O. ZWIETUSCH.

Carbonic Acid Gas-Generator.

No. 203,310. Patented May 7, 1878.

Fig. 2.

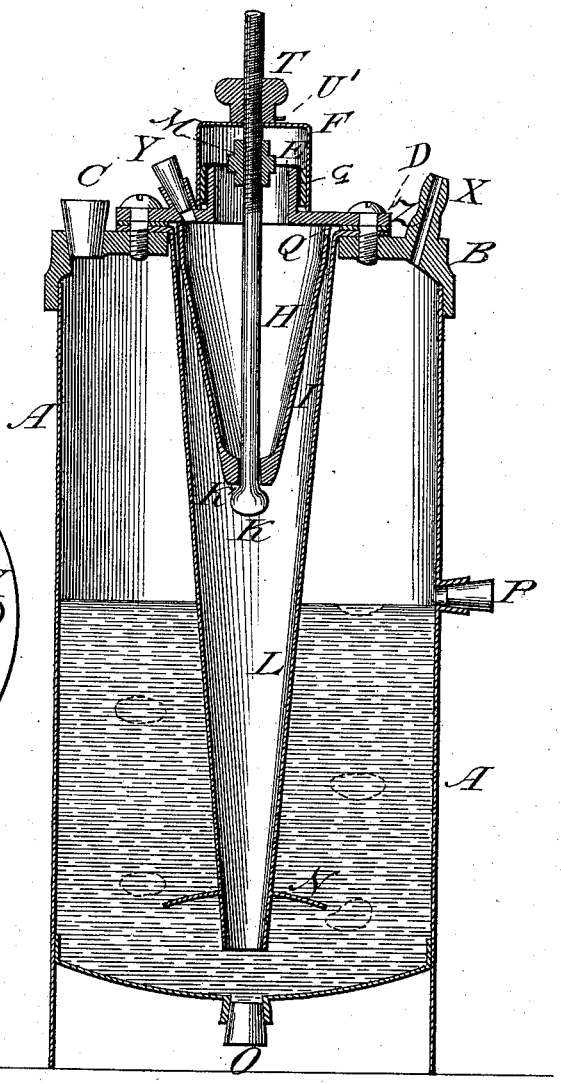
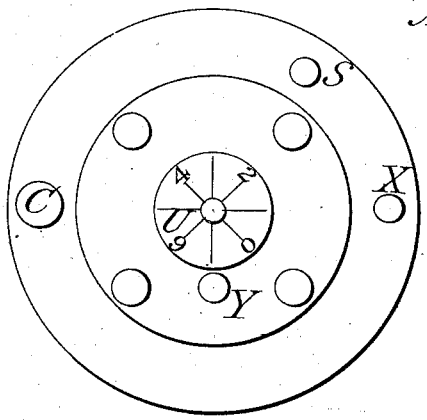


Fig. 1.



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OTTO ZWIETUSCH, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN CARBONIC-ACID-GAS GENERATORS.

Specification forming part of Letters Patent No. **203,310**, dated May 7, 1878; application filed January 15, 1878.

To all whom it may concern:

Be it known that I, OTTO ZWIETUSCH, of Milwaukee, Wisconsin, have invented certain new and useful Improvements in Carbonic-Acid-Gas Generators, of which the following is a clear, full, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a top-plan view of a carbonic-acid-gas generator, and Fig. II a vertical section of same, having the improvements attached.

My invention relates to carbonic-acid-gas generators constructed so as to operate automatically, and such as are specially used for preserving beer by means of the carbonic-acid gas.

It consists in the several combinations and arrangements of parts hereinafter described and claimed, whereby all the gas is perfectly purified in the same apparatus in which it is generated, thereby avoiding the aid and expense of all extra purifiers or washers.

To enable others skilled in the art to make and use my invention, I will proceed to describe the exact manner in which I have carried it out.

