No. 813,363. PATENTED FEB. 20, 1906.

A. E. DIETERICH.

FORMALDEHYDE GENERATOR.

APPLICATION FILED AUG. 8, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

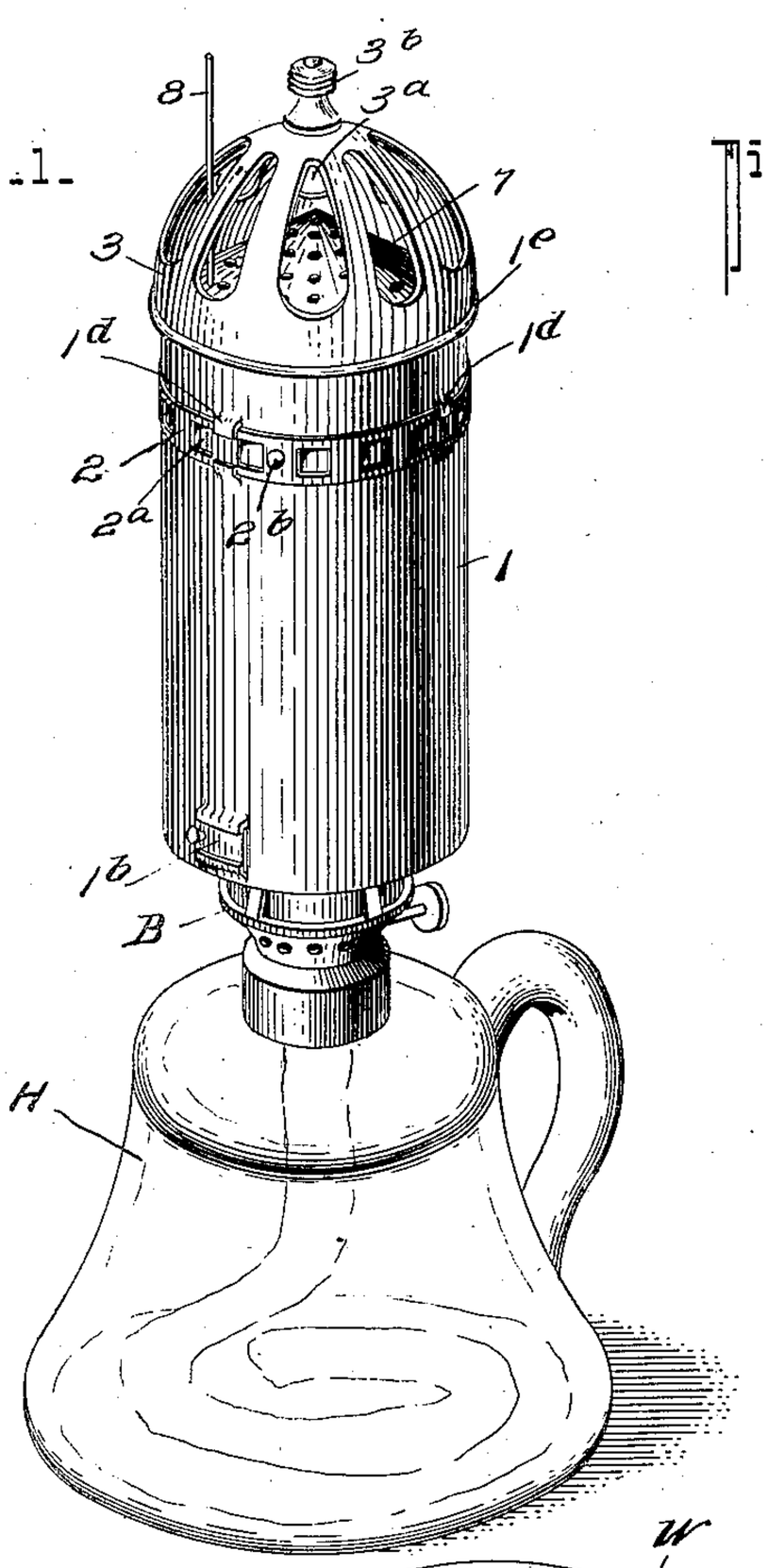


Fig. 2.

