

JOHN MATTHEWS.

Improvement in Apparatus for Generating Carbonic Acid Gas.

No. 128,234.

Patented June 25, 1872.

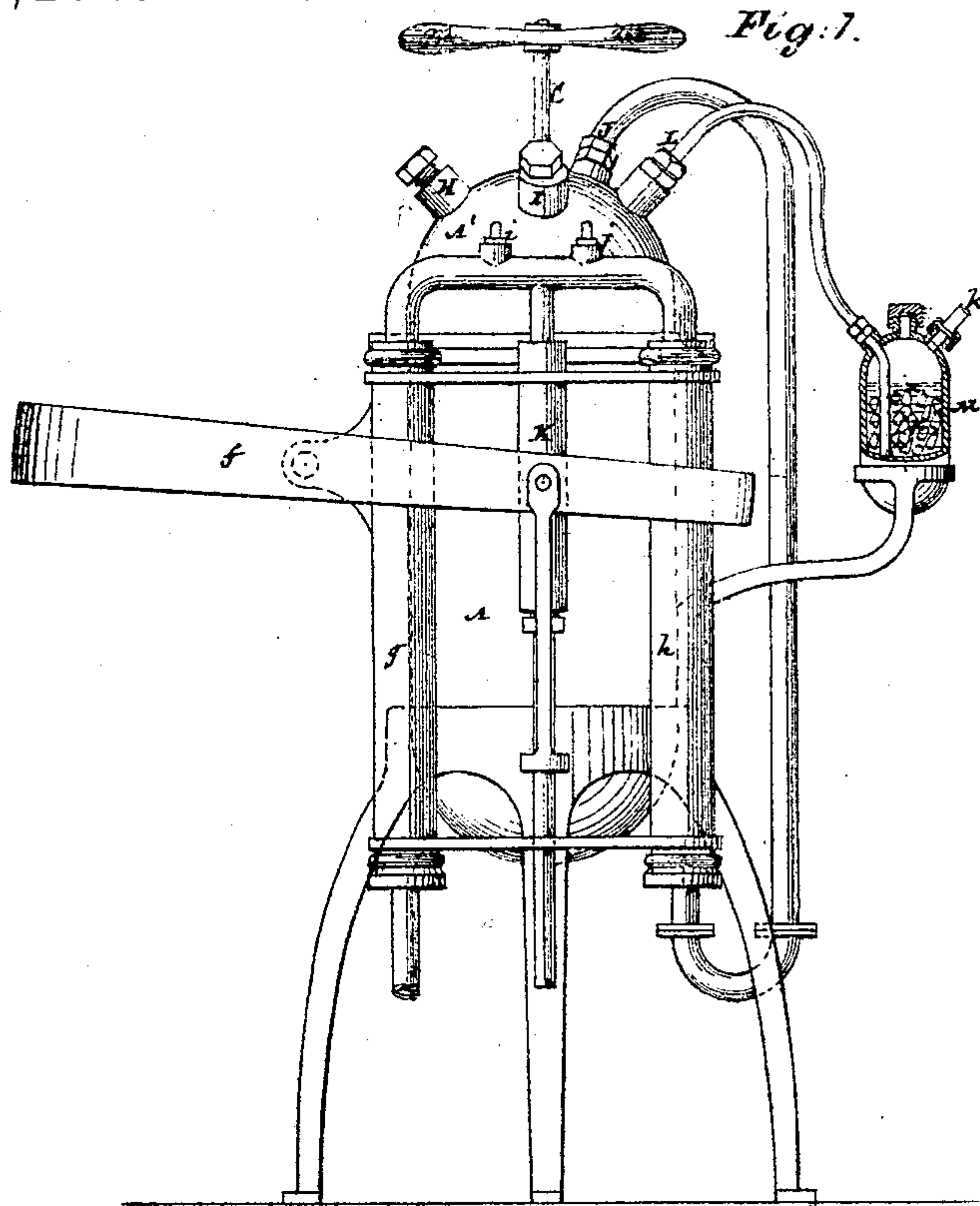
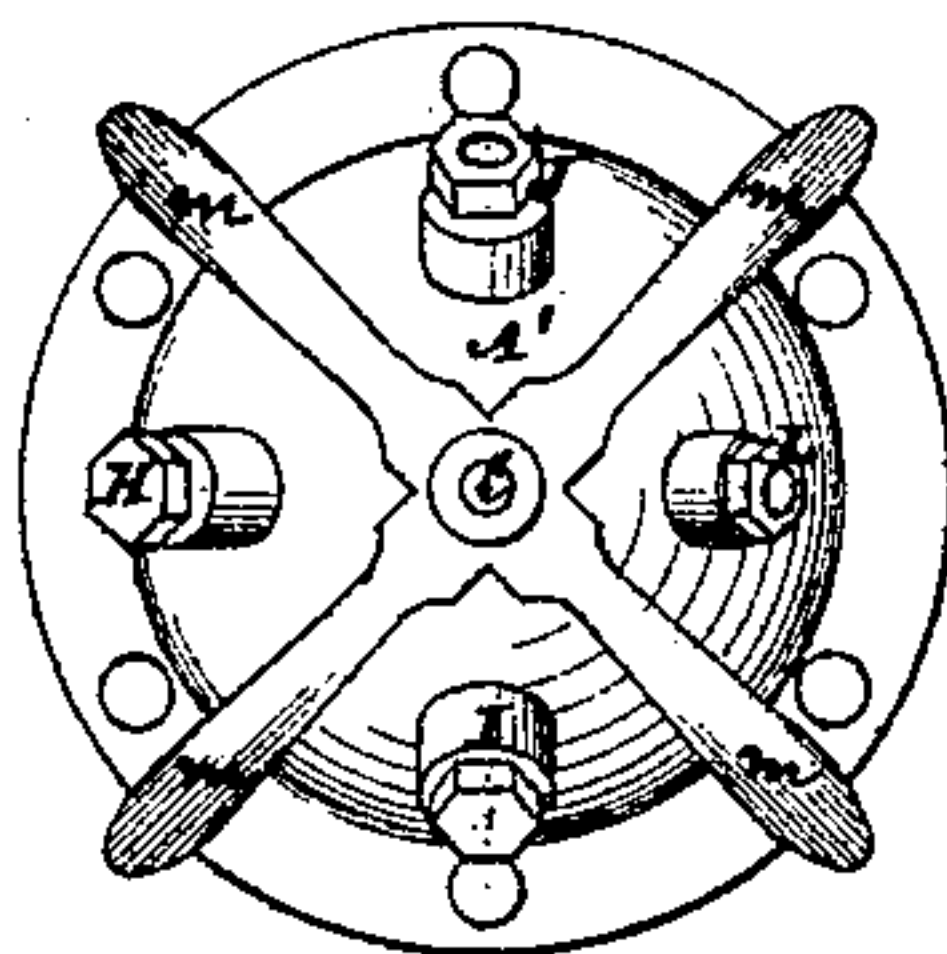


