

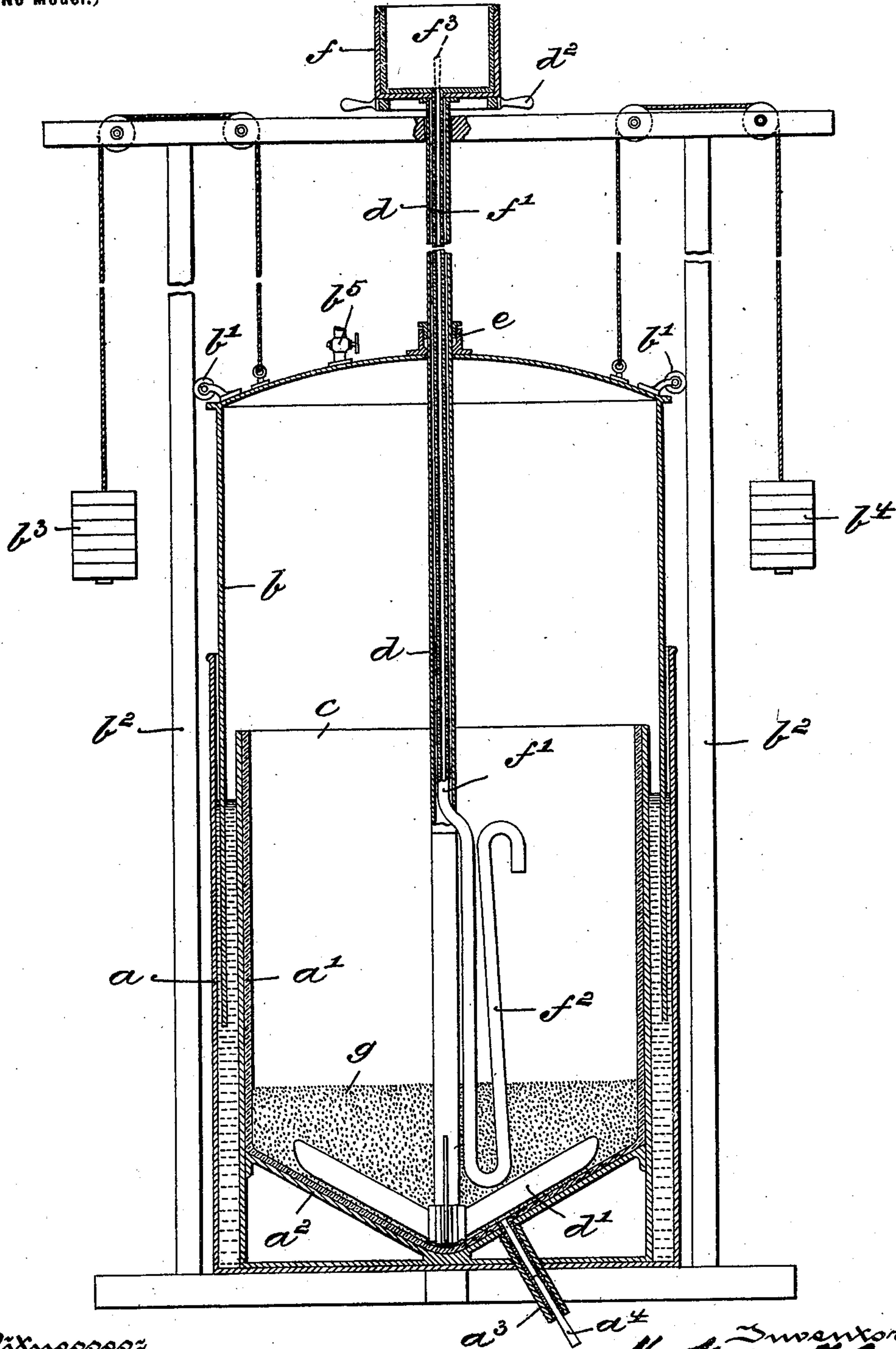
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Patented Aug. 5, 1902.

VAN VECHTON W. RIESBERG.
METHOD OF MAKING CARBONIC ACID GAS.

(Application filed July 18, 1901.)

(No Model.)



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VAN VECHTON W. RIESBERG, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF MAKING CARBONIC-ACID GAS.

SPECIFICATION forming part of Letters Patent No. 706,111, dated August 5, 1902.

Application filed July 18, 1901. Serial No. 68,726. (No specimens.)

To all whom it may concern:

Be it known that I, VAN VECHTON W. RIESBERG, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Making Carbonic-Acid Gas, of which the following is a specification.

Heretofore in the manufacture of carbonic-acid gas the solid material, usually marble-dust or other carbonate-of-lime compound, has been introduced into a receptacle reinforced so as to withstand a pressure of many pounds. The acid, usually sulfuric acid, has been introduced into this receptacle and the gas caused to evolve in the receptacle and maintained therein under enormous pressure. The cost of constructing a receptacle strong enough to withstand this pressure, the liability of the receptacle to burst without warning, causing loss of life and property, and the inaccessibility of the interior of the chamber for the purpose of removing the spent materials are some of the main disadvantages of the old method and apparatus for making carbonic-acid gas. A further disadvantage was that the acid and carbonaceous materials were not completely combined or spent, but a considerable proportion was passive and lost in the subsequent cleaning and recharging of the apparatus. Again, in opening the receptacle for cleaning or recharging a large quantity of gas was wasted, since gas under a pressure of less than one hundred and fifty pounds remaining in the receptacle could not be utilized for charging the liquid to be carbonated.

