

(No Model.)

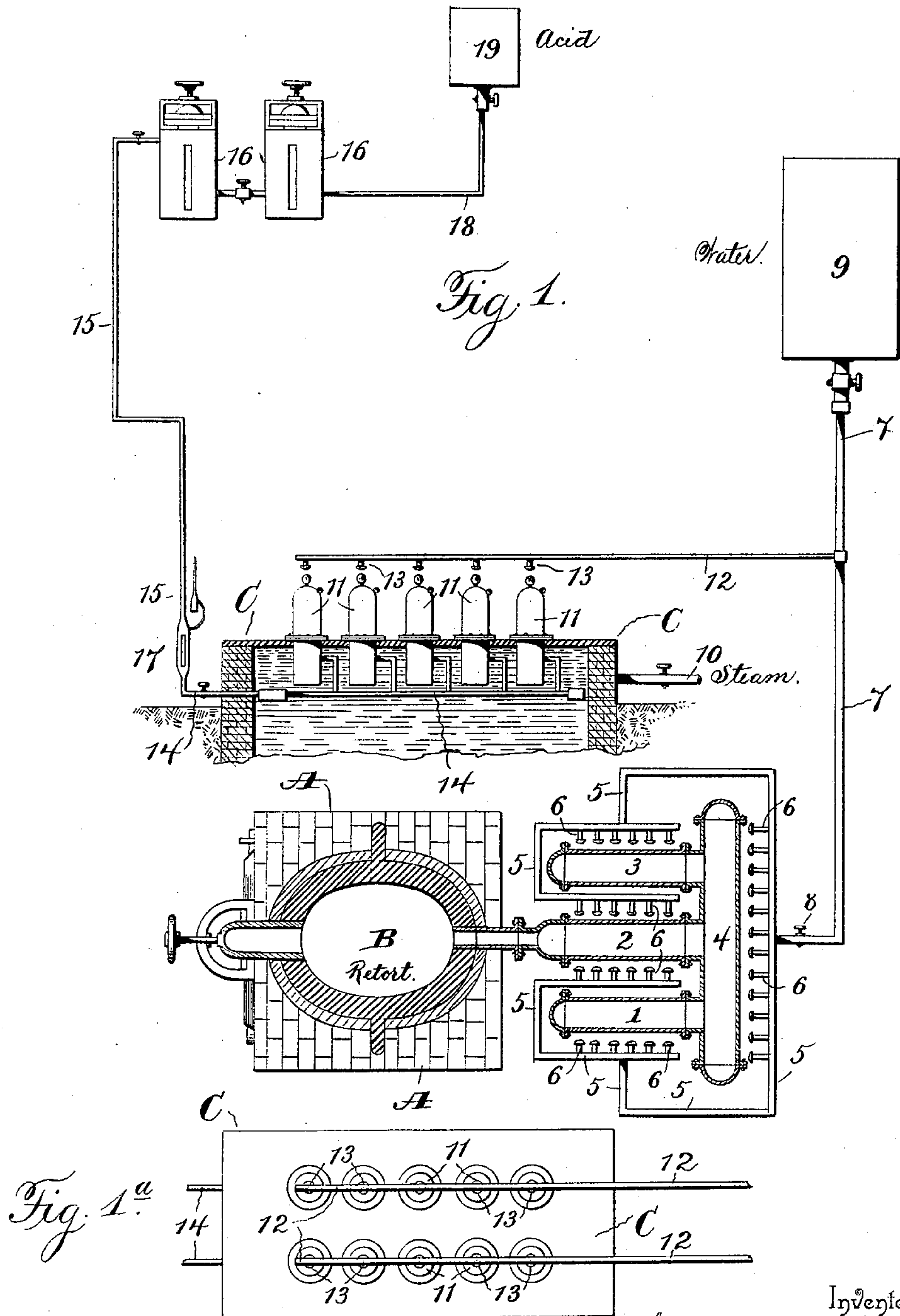
2 Sheets—Sheet 1.

W. SANDERS.

APPARATUS FOR MAKING AMMONIUM CARBONATE.

No. 594,100.

Patented Nov. 23, 1897.



Witnesses

James Hutchinson
G. F. Downing.

