3 Sheets--Sheet 1.

G. D. DOWS.

Apparatus for Generating Carbonic Acid.

No. 149,207. Patented March 31, 1874.

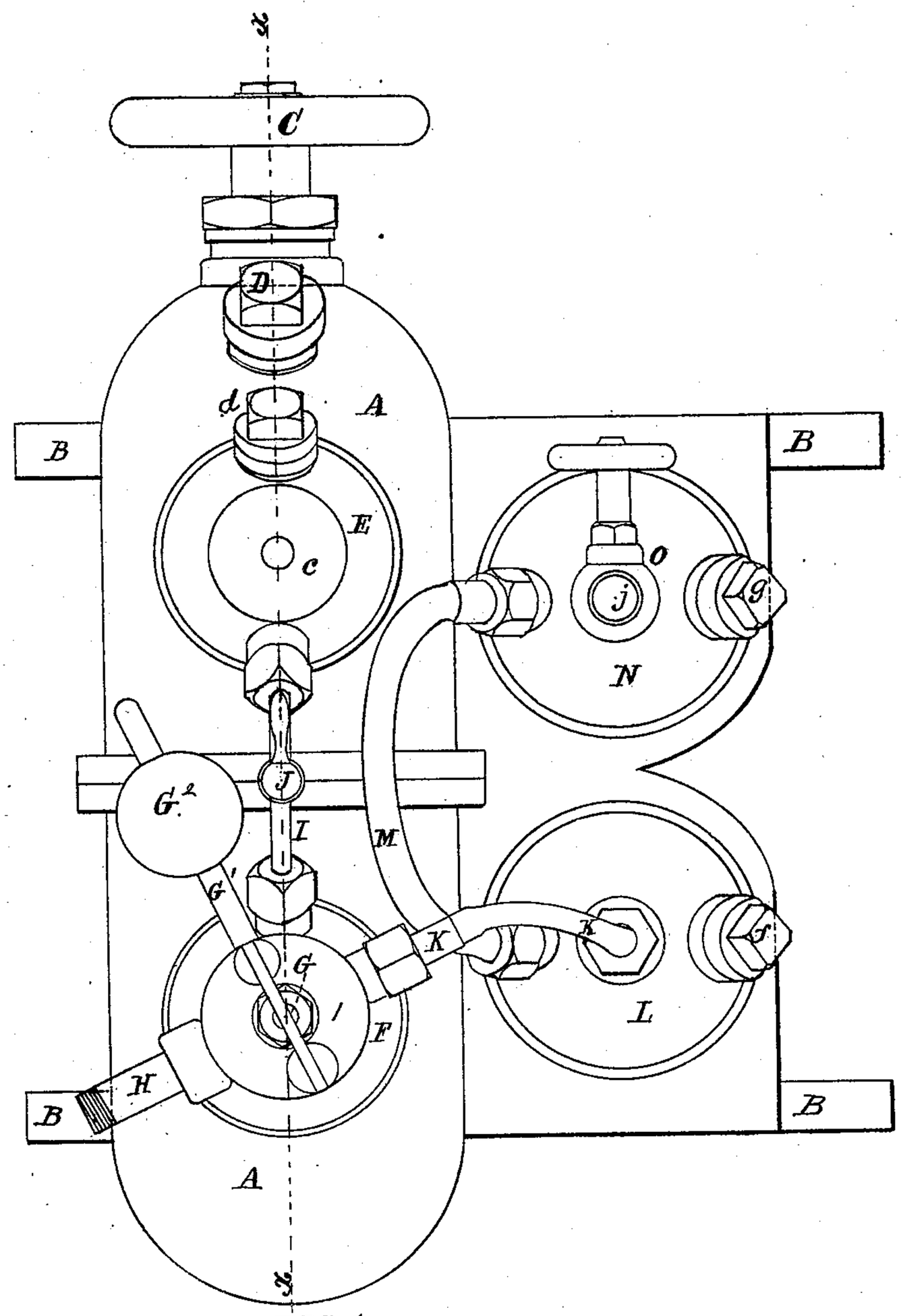

FIG. 1.