Fig. 2.



Witnesses:

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Scale. 0 1 2 3 ft.

Scale.

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per Brown & Cornish & Co
Attorneys

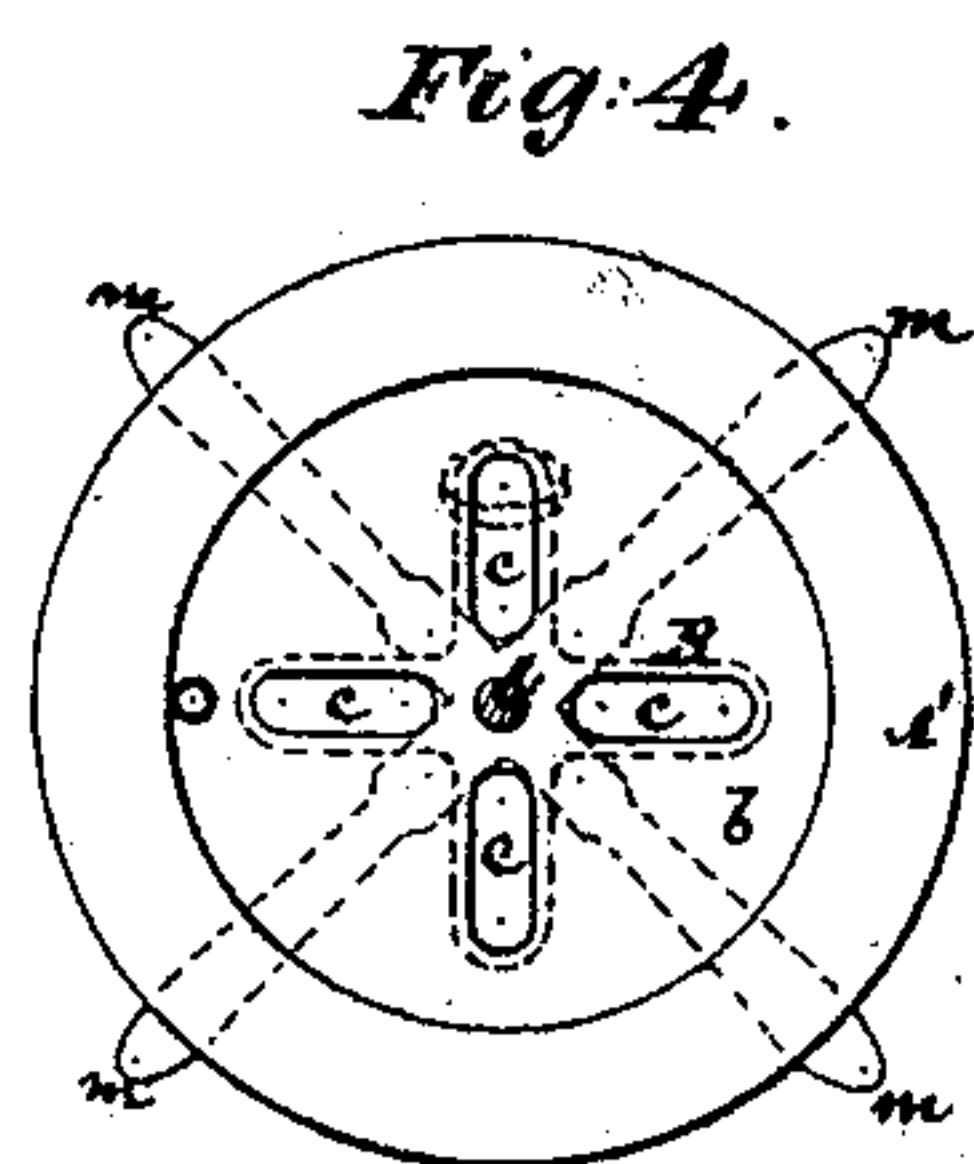
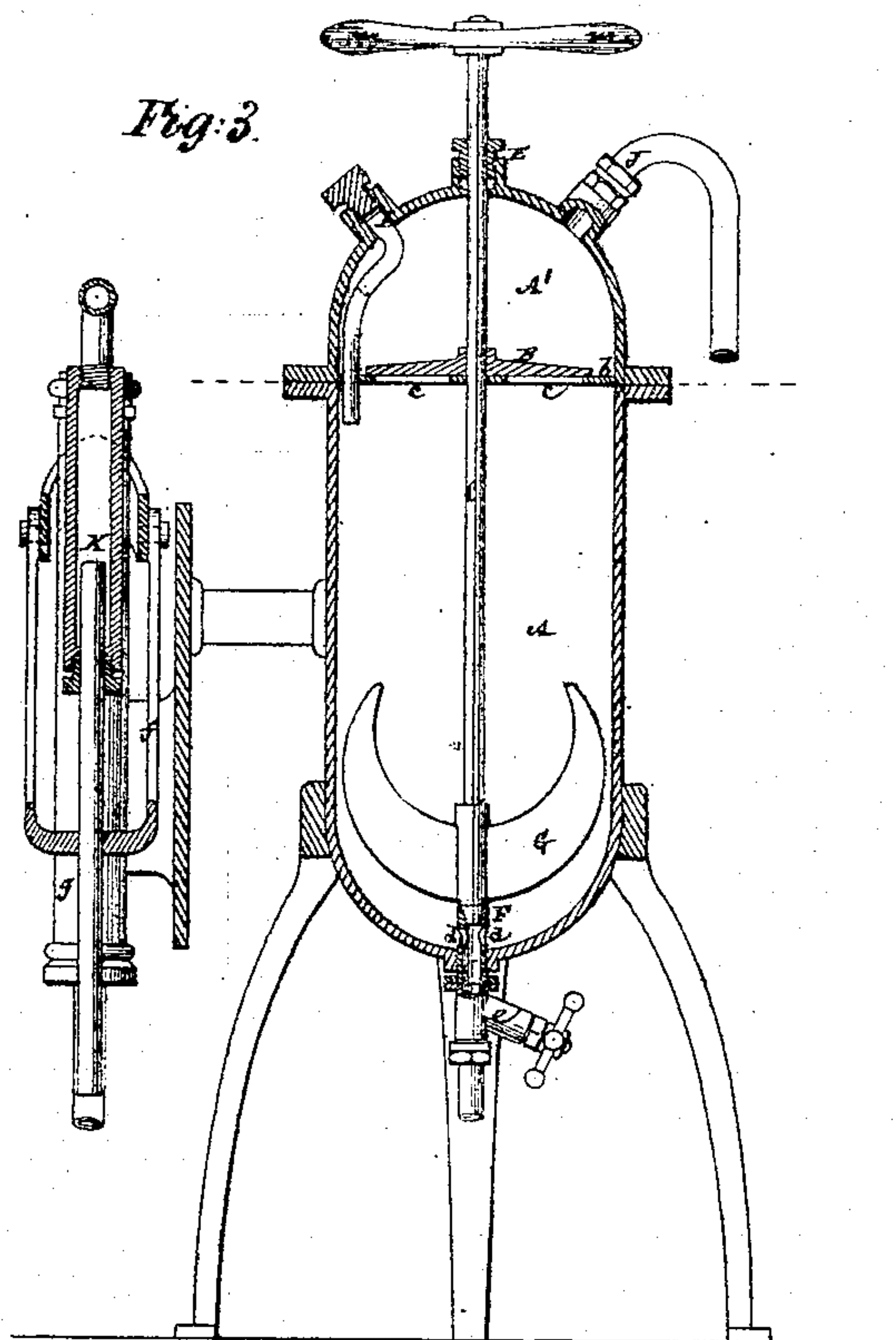
JOHN MATTHEWS.