Inventor

William Sanders,
By H. A. Seymour
Attorney

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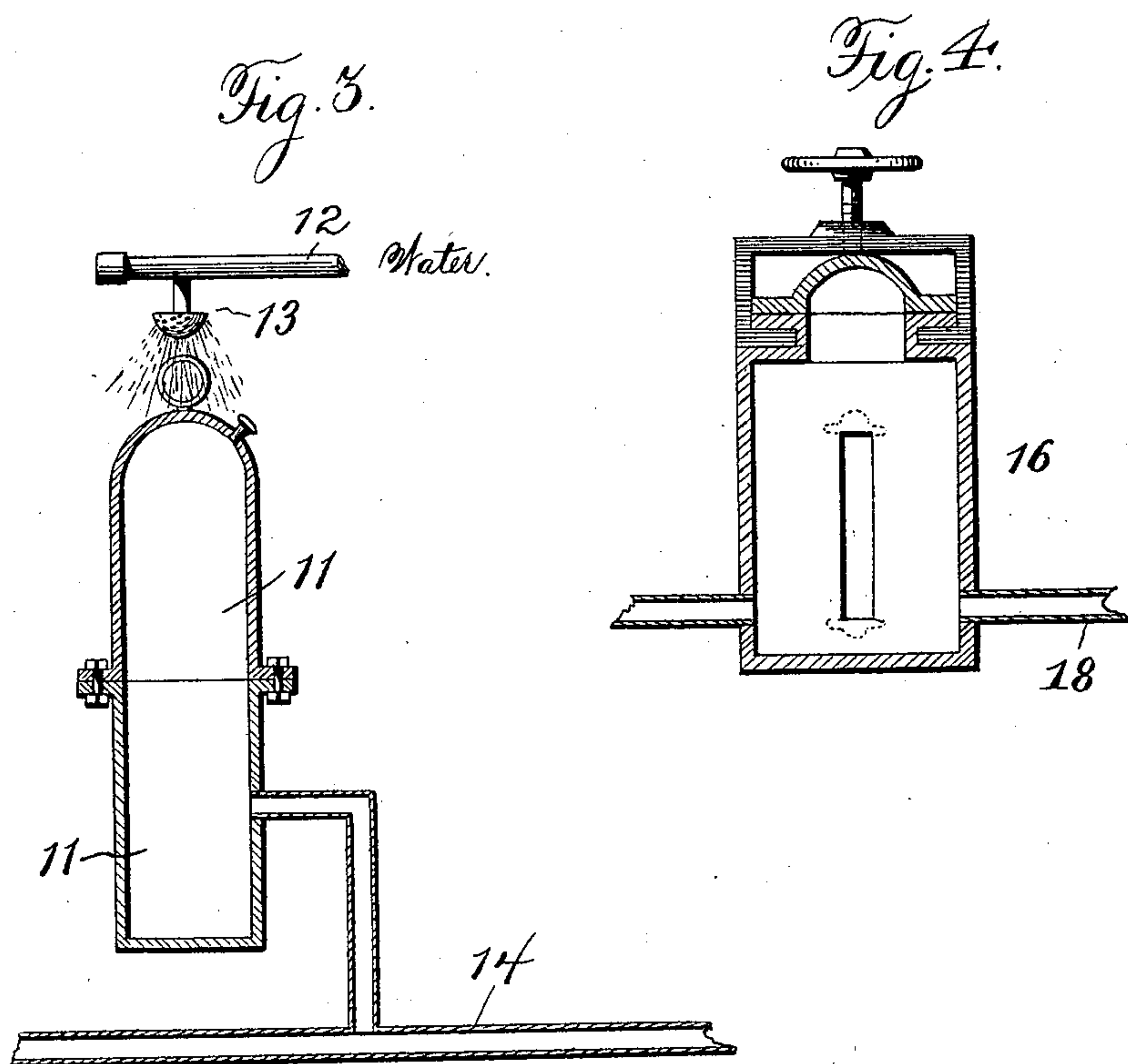
