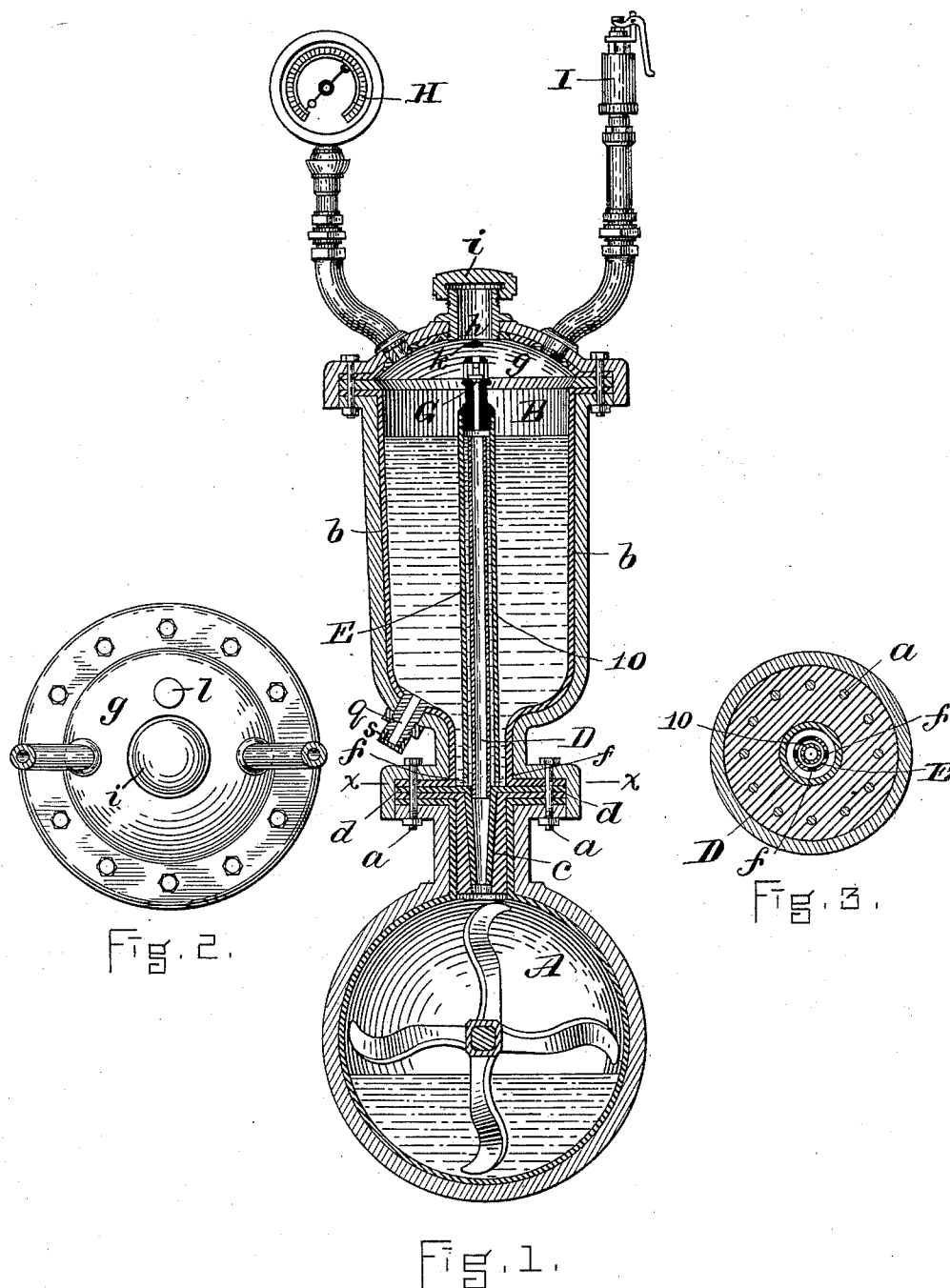


(No Model.)

P. J. MAGUIRE.
CARBONIC ACID GAS GENERATOR.

No. 467,673.

Patented Jan. 26, 1892.



WITNESSES.

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CARBONIC-ACID-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 467,673, dated January 26, 1892.

Application filed October 7, 1891. Serial No. 408,032. (No model.)

To all whom it may concern:

Be it known that I, PATRICK J. MAGUIRE, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain Improvements in Carbonic-Acid-Gas Generators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a transverse vertical section of a carbonic-acid-gas generator embodying my invention. Fig. 2 is a top view of the acid-chamber. Fig. 3 is a horizontal section on the line *x x* of Fig. 1.