In the drawings, A represents the generating apparatus, with the cover B preferably cast in one piece, and the apparatus made of metal, glass, or stone, as shown, or in any other shape or form. C is an opening in cover B, for the introduction of water-alkalies. D is an upper cover, screwed on cover B, and provided with a rubber packing, and having secured to it the elastic diaphragm E by means of the ring G. F is a capsule for the protection of the elastic diaphragm E, also guide for vent-rod H, and support for the weight-nut T, with a dial on its upper surface, on which the distance is indicated how far the valve K is opened or closed. A vent-rod or valve-stem, H, made of brass or copper, with a lead covering or lining, passes down through the cone-shaped acid-chamber I, and is provided at its lower end with a valve, K, fitted in the valve-seat K′, on the under end of the acid-chamber I. L is a cylinder holding the unpurified gas, attached securely air-tight on or between covers B and D, surrounding acid-chamber I, thereby leaving a space between the two, and terminating a short distance above the bottom of the generating apparatus A. From this cylinder the gas passes through the openings Q, at the top of the acid-chamber, into it, where it acts as an equalizer, and presses on the diaphragm E.

The rod H passes through the center of the diaphragm E, and is secured to it by means of two screw-nuts, M, or in any other convenient manner. The cylinder L leads the acid toward the bottom of the generating apparatus A direct on the soda.

Flange N is fastened to cylinder L near its lower end, which has for its purpose to lead the liberated gas more through the middle of the purifying solution in passing toward the upper part of generating apparatus A, as shown in Fig. II. O is the discharge-opening for the removal of the refuse.

At the side of the generating apparatus I place the opening P, at a point to which the apparatus is to be filled with water. Gas is allowed to escape through opening X. U′ is the pointer for dial U on weight-nut T. The inlet Y is for the introduction of the acid in the chamber I. Z is a rubber packing between covers B and D.

Fig. II, the top plan view of the carbonic-acid-gas generator, shows the dial U on the upper surface of capsule F. S is the place in which the safety-valve may be put.

The acid-chamber I is preferably made like a cone, which shape renders the chamber strong, if made from lead alone, and requires no extra shell to render it stronger. It is fastened to cover D, or hung in cylinder L, in such a manner that communication exists at the top of acid-chamber I to equalize the pressure between cylinder L and acid-chamber I.

The cylinder L is a reservoir for unpurified gas, which may be made straight, or formed any other way; but I prefer it shaped like a cone, as shown in drawing, for it is thereby strong by using even light material, and occupies less space in generating apparatus A. The capsule F has a dial, U, on its upper surface, on which it is indicated, by a pointer, U′, on weight-nut T, how far the valve K is opened

or closed. Turning the weight-nut more or less to the right or left opens and closes the valve K accordingly, which again corresponds with the coarseness of the thread on rod H.

Nut T, I give different sizes, so that the weight of vent-rod H and said nut T counterbalances the pressure, bearing against the diaphragm E, with the pressure that I desire in the apparatus.

My improved apparatus operates in the following manner: Close the vent K by screwing down the weight-nut T, and open the orifices C, Y, and P. Put the necessary quantity of sulphuric acid in opening Y, and take only so much of it for one charge that, when all of it is consumed, a residue of soda remains at the bottom of generating apparatus A. Close opening Y, and add, through opening C, bicarbonate of soda, somewhat more in quantity than the acid and water, in proportion, would absorb; then add water through the same opening until it reaches the height of opening P. After all openings are closed again, weight-nut T is turned to the left, by which the valve K is opened.

By filling the acid-chamber I first, and closing opening Y before soda and water are put into the generating apparatus, the air in cylinder L, and the soda on the bottom, prevent the entering of water in said cylinder, so that the acid flows through cylinder L directly on the soda lying below, which produces carbonic-acid gas immediately. Part of the gas produced passes upward into cylinder L, through opening Q, into the acid-chamber I, and acts as equalizing-pressure on the acid and against the flexible diaphragm E, by which the valve K is closed and the flow of the acid stopped. The balance of the produced gas passes out beneath the cylinder L, and then through the water to the upper part of the generating apparatus A, whereby a part of the dissolved bicarbonate of soda mixes with and saturates the water, causing it to become a better purifying medium; and all gas generated must pass through this liquid, by which it is thoroughly purified before it is drawn off for use. At the same time the cylinder L is emptied of the liquid that may be contained therein, and remains empty, because the pressure in acid-chamber I and cylinder L is always so much greater than the corresponding weight of the water-column.