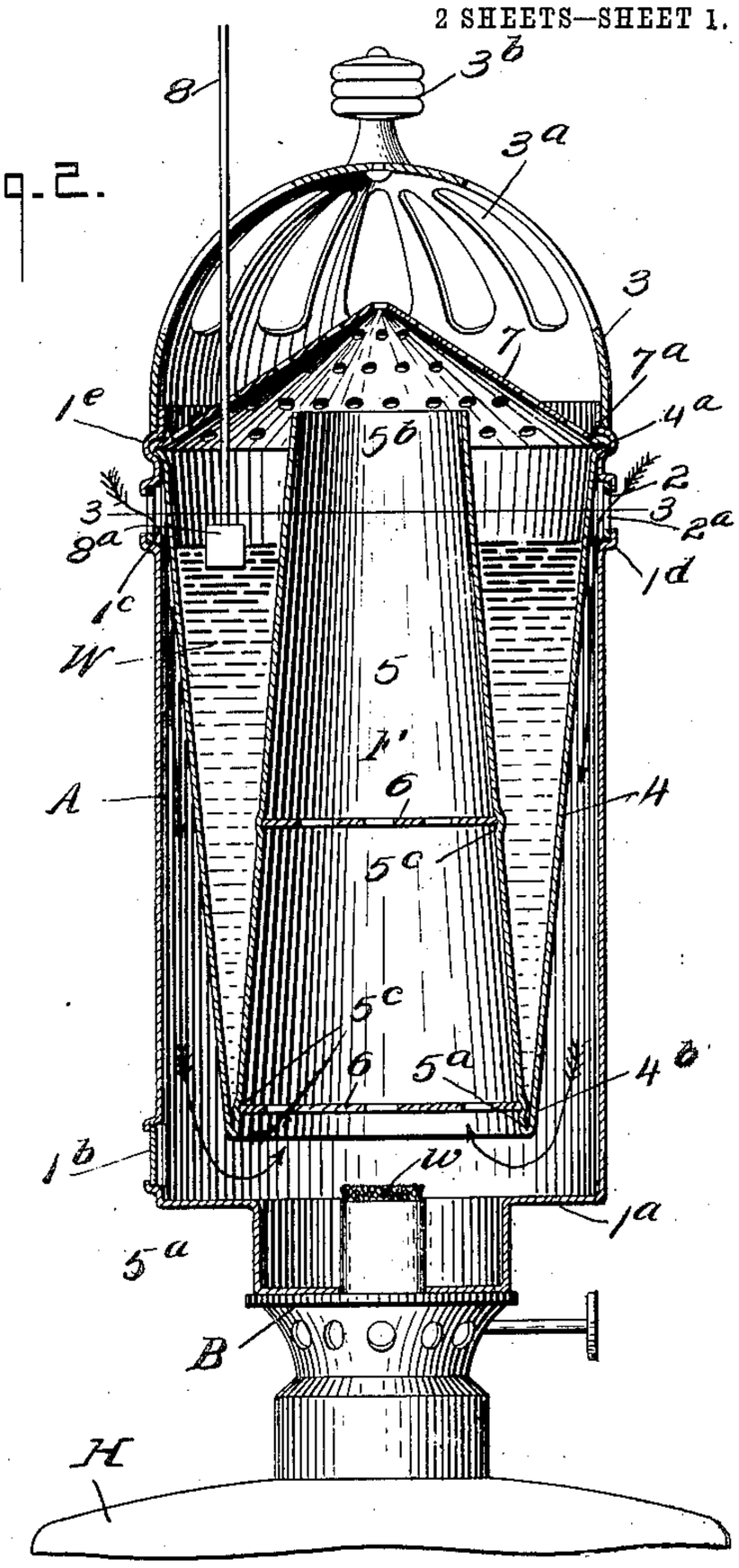


Fig. 4.

