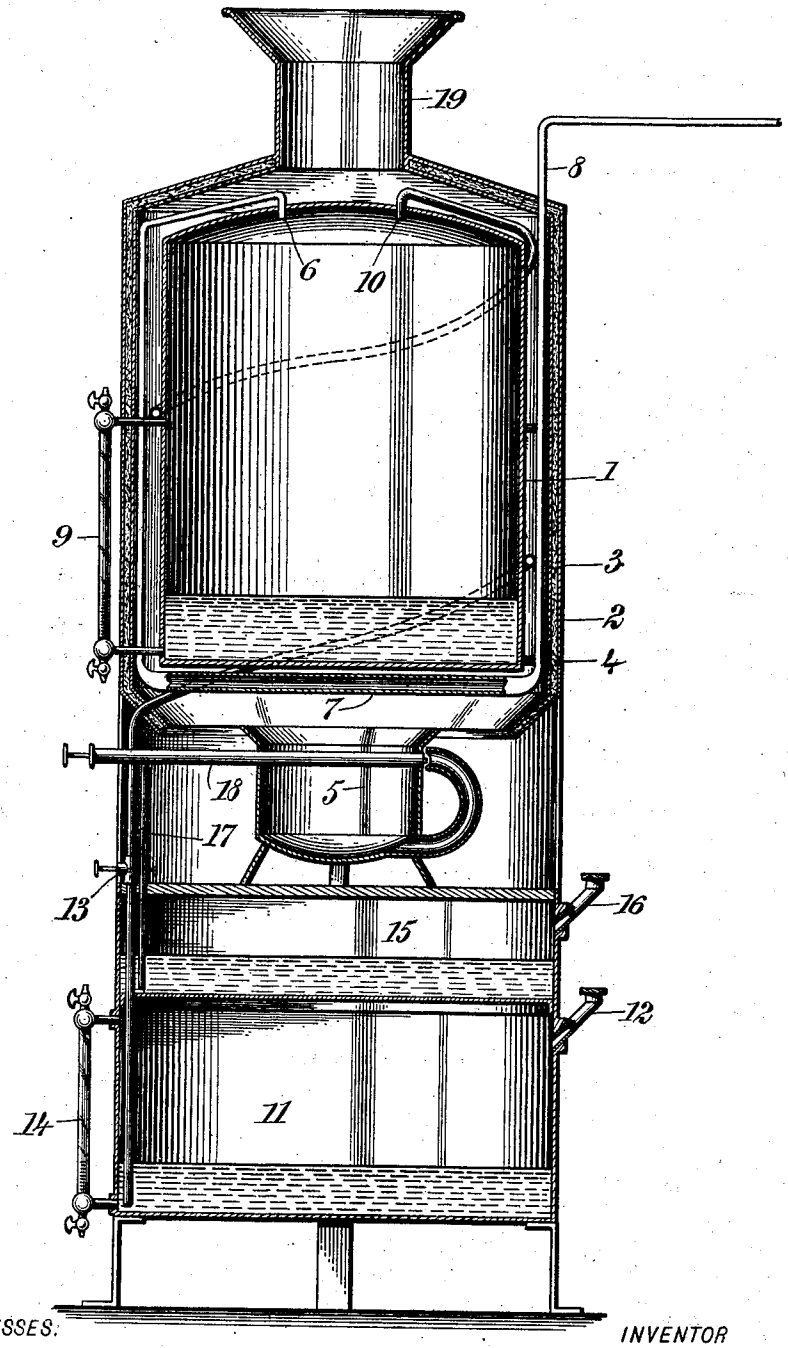
No. 762,845. PATENTED JUNE 14, 1904.

S. RAUSCHENBERG.

FORMALDEHYDE APPARATUS.

APPLICATION FILED JULY 8, 1903.

NO MODEL.



WITNESSES:

A. R. Appleman

C. R. Ferguson

INVENTOR

Sidney Rauschenberg

BY Munn & Co

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 762,845. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

SIDNEY RAUSCHENBERG, OF MOUNT VERNON, NEW YORK, ASSIGNOR TO CHEMICAL WORKS OF AMERICA, INCORPORATED, A CORPORATION OF CONNECTICUT.

FORMALDEHYDE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 762,845, dated June 14, 1904.

Application filed July 8, 1903. Serial No. 164,686. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY RAUSCHENBERG, a citizen of the United States, and a resident of Mount Vernon, in the county of Westchester and State of New York, have invented a new and Improved Formaldehyde Apparatus, of which the following is a full, clear, and exact description.

This invention relates to improvements in apparatus for the regeneration of gaseous formaldehyde from liquid formaldehyde for disinfection.

The various kinds of apparatus as now in use for the regeneration of formaldehyde have serious defects, rendering them unsafe as mechanical devices, or they are slow in operation, unreliable in the liberation of the gas from the liquid, or they produce gas under conditions not favorable for practical disinfection. A few of the defects may be summarized as follows: Danger of explosion from corrosion of the boiler; stopping of the discharge-tube or failure of the blow-off valve to properly open; the dripping or spurting of the liquid formaldehyde from the discharge-tube, thereby causing loss of the liquid formaldehyde and damage to whatever it touches; the necessity of using calcium chlorid for preventing polymerization, which while trivial so far as cost is considered, yet is an unnecessary expense; the use of glycerin, as in some instances, with the gas renders the fumigated surface sticky with the deposited glycerin, which soils and ruins many objects, the odor also being difficult to remove.

