said valve being adapted when seated to prevent the liquid in the cylinder and pipe connection from flowing to the exhaust-pipe while the conical lower end of said valve is unseated and liquid is flowing from the supply-pipe to the pipe connection and the cylinder, substantially as described.

9. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe admitting gas thereto, a liquid-supply pipe, a pump for forcing liquid through said supply-pipe to the mixer, a belt-shipper, a bell-crank lever connected with said belt-shipper, a cylinder, a piston-rod connected to said bell-crank lever and carrying a piston operating in said cylinder, an extension on the supply-pipe, a pipe connecting said extension with the cylinder, a double-seating wing-valve arranged to operate in said extension, an exhaust-pipe located above the valve and connected to said extension, the lower conical end of said valve adapted, when seated, to prevent the flow of liquid from the supply-pipe to the cylinder while the conical upper end of said valve is unseated and the conical upper end of said valve adapted, when seated, to prevent the flow of liquid from the cylinder and the pipe connection to the exhaust-pipe while the conical lower end of said valve is unseated, a stem for said valve provided

with a yoke, a lever pivoted on the mixer and having one end passing through said yoke and provided with a weight, a balanced tank hung on the other end of said lever and having a pipe connection with the mixer, substantially as and for the purpose described.

10. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe connected therewith, a liquid-supply pipe entering the top of said mixer, an inclosing cylinder located around the end of the liquid-supply pipe and provided with regular openings therein and a spring-pressed cylinder arranged within the inclosing cylinder and provided with openings therein to register with the openings in the inclosing cylinder, the openings in the spring-pressed cylinder being graduated in size, substantially as and for the purpose described.

11. In a liquid-carbonating apparatus, the combination with a mixer, of a gas-supply pipe connected therewith, a liquid-supply pipe entering the top of said mixer, an inclosing cylinder located around the end of the liquid-supply pipe within the mixer and provided with square openings on its sides and a spring-pressed cylinder located within said inclosing cylinder and provided with triangular openings arranged to register with the openings in the inclosing cylinder, substantially as and for the purpose described.

12. In an apparatus for carbonating liquids, a chamber wherein the liquid is saturated with gas, said chamber having therein a roll of wire-gauze, over which the liquid passes in filmy form through the chamber, substantially as and for the purpose described.

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Witnesses:
WM. O. BELT,
C. L. WOOD.