My invention relates to carbonic-acid-gas generators, and has for its object to render the apparatus automatic in its action, whereby the flow of the acid to the alkali-chamber can be regulated automatically exactly in proportion to the quantity of gas being used, thereby avoiding danger of explosion from excessive pressure, as is liable to occur from carelessness or neglect where the flow of the acid is controlled by the attendant, as has hitherto been customary.

To this end my invention consists in certain novel combinations of parts and details of construction, as hereinafter set forth, and specifically pointed out in the claims.

In the said drawings, A represents the alkali-chamber of a carbonic-acid-gas generator, upon which is secured by means of bolts *a* in the ordinary manner the acid chamber or receptacle B, provided, as usual, with a lead lining *b*, the passage between the said chambers A B being provided with a lead bushing *c*, having a flange *d*, which is confined between the flanges of the acid and alkali chambers, as shown, a suitable packing of lead being provided at the joint between the said chambers, as usual. Within the upper end of the bushing *c* is fitted the end of a pipe D, which extends up vertically within the acid-chamber B and is surrounded by an outer casing or jacket E, the lower end of which is tightly soldered to the upper surface of the flange *d* of the bushing *c*, immediately above which and as closely as possible to the bottom of the acid-chamber are formed openings *f* for the passage of the acid which flows

into the space 10 between the jacket E and the pipe D and rises within said space until it finds its level. The upper end of the jacket E, which extends above the top of the pipe D, is provided with a back-pressure or check valve G, opening upward into the acid-chamber, through which valve the gas from the alkali-chamber may escape into the acid-chamber B to create a pressure upon the surface of the acid therein, whereby whenever the pressure in the chamber B exceeds that in the alkali or generating chamber A the acid is caused to flow over the top of the pipe D and down into the alkali-chamber A, while as soon as the pressure in the generating-chamber A equals that in the chamber B the flow of acid will be stopped, and consequently the generation of gas will be checked and liability of explosion avoided, the pipe D thus forming a portion of the equalizing-pipe and also serving as a delivery-pipe for the acid.

The cover *g* of the acid-chamber is provided at its center with a large aperture *h* to afford access to the valve G, said aperture being closed by a screw-cap *i*. *k* is an opening in the cover *g*, through which the acid is poured into the chamber B, said opening being closed by a screw-cap *l*. H is a pressure-gage, and I the safety-valve, both of the usual construction.

In starting the apparatus, the chamber B having been filled with acid to the level of the top of the delivery-pipe D, a small additional quantity of acid is poured in through the opening *k*, which is then immediately closed by screwing the cap *l* tightly down thereover. This raises the level of the acid above the top of the pipe D, causing it to flow simply by gravitation down through said pipe D into the alkali-chamber A, containing the usual supply of marble-dust and water. The gas generated in the chamber A then rises into the pipe D, and when the pressure in the chamber A rises to a sufficient height it will force the column of liquid in the pipe D bodily upward and into the chamber B, compressing the gas therein until such pressure, plus the column of liquid in the pipe D, is equal to the gas-pressure in the chamber A. The flow of acid will then cease until the pressure in the chamber A is lowered. The gas in the cham-

- ber B will then expand, and being prevented by the valve G from passing through the pipe D will force the liquid through said pipe, when the flow of the acid will be resumed.
- 5 The action is thus automatic and regulated by the generation of gas in the chamber A and the rapidity with which such gas is used, no care or attention on the part of the attendant being necessary so long as the acid-chamber contains a supply of acid, the operation of the apparatus being thus regulated with the greatest nicety, and all danger of explosion from carelessness or neglect on the part of the attendant thus avoided.
- 15 The acid-chamber is provided at its bottom with an opening *g* to facilitate the operation of washing out said chamber, the opening being closed by a screw-cap *s*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a carbonic-acid-gas generator, the combination, with the acid-chamber, of a vertical pipe rising within said chamber and communicating with the alkali-chamber, an outer casing or jacket surrounding said vertical pipe and provided at its bottom with an

inlet for the passage of the acid to the space between said vertical pipe and its outer casing or jacket, and a back-pressure or check valve applied to the upper end of the jacket above the end of the vertical pipe inclosed thereby and opening into the acid-chamber, all operating substantially as and for the purpose set forth.

2. In a carbonic-acid-gas generator, the combination, with the alkali-chamber A, of the acid-chamber B, the vertical pipe D, rising within said acid-chamber and communicating with the alkali-chamber, the outer casing or jacket E, surrounding the pipe D and provided at its bottom with inlet-openings *f* for the passage of the acid to the space between the pipe D and its jacket E, and the back-pressure or check valve G at the upper end of the jacket E, said valve opening into the acid-chamber, substantially as described.

Witness my hand this 24th day of September, A. D. 1891.

PATRICK J. MAGUIRE.

In presence of—

P. E. TESCHEMACHER,
HARRY W. AIKEN.