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3 Sheets--Sheet 2.

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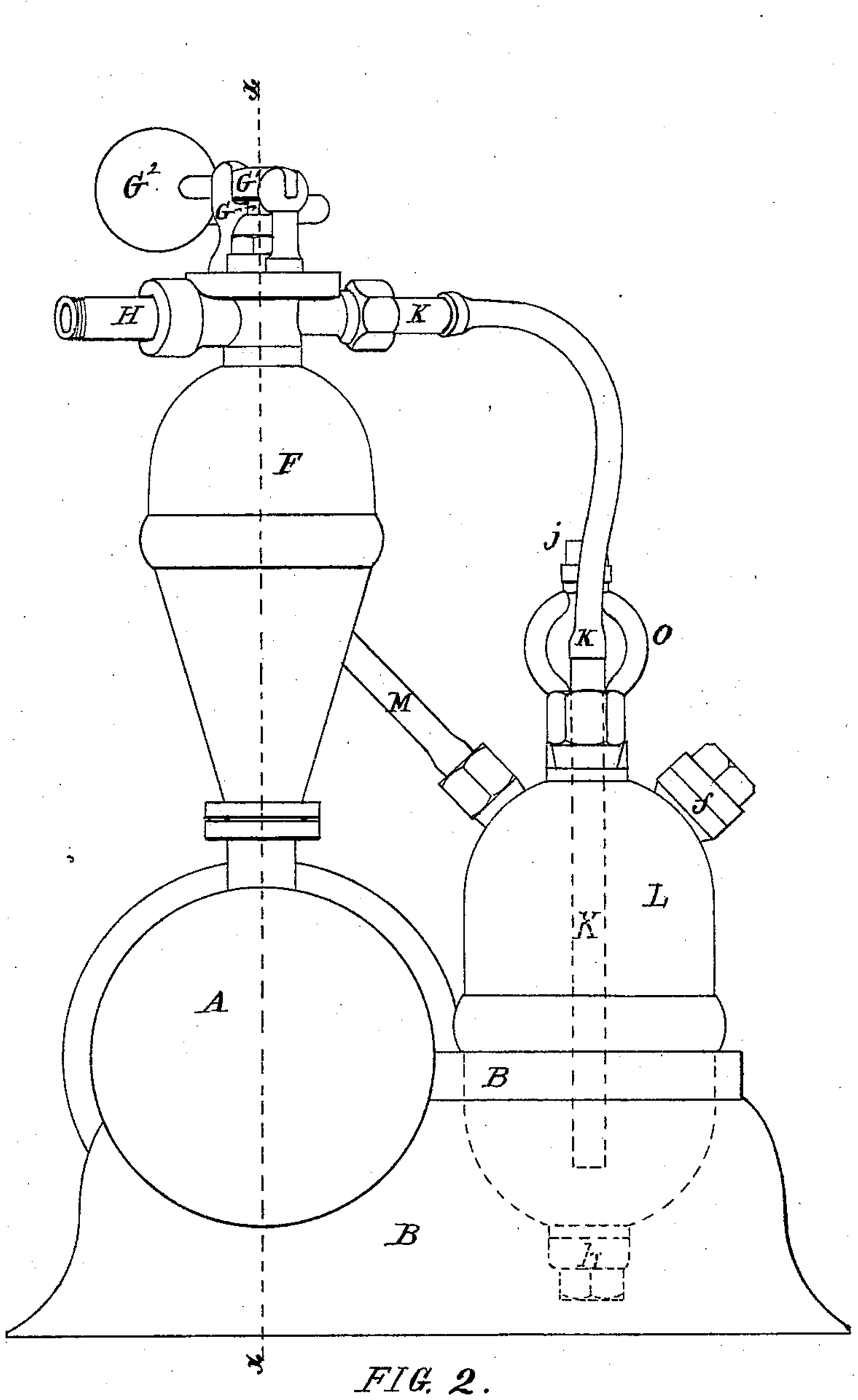

FIG. 2.