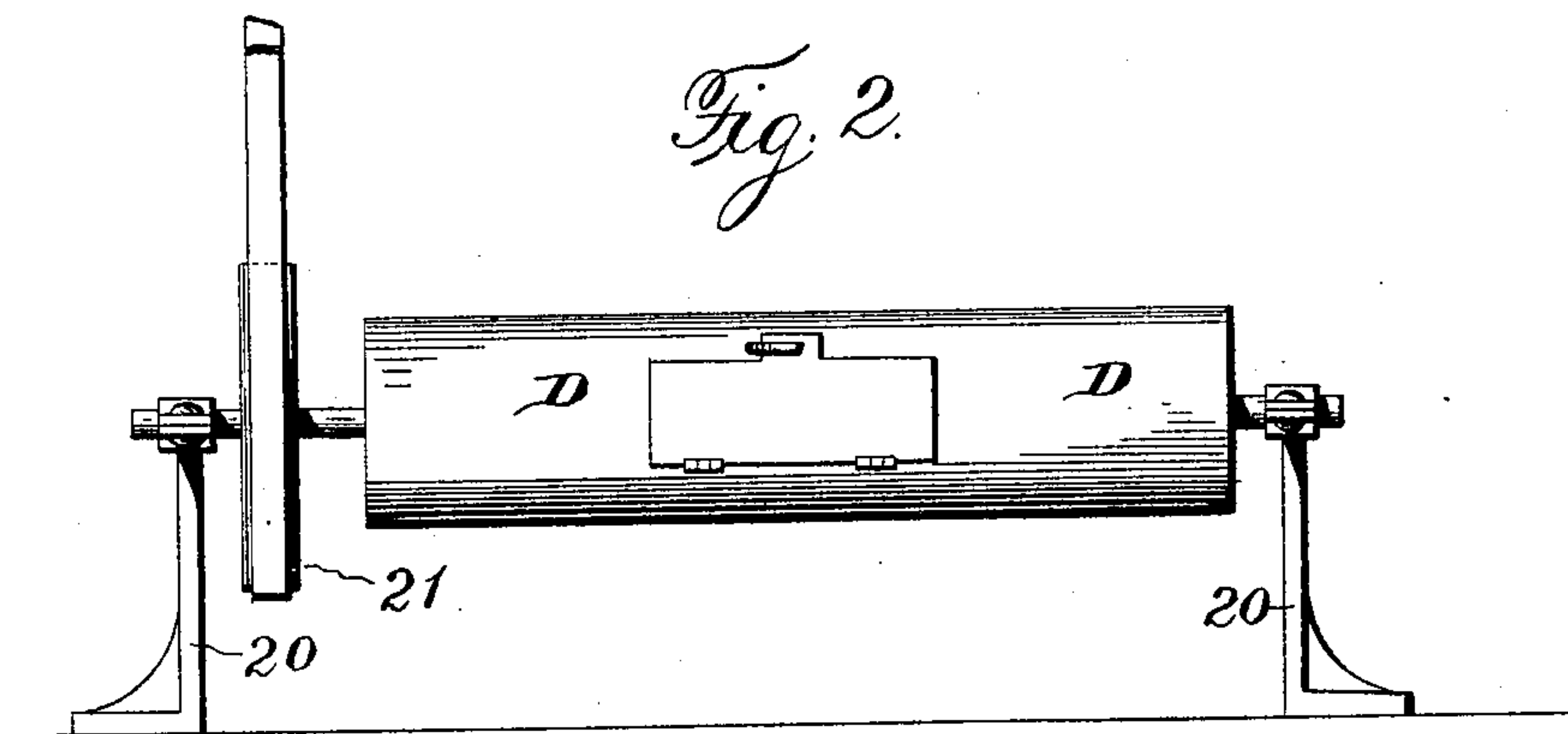
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UNITED STATES PATENT OFFICE.