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UNITED STATES PATENT OFFICE.

JOHN MATTHEWS, OF NEW YORK, N. Y.

IMPROVEMENT IN APPARATUS FOR GENERATING CARBONIC-ACID GAS.

Specification forming part of Letters Patent No. 128,234, dated June 25, 1872; antedated June 7, 1872.

To all whom it may concern:

Be it known that I, JOHN MATTHEWS, of the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Evolving Carbonic Acid; of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents an elevation of an apparatus constructed in accordance with my invention; Fig. 2, a plan of the upper portion of the generator; Fig. 3, a vertical section in a plane at right angles to Fig. 1; and Fig. 4, an inverted plan of the upper portion of the generator.

Similar letters of reference indicate corresponding parts throughout the several figures.

My invention in apparatus for evolving carbonic acid, applicable to the manufacture of soda-water and other purposes, embraces a vertical generator, with a stuffing-box on top that serves both for the agitator and a valve or valves, by which the marble dust is admitted to the generator in a gradual and shower-like manner at various points or places of distribution, over a column of liquid acid of suitable strength, through which it descends. By thus admitting the marble-dust to the diluted acid the former is more thoroughly acted upon by the latter, and a uniform strength of acid is preserved. When, as previously practiced, the marble is first introduced, it is necessary to admit the water before letting on the acid, which latter is accordingly at first or for a while too much diluted. Furthermore, the agitator and valve above referred to, both being operated in common—that is, through or by the same stem or shaft—not only allows of the one stuffing-box sufficing, but a proper relative action of the agitator to the supply of marble-dust is kept up, and a more thorough or intimate contact of the marble with the acid, as the former descends through the latter, is effected. The invention also embraces a perforated tubular step-bearing for the agitator-shaft, in the bottom of the generator, for drawing off the residuum below.

The invention likewise consists in a certain arrangement of handles for operating the valve that admits the marble-dust relatively to the openings in the valve or valve-seat and openings through which the marble-dust and other ingredients are introduced, whereby said handles also form guards to prevent the last-mentioned openings being exposed for the purpose of resupplying the generator when the valve is open, thus preventing—that is, by the closed position of the valve or closed condition of the valve-seat—waste and back action of the gas in the generator on the marble-dust, causing the latter to blow or fly into the eyes of the attendant or otherwise. The invention furthermore embraces a combination, with a washer or purifier and the water therein, of broken pieces or lumps of carbonate of lime or other material containing carbonic acid, whereby less water is required to effect the washing of the gas as it passes from the generator, and consequently there is a reduced absorption of the carbonic acid; also the latter is made to pass more circuitously through the washer, and is, therefore, more thoroughly exposed; and the carbonate of lime in the washer takes up any excess of sulphuric acid passing off in a free state; also adds to the carbonic acid. The invention likewise consists in a combination of a force-pump, as an integral part of the apparatus, with the generator thereof, for the purpose of expelling, by forcing in water, the carbonic acid at a high pressure from the generator, and clearing the latter of gas.

Referring to the accompanying drawing, A A' represent the generator of the apparatus, the upper portion, A', being separated from the lower portion, A, by a disk or diaphragm, b, which has openings c c in it for introduction of the marble-dust and water to the lower and main portion A of the generator, and for the escape of the carbonic acid as evolved in the latter. These openings c c are controlled by a revolving valve, B, carried by an upright stem or shaft, C, said valve being formed of arms or covering-surfaces of about or a little more than the area of the openings c c, so that as the valve is rotated it opens and closes

said openings. Any other suitable form of valve may be used.