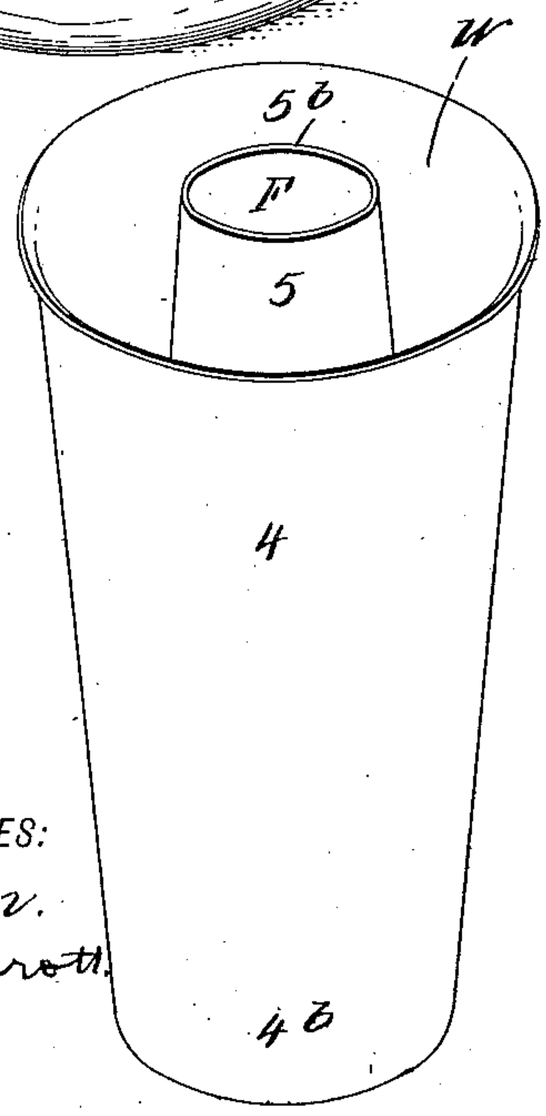
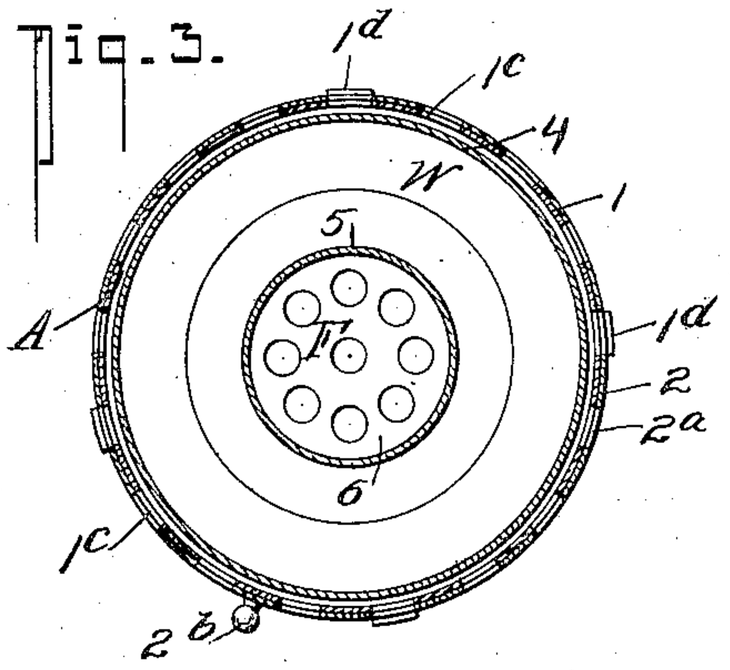


Fig. 3.



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FORMALDEHYDE GENERATOR.

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2 SHEETS—SHEET 2.