WILLIAM SANDERS, OF LOWELL, MASSACHUSETTS.

APPARATUS FOR MAKING AMMONIUM CARBONATE.

SPECIFICATION forming part of Letters Patent No. 594,100, dated November 23, 1897.

Application filed August 24, 1896. Serial No. 603,729. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SANDERS, a resident of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in the Manufacture of Carbonate of Ammonia; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in the manufacture of carbonate of ammonia; and the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a general view of the apparatus, with parts shown in section to illustrate their construction. Fig. 1^a is a plan view of the tank C and the condensers therein. Fig. 2 is an elevation of the mixer. Fig. 3 is a vertical cross-section of one of the condensers 11 and coöperating pipes and sprinkler. Fig. 4 is a vertical cross-section of one of the gas-generators.

A represents a furnace in which a retort B is located. The retort B communicates with a series of cooling-chambers 1 2 3 4, located exteriorly of the furnace. A series of pipes 5 are arranged alongside the cooling-chambers and provided with a number of sprinklers 6, adapted to discharge water against the walls of said chambers, the water being conducted to said pipes and sprinklers by means of a pipe 7, having a valve 8, from a cold-water tank 9. In order to permit the ready removal of material from the cooler, the same is made in sections removably secured together.

C represents a tank adapted to contain water, which water is heated by means of steam entering through pipes 10 from any convenient source of supply.

A series of condensers 11, made in removable sections, is located within the tank C, and over each series of condensers a pipe 12 is disposed, one end of each of which pipes communicates with the water-pipe 7, and each pipe 12 is provided with a series of sprinklers 13, adapted to discharge cold water onto the condensers. With each set of condensers a

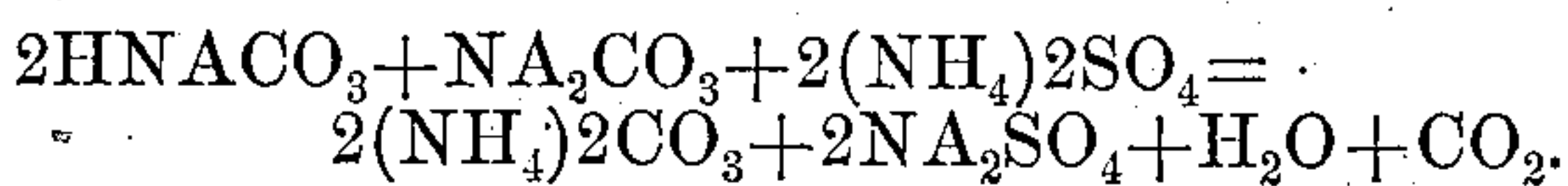
pipe 14 communicates, said pipes 14 communicating at one end with a pipe 15. The pipe 15 is adapted to receive carbon-dioxid gas from generators 16, and between the ends of said pipe 15 gages 17 are located, one gage for each set of condensers. To create the dioxid gas, lime or similar material is placed in the generators and muriatic or other acid is conducted into the generators through a pipe 18 from an acid-tank 19.

D represents a mixing-cylinder which may be conveniently mounted on suitable standards 20 and its shaft provided with a wheel or pulley 21, to which motion may be imparted from any convenient source of power.

In carrying out my improved process of making carbonate of ammonia I take soda bicarbonate, fifty-four pounds; ammonia sulfate, one hundred and eighty pounds; soda carbonate, one hundred and twenty-five pounds. These ingredients are thoroughly mixed in the mixer D. The compound is then placed in the retort B and subjected for several hours to heat from the furnace A. The compound will be reduced to fumes, which will enter the cooling-chambers. The chambers 1 2 3 4 will then be cooled by water flowing against them from the sprinklers 6, and the fumes will be condensed into crystals. The coolers will then be taken apart and the crystals and the refuse will be removed. The crystals and refuse will be mixed and placed into the condensers 11, where the chemicals will be subjected to heat from the hot water in the tank C, this heat serving to convert the chemicals into fume. Dioxid gas will be admitted to the condensers under pressure greater than the pressure of the fumes. The gas will serve to clarify and solidify the crystals of carbonate of ammonia, into which the fumes and gases will be condensed by the application of cold water from the sprinklers 13.

When the condensers shall have been cooled as just explained, the process will have been completed and result in clear crystals of carbonate of ammonia ready for the market.

The chemical equations may be stated as follows:



By means of my improved apparatus I am

enabled to produce carbonate of ammonia possessing a high degree of purity and at much lower cost than has been accomplished by means of apparatus heretofore employed.

5 Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a furnace and a retort to be heated thereby, of a series of cooling-chambers to receive fumes from said retort, means for subjecting said cooling-chambers to the action of cold water, a tank adapted to receive water, means for heating the water, condensers in said tank, means for subjecting
10 said condensers to the action of cold water
15 and means for generating carbon-dioxid gas and conducting it into said condensers, substantially as set forth.

2. The combination with a furnace and a
20 retort to be heated thereby, of a series of cool-

ing-chambers adapted to communicate with said retort, pipes alongside said cooling-chambers, a cold-water tank adapted to supply water to said pipes, sprays communicating with said pipes and adapted to discharge cold
25 water against said cooling-chambers, a hot-water tank, steam-pipes leading into said hot-water tank, condensers in said hot-water tank, means for generating carbon-dioxid gas and conducting it to said condensers, and pipes
30 communicating with the cold-water tank and having sprays to discharge water on said condensers, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 35

WILLIAM SANDERS.

Witnesses:

RANDOLPH W. WEBSTER,
ALBERT D. JACOBSON.