During a prolonged investigation on a large scale with frequent exposure of bacteriological cultures as a control on the results I have shown that practical room fumigation with formaldehyde depends more upon a moderate proportion of active or nascent gaseous formaldehyde free from its polymers combined with steam in a superheated state being quickly injected into a chamber and exposed for a short period rather than upon a greater proportion of the gas in a wet steam injected more slowly and exposed for a longer period.

The object of my invention, therefore, is to produce an apparatus which may be quickly started and kept in continuous action to disinfect large spaces or to disinfect in rapid succession any number of chambers of smaller sizes with a definite and controllable quantity of liquid formaldehyde, producing likewise a definite and controllable quantity of superheated active gaseous formaldehyde free from its polymers with a controllable quantity of superheated steam to avoid the spurting of the liquid, to avoid the use of discharge-valves and to have the least possible pressure and wear upon the various parts of the apparatus, thereby insuring safety; but the most important object is to discharge the formaldehyde in a superheated state in the shortest possible time and without danger of fire.

I will describe a formaldehyde-regenerator embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure is a sectional elevation of a formaldehyde-regenerator embodying my invention.

The process employed by me consists, broadly, in boiling liquid formaldehyde, whereby it is converted into its polymers, which are volatized along with the steam, which still holds formaldehyde absorbed in it. This is passed through a superheater. The high temperature entirely liberates the formaldehyde from the steam, converts the polymers into active formaldehyde, and discharges it with the steam in a superheated state through the door into the chamber to be fumigated. This is quickly accomplished with a properly-regulated heat.

Referring to the drawings, 1 designates a boiler arranged in an outer casing 2, between which and the boiler is a lining 3, and between this lining and the casing is asbestos 4. In the boiler 1 the formaldehyde is heated from a suitable burner 5. The formaldehyde and the steam still containing formaldehyde are discharged by means of a tube 6, which passes through the closed upper end of the boiler, thence down the side thereof, communicating with an

enlarged superheating chamber or tube 7, located over the burner, where the intense heat liberates the remaining formaldehyde from the steam and converts the polymers into active formaldehyde and discharges it with the steam in a superheated state through a delivery-tube 8, which is connected with the superheater 7 and designed to lead into the chamber or space to be fumigated. A graduating-glass 9 communicates with the interior of the boiler 1 and will indicate the volume of liquid in the boiler. A tube 10 passes through the top of the boiler and is then coiled around the outer side thereof and passes down into a storage-reservoir 11. This storage-reservoir is provided with an inlet 12 for liquid formaldehyde, and to this inlet a suitable air-pressure device may be attached to place pressure on the contents of the reservoir, so that the formaldehyde will pass up the pipe or tube 10 and become somewhat heated by passing around the boiler before it passes into said boiler. By thus passing the supply into the boiler in a heated condition the boiling of the formaldehyde in the boiler is not retarded, and the flow through the tube 10 may be regulated by a valve 13, while the contents of the reservoir 11 may be disclosed through a graduating-glass 14.

Above the reservoir 11 is a reservoir 15 for kerosene or the like. It may be filled through a tube 16, and a pneumatic pressure device may be attached to this tube to force the oil through a tube 17 and valved tube 18 into the burner 5. At the upper end of the casing 2 is a flue 19 for the escape of gases of combustion.

The apparatus here illustrated is of small size; but the same process with slight modifications of apparatus may be applied on a scale of any magnitude. The hydrocarbon-burner may be replaced by the customary fire-box for coal or similar fuel.

In operation a definite and predetermined volume of liquid formaldehyde of a known strength is placed in the boiler 1, the heat is applied until the liquid is evaporated, and the superheated steam and gas produced are passed, by means of the tube 8, through a hole into the chamber to be disinfected, a known quantity of the gas having been produced.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus for the purpose described comprising a boiler, a storage-reservoir, a pipe leading from the reservoir into the boiler, a heater under the boiler, and a tube leading from the top of the boiler and having an enlarged portion extended over the heater.

2. An apparatus for the purpose described comprising a boiler, a storage-reservoir below the same, a feed-pipe leading from the bottom of said reservoir into the top of the boiler and having a portion coiled around the boiler, a heater between the reservoir and the boiler, and a discharge-pipe leading from the top of the boiler and having an enlarged portion extended between the boiler and the heater.

3. An apparatus for the purpose specified, comprising a boiler, a storage-reservoir for formaldehyde, a tube on said reservoir adapted for connection with an air-pressure device, a tube leading from said reservoir into the boiler and having a portion coiled around the outer side of said boiler, a superheater having communication with said boiler, and a discharge-tube leading from the superheater.

4. A formaldehyde apparatus, comprising a boiler, a hydrocarbon-burner arranged under the boiler, a closed oil-supply tank for said burner arranged below the burner, a closed formaldehyde-storage reservoir below the oil-tank, compressed-air-entrance tubes connecting respectively with the tank and reservoir, a pressure-tube leading from said reservoir into the upper portion of the boiler and having a portion coiled around the boiler, a superheater arranged between the boiler and hydrocarbon-burner, a tube leading from the upper portion of the boiler into one end of said superheater, and a discharge-tube leading from the other end of said superheater.

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

SIDNEY RAUSCHENBERG.

Witnesses:

JNO. M. RITTER,

C. R. FERGUSON.