Witnesses.
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3 Sheets--Sheet 3.

G. D. DOWS.

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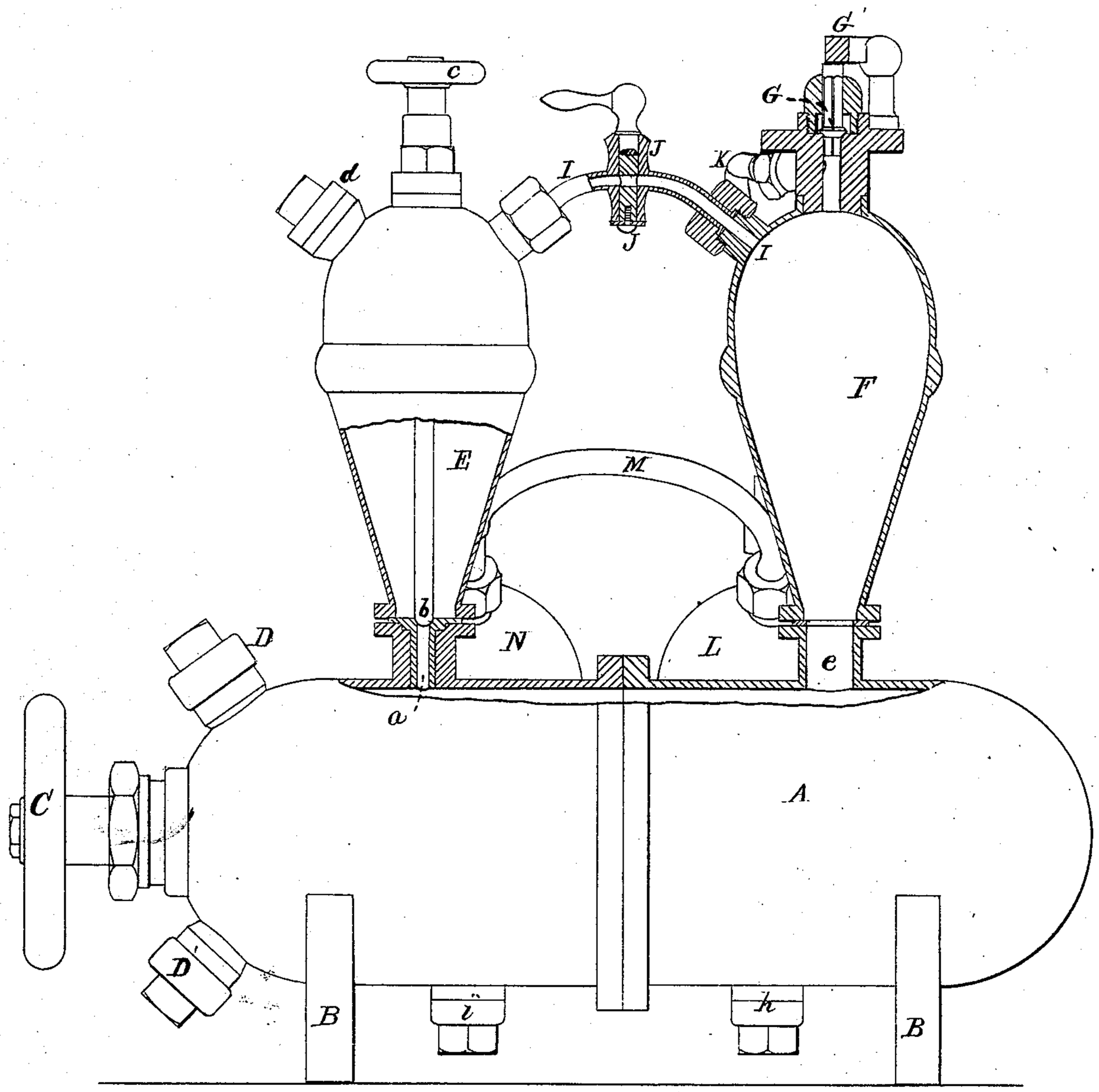

FIG. 3.