By allowing the carbonic-acid gas to escape through opening X, it passes to the beer, and the pressure in the barrel, as well as that of the apparatus, diminishes accordingly as the quantity of beer is drawn from the barrel. If the pressure in the acid-chamber I is diminished, the flexible diaphragm E is pressed downward, which causes the valve K to be opened. Acid is then again allowed to flow to the alkalies, and carbonic-acid gas is again produced. In this way the apparatus operates continually automatically as long as there is a supply of acid.

The well-saturated water prevents any sulphuric-acid particles to be carried away by the produced gas, and the gas which reaches the acid-chamber must return through opening Q and cylinder L, and pass through the purifying-liquid. In this way all the gas is made thoroughly and chemically pure without the aid of an extra purifier, which is not the case with other machines of this kind in which the acid-chamber has openings above, for the purpose of equalizing gas, but not surrounded by a cylinder, nor having a pipe connected with the acid-chamber that leads the gas back through the purifying-solution. The gas is more liable to pass through the short acid column in a chamber which has a pipe attached at its lower end running downward near to the bottom of a generating apparatus, especially if there is but little acid left in said acid-chamber, than if it has to pass through a larger column of soda solution for the purpose of equalizing. By that method the gas passes more or less unpurified through the valve into the acid-chamber when the valve is opened, and at the same time prevents a steady flow of acid through the valve. One object of my present invention is to overcome these difficulties.

The cylinder L is attached to the apparatus at a point above the level of the liquid contained in the acid-chamber, and terminates near to the bottom of the apparatus. By this arrangement the acid-chamber is supplied with equalizing pressure through openings in said chamber above the level of the liquid, that comes from the cylinder below where it is first liberated, which causes the gas to act in a more convenient and effective manner against diaphragm E.

I give acid-chamber I the shape like a cone, because this form renders it strong and durable by using but light material, and consequently avoids an extra lining. It prevents bending, so that the valve cannot get out of its seat, or get out of order otherwise.

The stem H has the valve-plug K at its lower end, which opens and closes the valve from the under side of the acid-chamber, correspondingly as the weight-nut above, or the pressure acting against diaphragm E beneath regulates it.

Part of this invention bases on the same principles as shown in my Patent No. 191,912, in which I obtain the same results in purifying gas by making use of a hollow valve-rod; but the channel which runs through it weakens the rod, and there is also a chance for the channel to block up, which I remedy and overcome by making the machine as hereinbefore described.

Having thus explained my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A carbonic-acid-gas generator constructed with the generating-vessel A cover B D, acid-chamber I, and gas-cylinder L depending from the cover, substantially as specified.

2. Gas-cylinder L, attached to the cover of

the generating-chamber between the acid-chamber I and the outermost shell of apparatus A, substantially as shown and specified.

3. In a carbonic-acid-gas generator, the combination of the cone-shaped acid-chamber I and the cone-shaped gas-cylinder L, substantially as shown and described.

4. In a carbonic-acid-gas generator, the combination of acid-chamber I, having openings Q and gas-cylinder L surrounding it, so arranged that the gas which serves as equalizing pressure enters into acid-chamber I through openings Q from gas-cylinder L, substantially as specified.

5. In a carbonic-acid-gas generator, the combination of the cone-shaped gas-cylinder L, depending from the cover of generator A, with flange N, somewhat above the lower termination of said cylinder, substantially as specified.

6. In a carbonic-acid-gas generator, the combination of acid-chamber I, valve K, stem H, diaphragm E, capsule F, and weight-nut T, with the gas-cylinder L, substantially as specified.

7. In a carbonic-acid-gas generator, the combination of valve K, stem H, diaphragm E, capsule F, dial U, and weight-nut T, arranged so that stem H and weight-nut T counterbalance the pressure against diaphragm E, substantially as described.

8. In a carbonic-acid-gas generator, the combination, with acid-chamber I, of the valve K closing from the under side of the acid-chamber, the valve-stem H, weight-nut T, pointer U′, and capsule F, having a dial on its upper surface, substantially as and for the purpose hereinbefore set forth.

OTTO ZWIETUSCH.

Witnesses:

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