H. VOIGT.

Apparatus for Generating and Washing Carbonic-Acid Gas.

No. 168,300. Patented Sept. 28, 1875.

Fig: 1.

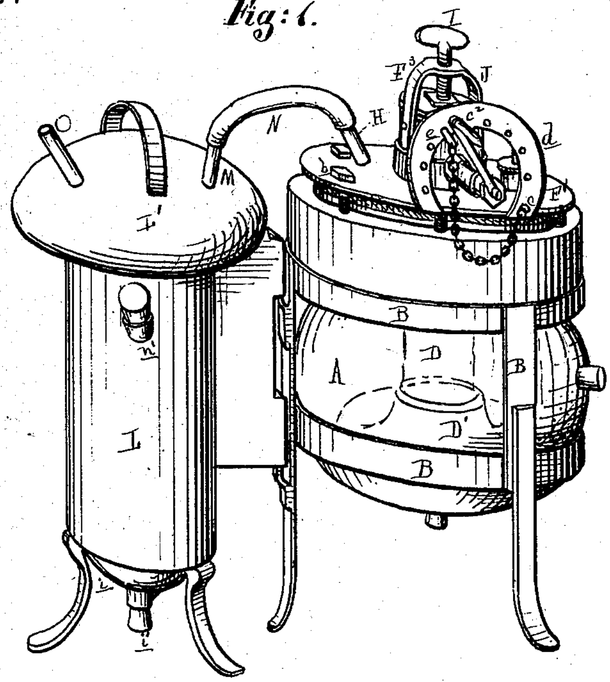
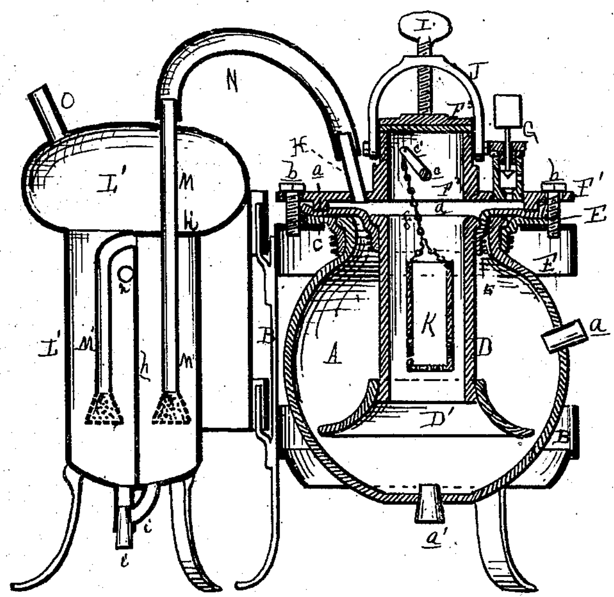


Fig: 2.



Attest.
E. E. Ellsworth
G. W. Andrews.

Inventor.
H. Voigt
By Atty
Thos. S. Sprague

UNITED STATES PATENT OFFICE.

HERMANN VOIGT, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN APPARATUS FOR GENERATING AND WASHING CARBONIC-ACID GAS.

Specification forming part of Letters Patent No. **168,300**, dated September 28, 1875; application filed February 26, 1875.

To all whom it may concern:

Be it known that I, HERMANN VOIGT, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented an Improvement in Apparatus for Generating and Washing Carbonic-Acid Gas, of which the following is a specification:

The first part of my invention relates to an apparatus for generating carbonic-acid gas by the action of muriatic acid upon marble broken in small pieces, and so constructed that the volume and pressure of the gas so generated can be regulated at will.

The second part of my invention relates to the peculiar construction of an apparatus for washing the gas generated, as described, being connected with the generator by a flexible tube of india-rubber, and the entire apparatus is peculiarly adapted to charging ale and beer casks with gas.

Figure 1 is a perspective view of the apparatus. Fig. 2 is a vertical section.