Witnesses.

N. C. Lombard

L. G. Hood.

Inventor.

Gustavus D. Dows.

UNITED STATES PATENT OFFICE.

GUSTAVUS D. DOWS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN APPARATUS FOR GENERATING CARBONIC ACID.

Specification forming part of Letters Patent No. **149,207**, dated March 31, 1874; application filed December 19, 1873.

To all whom it may concern:

Be it known that I, GUSTAVUS D. DOWS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Gas-Generators for Charging Soda-Fountains, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is the construction of a generator for the production of carbonic-acid gas, to be used in charging soda-fountains, that shall be safe in its operation, and produce a gas having less impurities than any heretofore made.

In all generators heretofore used, so far as my knowledge extends, the gas has been drawn directly from the mixing-chamber or generating-cylinder by means of a small pipe leading therefrom to the purifier, and in like manner the pipe leading to the pressure-gage was small, and opened directly from the mixing or generating chamber, which circumstances have been the prime cause of a great majority of the accidents which have occurred in the use of such apparatus. Such pipes, opening directly from the generating-chamber, and in close proximity to the agitation taking place therein, are very liable to become choked by being filled with the sediment contained in said chamber.

It is obvious that if the pipe leading to the pressure-gage should become choked, as above described, the gage would become entirely worthless as an indicator of the pressure in the generating-chamber, and the first warning that the operator receives that anything is wrong is an explosion. Such also would be the result if the escape-pipe leading to the purifiers, and thence to the fountain or chamber to be charged should become choked or stopped up, as described, an explosion being inevitable, if the charge of chemicals brought into action in the generator is of sufficient capacity to raise the pressure therein above what the strength of the material will bear, when the discharge-pipe is suddenly closed up. In the latter case the operator may be cognizant of the fact that something is wrong if he is watching the pressure-gage, but an explosion is inevitable unless the pressure is relieved, which may be done by the operation of the safety-valve, if the apparatus is provided with one, and it is in good working order; but if there is no safety-valve, or it is inoperative from any cause, the only remedy is unscrewing the cap of one of the nozzles in the mixing or generating chamber; and it sometimes happens that there is not sufficient time after the trouble is discovered to do this.

Another objection to the old style of generators is, that the sulphuric acid and the marble-dust or other ingredients used to generate the gas, are often carried over into the purifier, and thence into the fountain, when it is being charged, producing an impure soda-water.

Another defect in the generators heretofore in use is, that the vitriol-chamber cannot be opened during the process of generation to increase the charge of vitriol, as it is very often desirable to do.

To overcome these objections, and to remedy the evils resulting from the defects in the construction of the generators now and heretofore in use, has been my aim in making the present invention.

My invention consists, first, in the combination, with a generating-chamber provided with a suitable agitating device, and a vitriol-chamber connected therewith, and provided with a suitable valve, by means of which said vitriol-chamber may be shut off from the generating-chamber, or put in communication therewith at will, of a gas-chamber, raised above the generating-chamber, and having a large and perfectly free communication with the upper side of said generating-chamber, as will be described.

My invention further consists in attaching the pipes leading from the generator to the purifiers and to the pressure-gage, and the equalizing-pipe leading to the top of the vitriol-chamber, to the top of the gas-chamber, so that all the gas escaping from the generator will have to pass through the whole height of the gas-chamber before entering the small outlet-pipes, thus making it practically impossible for said small pipes to become choked up; and, as the orifice communicating between the generating and gas chambers is made large, and is always open, it follows that the pressure-gage will never become inoperative, because of the pipes being choked or stopped up.

My invention further consists in the introduction of a stop-cock into the equalizing-pipe, connecting the gas and generating chambers with the upper portion of the vitriol-chamber, so that the vitriol-chamber may be shut off from said chambers, for the purpose of increasing the charge of vitriol during the process of generating.