The stem C is arranged to project through a stuffing-box, E, in the top of the generator, and extends downward to or near the bottom of the generator, where it works in a step-bearing, F. This step-bearing is formed of a tube arranged to screw or project up into the generator at its lowest point, and perforated, as at *d d*, below its support of the stem or shaft C, whereby all the residuum in the generator may be drawn off from time to time, as required, and which a lateral arrangement of said tube as a mere discharging device would not effect. A discharge-pipe is connected with this perforated tubular step-bearing outside of the generator, and the same fitted with a valve, *e*, for opening and closing the discharge, as required.

The stem or shaft C is provided below with an agitator, G, so that the same stem, C, working through the one stuffing-box, E, not only operates the valve to supply the lower and gas-evolving portion A of the generator with marble-dust, but to simultaneously set in motion the agitator to stir up the diluted acid and marble-dust descending therethrough, and this in proper relation with the admission of the marble, the agitator stopping, when the valve B is at rest, over the openings *c c*, and increasing or diminishing its action with the more rapid or slower rotation of the valve. Said agitator may be variously shaped or constructed.

The marble-dust is admitted to the upper portion or chamber A' of the generator by an inlet, H, and, as the valve B is rotated, is distributed, at various points and in broken showers, through the openings *c c*, descending through the column of diluted acid in the lower part of the generator, and the whole contents being thoroughly stirred by the agitator during such descent of the dust, thus bringing the marble into intimate contact with the acid, and expediting the evolution of the gas.

Prior to the introduction of the marble-dust the liquid acid is admitted, as by a tube or inlet, I, arranged to project through the upper portion, A', of the generator and diaphragm or disk *b*, and the water to dilute the acid is introduced, by an inlet or pipe, J, to the chamber A', at or near its top, passing down through the valve, and washing out any remaining marble-dust in said chamber.

The water may be forced in by a pump, K, that forms an integral portion of the apparatus, and which is more especially designed to expel, by forcing in water, the gas from the generator at a high pressure after the evolution of fresh gas has ceased. Said pump may be variously constructed, but is here shown as operated by a brake, *f*, and

as drawing in water up one column, *g*, and discharging it down another column, *h*, to the pipe J, the valves of the pump being at *i* and *j*.

L is the outlet or pipe which conducts the gas as made to the washer and purifier M, from which it passes off by an outlet, *k*. This washer, in addition to being charged with water, is also supplied with lumps, *x x*, of carbonate of lime or other material containing carbonic acid, whereby a less quantity of water suffices in the washer, and there is consequently a reduced absorption of the carbonic acid passing into or through the washer; likewise a more circuitous route is established for said acid, and a more perfect exposure of it secured; also whereby the carbonate of lime in the washer takes up any excess of sulphuric acid passing off in a free state, and addition is made to the carbonic acid.

The stem or shaft C is operated by handles *m m*, and these are so set, in relation with the valve B and the different openings through which the ingredients are admitted to the generator, that they act as guards to check or prevent the opening of said inlets when the valve B is open or apertures *c c* uncovered by it, thereby avoiding waste of gas from the generator and blowing or flying of the marble-dust by the pressure of the gas at or through the inlet when attempting to admit it. Thus the handles *m m* are set so that they lie over the inlets H I J and outlet L, or certain of them, when the valve B is open, or openings *c c* not covered by it, thus making it inconvenient to get at said inlets; but when the valve B is closed, then the handles *m m* occupy an intermediate position to the inlets, especially to the inlets H and I, as represented in Figs. 2 and 4, thereby giving ready access to said inlets, or indicating, by the position of the handles, that the valve B is closed, and that it will be safe to admit of a fresh supply of marble-dust, or otherwise establish communication with the exterior of the generator.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the valve B and agitator G with the stem or shaft C and single stuffing-box E on top of the generator, substantially as and for the purposes herein set forth.

2. The combination of the perforated tubular step or bearing F with the stem C and generator or lower portion A thereof, essentially as described.

3. The combination of the handles *m m* with the valve-stem C, when arranged in relation with the valve or openings *c c* in the valve-seat, and inlets and outlets, or certain of them, by which communication is established with the exterior of the generator, whereby said handles are made to form guards to check or

prevent the opening of such communication when the valve that supplies the generator is open, substantially as specified.

4. The combination, in the washer or purifier M, with the water therein, of broken pieces or lumps of carbonate of lime or other material containing carbonic acid, for operation substantially as and for the purposes herein set forth.

5. The combination, with an apparatus for

evolving carbonic acid, of a force-pump, arranged to connect with the generator at or near its top, and forming an integral portion of said apparatus, to effect the expulsion of the gas, essentially as herein described.

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Witnesses:

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