The main objects of my present invention are to provide a method of generating carbonic-acid gas under low pressure within a receptacle in which the materials may be completely combined and which has its interior readily accessible for cleansing and recharging without wasting the gas.

In a divisional application filed under date of September 26, 1901, Serial No. 76,610, a preferred form of apparatus wherein the method of the present application may be attained is described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the ac-

companying drawing, forming part hereof and illustrating in vertical section an apparatus designed for carrying my method into effect.

Referring to said drawing, *a* represents a double-walled stationary tank forming part of an expansible gasometer. Between the walls of this tank *a* is introduced a liquid forming a seal for the mounted dome *b*, which telescopes in the tank *a* and forms the movable part of the gasometer. The dome *b* is provided with rollers *b'*, engaging the uprights or standards *b²*, so as to permit the dome to move easily up and down, as required. The weight of the dome *b* is counterbalanced by the weights *b³* and *b⁴*. The interior of the tank *a* is provided with a lining *a'*, of lead or similar material, not affected by the acid used in the manufacture of the gas, and the lined receptacle *c* thus formed is preferably provided with a conical base *a²*, from which a lead-lined pipe or duct *a³* discharges. This duct or pipe *a³* is used only in cleaning the lead-lined receptacle *c* by permitting the spent materials therein to discharge through the pipe or duct *a³*. At all other times the duct or pipe *a³* is closed by a plug *a⁴*, of vitreous or non-corrodible material.

The receptacle *c* and the movable dome *b* are traversed by a shaft *d*, which may be completely or partially hollow. Where the shaft *d* passes through the roof of the dome *b* a stuffing-box *e* of ordinary construction is formed on the dome, so as to permit said dome to slide up and down on the shaft *d* without permitting gas to escape.

The upper end of the shaft *d* is secured to the base of a box or tank *f*, preferably lead-lined, and this box *f* is adapted to receive the acid, usually sulfuric acid, used in the liberating of the carbonic-acid gas from the carbonaceous material *g*, usually marble-dust, located in the receptacle *c*. The lead lining of the box *f* is continued in the form of a lead pipe *f'*, traversing a portion of the length of the hollow shaft *d* and extending therefrom in the form of a siphon *f²*, adapted to discharge acid passing through said pipe *f'* and siphon *f²* upon the top of the material *g*. At the bottom of the shaft *d* is formed or secured a series of paddles or stirring-wings *d'*, and the box *f*, to which the upper end of the shaft

d is secured, is provided with handles d^2 to form a preferred means of rotating or oscillating the shaft d and its paddles d' . The paddles d' extend into the carbonaceous material g and lie adjacent to the conical bottom of the receptacle c .

In operation the dome b is first raised so that it clears the upper edge of the receptacle c , and the carbonaceous material is introduced into said receptacle. The dome b is then lowered until it telescopes slightly with the fixed tank a and an air-tight gas-generating chamber or gasometer is formed. The air in this chamber or gasometer is now completely or almost completely exhausted, and the vacuum thus formed causes the dome b to collapse until its roof rests upon the upper edge of the receptacle c . Acid, usually sulfuric acid, is now poured into the box f and escapes by the pipe f' and siphon f^2 to the receptacle c and is discharged by the siphon f^2 upon the carbonaceous material g . Carbonic-acid gas will now be evolved and will collect in the gasometer, moving the dome b upward. When the dome b has risen a certain predetermined distance, a required low pressure of gas within the gasometer has been secured. A valve-controlled outlet b^5 from the dome b is now opened and the gas conducted to suitable apparatus (not shown) for charging the liquid to be carbonated. As the gas escapes from the dome b the dome will fall, thus maintaining in the gasometer a constant or uniform low pressure of gas. The dome b in reaching its lowest predetermined limit indicates that the action of the acid upon the carbonaceous material has practically ceased. The shaft d and its paddles d' are now turned or oscillated to stir up the carbonaceous material and to present fresh or uncombined

material to the acid. A new evolution of gas results and the dome b again ascends. These movements up and down of the dome b continue until the carbonaceous material has been thoroughly or completely combined with acid and has yielded up all of its carbonic-acid gas. A plug f^3 is then inserted in the acid-pipe f' to stop the flow of acid. The dome b is mechanically raised to expose the interior of the receptacle c after its gas-outlet b^5 has been closed. Water or other cleansing fluid is then introduced into the receptacle c and the paddles d' operated to agitate the spent materials and force them out of the duct or pipe a^3 , from which the plug a^4 has been removed. The counterbalancing of the dome b by the weights b^3 serves to relieve the pressure of the dome b upon the gas, and hence said gas is maintained under low pressure in the gasometer.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

The method of generating carbonic-acid gas, which consists in, first, introducing a charge of carbonaceous material into a receptacle; second, in forming in the receptacle a partial vacuum; third, introducing acid continuously to the carbonaceous material after the vacuum has been formed, and, finally, increasing the capacity of the receptacle as the gas is generated, to thereby maintain the gas under low pressure.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

VAN VECHTON W. RIESBERG.

Witnesses:

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