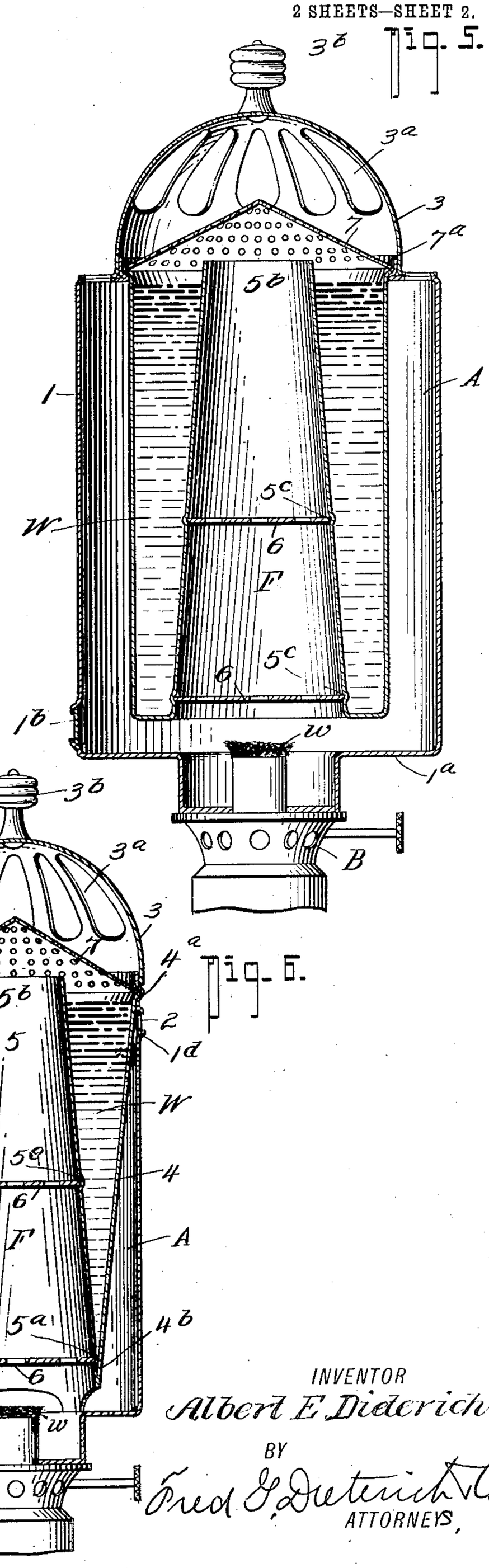

Fig. 6.

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UNITED STATES PATENT OFFICE.

ALBERT E. DIETERICH, OF WASHINGTON, DISTRICT OF COLUMBIA.

FORMALDEHYDE-GENERATOR.

No. 813,363. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed August 8, 1904. Serial No. 220,001.

To all whom it may concern:

Be it known that I, ALBERT E. DIETERICH, residing at Washington, in the District of Columbia, have invented a certain new and Improved Formaldehyde-Generator, of which the following is a specification.

My invention relates to that type of generating appliances for producing formaldehyde for disinfecting and medicinal purposes especially arranged to generate the formaldehyde-gas from wood-alcohol and simultaneously to produce a water-vapor by utilizing the heat due to the chemical reaction when the alcohol is changed into aldehyde.

The main object of my invention is to provide a formaldehyde-generator of a very simple and economical nature which can be manufactured at a cost that will make its general use possible and in which the several parts are so arranged and coöperatively combined that they can be used by any one of ordinary intelligence without the least danger.

My invention also comprehends a generator of the kind stated in which it is possible to produce a greater amount of formaldehyde from alcohol and to simultaneously mix the alcohol-fumes with water-vapor, as I have found from practical experience that when formaldehyde is in the presence of moisture its disinfecting, fumigating, and medicinal properties are greatly increased.

Another object of my invention is to provide a simple form of generating means of the character stated which includes an air-controlling device fixedly connected with the generating vessel and capable of being instantly adjusted for cutting off or opening up air to the interior parts thereof.

Generically my invention includes a generator adapted to be attached to an ordinary alcohol-lamp and includes a casing within which is suspended a water-holding receptacle including a water-chamber and a gas-generating chamber, the water-chamber entirely surrounding the generator-chamber, whereby the heat caused by the chemical reaction within the generating-chamber will vaporize the water in the water-chamber, which water-vapor and generated gas will pass off together.

My invention also includes means for mixing the water-vapors and the generated gases as they are evolved and before they are delivered from the generator.