In the drawings, Figure 1 is a plan of my improved generating apparatus. Fig. 2 is an end elevation; and Fig. 3 is a sectional side elevation of the same, the parts in section being cut on line *x x* on Figs. 1 and 2.

A is the generating-chamber, constructed in the usual manner, and mounted in a suitable frame, B, preferably in a horizontal position, and provided with any suitable stirring or agitating device, which may be operated by the wheel C. The chamber A is also provided with a capped nozzle, D, upon its upper side, through which the chamber is charged, and another similar nozzle, D′, upon its under side, through which the contents of the chamber may be discharged. E is the vitriol-chamber, constructed in the usual manner, and provided with the usual passage *a*, communicating with the generator, which passage is closed by the valve *b*, which may be opened or closed at will by means of the wheel *c* attached to the upper end of the valve-stem, all constructed and operating in a well-known manner. The chamber E is also provided with the usual capped nozzle *d*, through which the vitriol is introduced to said chamber. F is a supplementary gas-chamber, rising from the upper side of the mixing or generating chamber A, and communicating therewith by the free and open passage *e*. G is a safety-valve, set in the top of said chamber, and held in place by the lever G^1 and the weight G^2 in a well-known manner. H is a pipe, leading to the pressure-gage (not shown in the drawings.) I is a pipe, leading from the upper part of the gas-chamber F to the upper part of the vitriol-chamber E, for the purpose of equalizing the pressure in the vitriol-chamber with that in the mixing-chamber, so that the vitriol will descend into said mixing-chamber when the valve *b* is opened. The pipe I is provided with a stop-cock, J, by the closing of which, when the valve *b* is closed, the vitriol-chamber E is isolated from the generating or gas chambers, and may be opened to supply an extra charge of vitriol through the nozzle *d*, while the process of generation is going on in the generating-chamber. K is a pipe, leading from the upper part of the gas-chamber F to the purifying-chamber L, and extending nearly to the bottom thereof, as shown in dotted lines in Fig. 2. M is a pipe, leading from the top of the purifier L to a secondary purifying-chamber, N, and extending nearly to the bottom thereof, in the usual manner. The purifiers are provided with the capped nozzles *f* and *g* at their upper ends, through which they may be charged, and similar nozzles *h* and *i* in their lower ends for discharging their contents. The secondary purifier N is provided with a pipe, *j*, which leads to the fountain or other vessel to be charged, in which is a stop-cock or valve, *o*, in the usual manner.

The above description of the arrangement of the parts is based upon the plan usually adopted of placing the carbonate in the mixing-chamber, and the vitriol in a chamber placed above the mixing-chamber, and from which it may be discharged into the mixing-chamber at will by opening a valve; but it is evident that the vitriol may be placed in the mixing-chamber, and the carbonate in the elevated chamber, and the two ingredients brought in contact by opening the valve *b* and allowing the carbonate to descend into the mixing-chamber.

I do not wish, therefore, to be understood as limiting myself to the precise arrangement of parts shown in the drawings, nor to any special manner of bringing the ingredients into contact; but

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for generating carbonic-acid gas, the combination of the mixing-chamber A provided with a suitable agitating device, the vitriol-chamber E, and the gas-chamber F communicating with the mixing-chamber by a free and always open passage, and provided with outlets from its top leading to the purifiers and the vitriol-chamber, substantially as described.

2. The arrangement and combination of the mixing-chamber A, the gas-chamber F, and the pipes H, I, and K opening or leading from the upper portion of the chamber F, substantially as described.

3. The combination of the mixing-chamber A, the vitriol-chamber E, the gas-chamber F, and the equalizing-pipe I leading from F to E, and provided with the stop-cock J, substantially as described.

Executed at Boston this 16th day of December, 1873.

GUSTAVUS D. DOWS.

Witnesses:
N. C. LOMBARD,
S. A. WOOD.