In the drawing, A represents a globular glass vessel, with a large opening in the top, surrounded by a flanged neck. There is a small opening in the side for charging in the acid, and another in the bottom for emptying it, which openings are closed by vulcanized-rubber stoppers *a a'*, respectively. The vessel A is supported in a metallic frame, B, mounted on legs. C is an annular washer of india-rubber packing, whose inner edge is wired onto the neck of the vessel. D is a glass cylinder, having a flange at the upper end, under which an india-rubber washer, E, is wired onto said cylinder. Both joints are made air and gas tight. F is an annular casting with a pendent flange, which surrounds the neck of the vessel A. Both washers are turned over and rest upon its upper surface. F' is a metal cover secured to the flanged casting F by tap-screws *b*. The cover has an annular pendent ring, which compresses the washers C E against the upper surfaces of the casting F, but in such a manner as to open a communication between the cylinder and a safety-valve, G, in the cover, and also with the escape-pipe nipple H, which is tapped into it. F^2 is a cylindrical chamber rising from the center of the cover, closed by a rubber-packed cap, F^3, held in place by a screw, I, tapped through a yoke, J, whose ends are pivoted to the sides of said chamber. A horizontal shaft, *c*, is journaled through a stuffing-box in one side of said chamber F^2, and is provided with a crank, c^1, at the inner end, and another, c^2, at the outer end, working against a quadrant, *d*, perforated at intervals, and sustained in any position thereon by a pin, *e*. From the end of the crank c^1 a chain, *f*, suspends a perforated vessel, K, which contains marble broken in small pieces, being charged in through the top of the chamber F^2. The bottom of the cylinder D has a bell-shaped skirt, D', secured to it, reaching nearly to the walls of the vessel A. If preferred, the skirt may be substituted by a bell-mouth formed on the lower end of the said cylinder, and is an essential feature of the apparatus. The vessel K being charged with marble and raised up above the level of the side opening in the vessel A, muriatic acid is charged in to the level of said opening, which should then be closed. By lowering the marble into the acid, gas is at once generated in volume proportionate to the quantity so immersed, passing out through the top of the cylinder and nipple H. The deeper the marble-receptacle is immersed the more rapid will be the generation of carbonic-acid gas, and by lifting it out of the acid the generation of said gas ceases. In the generation of the gas the air previously contained in the vessel A is driven or forced up into the upper part and compressed, when, by its elasticity and pressure upon the surface of the acid, the outflow of gas from beneath the cylinder and bell-mouth will be resisted, and thereby compelled to seek an outlet at the top.

It frequently occurs in the generation of the gas in this manner that small pieces of marble fall through the apertures of the marble-receptacle to the bottom of the vessel A, where, under the action of the acid, an additional volume of gas is generated, and caught by the bell-mouth and passed up into the cylinder, instead of rising through the acid into the upper part of the vessel A.

L is a metallic receiving-vessel, preferably cylindrical in form, surmounted by a dome-shaped holder, L'. A vertical partition, *h*, with a horizontal diaphragm, *h'*, at the top, sepa-

rates one-half of the vessel from the other and from the holder. A branched drip-pipe, *i*, closed by a rubber plug, *i'*, serves to empty both chambers whenever necessary. Two openings, *n n'*, are made in the vessel L, one leading into each chamber, through which the latter are filled with water to the level of said openings, which are then closed with vulcanized-rubber plugs. M is a pipe leading through the dome and partition *h* down nearly to the bottom of one chamber, and is connected at the top by a flexible hose-pipe, N, with the outlet-nipple H of the generator. M' is a bent pipe or half-siphon, whose upper end is inserted in an opening in the top of the partition *h*, so as to communicate with the inlet-chamber, its other end hanging in the other chamber, so that the gas which flows into one compartment through the pipe passes up through the water in that compartment, thence flowing through the siphon-pipe M' nearly to the bottom of the other compartment, rising through the water contained in it into the dome-shaped holder, where it is stored for use until drawn off through the outflow-pipe O. In this way the gas is thoroughly washed and purified for use, either for aerating ale or beer or for charging waters.

What I claim as my invention is—

1. The combination of the rubber washers C E, flanged ring F, and cover F^1 with the generating-vessel A and cylinder D, for forming a gas-tight joint between them, substantially as described.

2. The bell-mouth D' at the lower end of the cylinder D, as and for the purpose set forth.

3. The combination of the cranked shaft *e*, chain *f*, and perforated vessel K with the chamber F^2, whereby the said vessel may be raised and lowered in the cylinder D, substantially as described.

4. The combined gas-washing and gas-holding vessel, consisting of the vessel L L', provided with the partitions *h h'* and pipes M M', substantially as shown and set forth.

HERMANN VOIGT.

Witnesses:

ADOLPH SULZER,

GUSTAV DREIZEHNER.