With other objects in view, which will be hereinafter full explained, my invention also includes certain novel construction and arrangement of parts, all of which will be first described in detail and then specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my invention as applied for use as an ordinary fumigator. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a transverse section on the line 3 3 of Fig. 2. Fig. 4 is a detail perspective view of the water-holder and gas-generating chamber detached. Fig. 5 is a vertical longitudinal section of a further modification hereinafter specifically referred to. Fig. 6 is another modification of my invention hereinafter specifically referred to.

Referring now to the accompanying drawings, in which like numerals and letters of reference indicate like parts in all the figures, 1 designates a casing which is preferably of a cylindrical shape, and the said casing has its bottom 1^a apertured and formed so as to be fitted on the burner B of any approved type, preferably an ordinary alcohol-lamp burner. Near the bottom the casing 1 is provided with an aperture closed by the gate or door 1^b, through which the wick *w* of the burner B may be lighted.

The casing 1 is provided with a plurality of apertures 1^c 1^c, with which the sliding gate 2, having registering apertures 2^a, coöperates. The gate 2 is held in place by lugs 1^d, stamped from the casing 1, and has a knob 2^b, by means of which it can be operated. Above the gate 2 the casing 1 is provided with a horizontal bead 1^e, which forms a stop for the top 3, which in the preferred form of my invention is preferably dome shape and is provided with outlet-apertures 3^a and a knob 3^b for the purposes readily understood.

4 designates a sheet-metal division member of a truncated conical shape whose larger end 4^a is outwardly flared to rest in the bead 1^e of the casing 1, and the conical division member 4 projects downwardly with its smaller end 4^b near the bottom 1^a of the casing 1, so as to form an air-chamber A, extending from the apertures 1^c to the bottom 1^a of the casing 1. Arranged within the division member 4 is a chimney 5, which is also preferably of the shape of a truncated cone, whose larger end 5^a is of such diameter as to snugly fit within the small end 4^b of the division member 4, to which it is welded or otherwise securely joined. The chimney 5 extends upwardly and has its small end 5^b ter-

minating above the flared edge 4^a of the member 4 to prevent the water from the water-chamber W, hereinafter again referred to, from backing over into the formaldehyde-generating chamber F, also hereinafter again referred to. The chimney 5 forms a disk-carrying member and is provided with beads 5^c 5^c to receive the apertured disks 6 6 of prepared platinized asbestos or other similar material.

The chimney 5 includes what I shall hereinafter term the "formaldehyde-generating chamber" F, while the conical member 4 and the chimney 5 form between them what I shall hereinafter term the "water-chamber" or "jacket" W. Arranged above the generating and air chambers F, W, and A is a mixer 7, consisting of a perforated screen or baffle whose edge 7^a rests on the flared edge 4^a of the member 4, and the said mixer 7 causes the generated gas and vapor to commingle and become thoroughly mixed before they pass out of the generator.

8 designates an indicating-rod which carries a cork 8^a to project into the water-chamber W to determine the height of the water therein. By reference to Fig. 2 of the drawings it will be seen the formaldehyde-generating chamber F extends practically the entire height of the casing 1, as does also the water-chamber W and the air-chamber A, the formaldehyde-chamber F being surrounded by the water-chamber W, which serves as a water-jacket therefor, while the water-chamber W is in turn surrounded by the air-chamber A. The formaldehyde and water chambers F and W are in communication with each other at the top thereof, while the formaldehyde and air chambers F and A are in communication with each other at the bottom thereof.

So far as described the manner of operation of my invention can best be explained as follows: The operator first fills the water-chamber W with water (H_2O) and then ignites the wick *w* of the alcohol-burner B through the door 1^b and also opens the air-inlets 1^c. As soon as the lower disk 6 has become heated to near incandescence the operator closes the door 1^b and the air-inlets 1^c, thereby cutting off the air-supply of the flame, causing it to become extinguished. He then immediately opens the air-inlets 1^c 1^c sufficiently to feed enough air to the disks 6 6 to cause them to absorb sufficient oxygen to oxidize the alcohol as it passes thereover to form the formaldehyde according to the following reaction:

$$(CH_4O)_2 + O_2 = (CH_2O)_2 + (H_2O)_2.$$

The chemical reaction between the alcohol-fumes and the oxygen is sufficient to maintain the disks 6 6 in an incandescent state, therefore causing the formaldehyde-generator-chamber walls to become very much heated, sufficiently to cause the water in the water-chamber W to vaporize. The water-vapors from the chamber W and the formaldehyde-gas from the formaldehyde-generating chamber F then pass together through the mixer 7, whereby they become thoroughly intermixed ere they pass out of the generator. By feeding the air from the top of the casing 1 through the apertures 1^c in the direction of the arrows in Fig. 2 the same is permitted to become warmed sufficiently to assist in vaporizing the alcohol from the wick *w*, as well as preventing the disks 6 6 from becoming cool, which would be the case were cold air fed to the disk rather than heated air.

It will be observed that my construction of generator permits of an effective and simple regulation of air to the formaldehyde-generating chamber and burner, it being understood that should at any time it be desirable to stop the generation of gas from the lamp it is only necessary to turn the gate 2 to close the apertures 1^c, and thereby shut off the air-supply. This will permit the disks 6 6 to cool down and prevent further generation of formaldehyde.

Among other advantages my form of generator can be conveniently handled and used for ordinary nasal or bronchial troubles, as it is susceptible of being operated and placed to suit the condition of the patient, and the quantities of alcohol (wood-spirits) may be easily poured into the holder H and for a long or short generative operation. Its compactness permits of its being easily carried in an ordinary traveling-case.

For hospital use or for contagious diseases—such as smallpox, diphtheria, scarlet fever, &c.—where a powerful germicide is required to penetrate fabrics, crevices, &c., moist formaldehyde has been found a very effective disinfectant.

When my invention is to be used for disinfecting very large rooms, the same will be constructed on a larger scale than shown in the drawings, but when used for disinfecting small rooms or as an inhaler the same will be constructed about the size shown in Fig. 1 of the drawings.

I also desire it understood that any suitable chemical, such as compound tincture of benzoin, may be added to the water in the water-chamber when the apparatus is used as an inhaler in treatment of tuberculosis and similar lung diseases.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete operation, construction, and many advantages of my invention will be readily understood by those skilled in the art to which it appertains, and I desire it understood that slight changes in the detail construction and arrangement of parts may be made without departing from the invention or the scope of the appended claims.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. A generator of the character stated, comprising a casing, a formaldehyde-chamber within said casing, a water-holding member surrounding said formaldehyde-generating chamber and contained within said casing, an air-chamber surrounding said water-containing member and connected by said casing, said air-chamber being in communication with the atmosphere, said water and air within the generator adapted to be heated by the heat evolved in the generating-chamber substantially as shown and described.

2. A formaldehyde-generator of the character stated comprising a body forming a formaldehyde-generating chamber, and a water-jacket surrounding said formaldehyde-generating chamber, a casing surrounding said water-jacket and air-chamber, the water in the water-chamber adapted to vaporize from the heat evolved in the generating-chamber.

3. A formaldehyde-generator of the character stated comprising a body forming a formaldehyde-generating chamber, and a water-jacket surrounding said formaldehyde-generating chamber, a casing surrounding said water-jacket and air-chamber, the water in the water-chamber adapted to vaporize from the heat evolved in the generating-chamber, and means for mixing said gas and vapor.

4. A means for generating formaldehyde-gas and water-vapor comprising a casing, supportable over an alcohol-burner, said casing having air-inlets and gas-outlets, a water-holder and a chimney suspended within said casing, said chimney forming a gas-generating chamber, and oxidizing-disks held within the chimney, all being arranged substantially as shown and described.

5. A formaldehyde-generator comprising an outer cylindrical casing having air-inlet apertures, a disk-carrying member and a water-containing member suspended within said outer casing, oxidizing-disks held within said disk-carrying member, an alcohol-containing means connected to the bottom of the casing, and a top for said casing, all being arranged substantially as shown and described.

ALBERT E. DIETERICH.

Witnesses:
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