

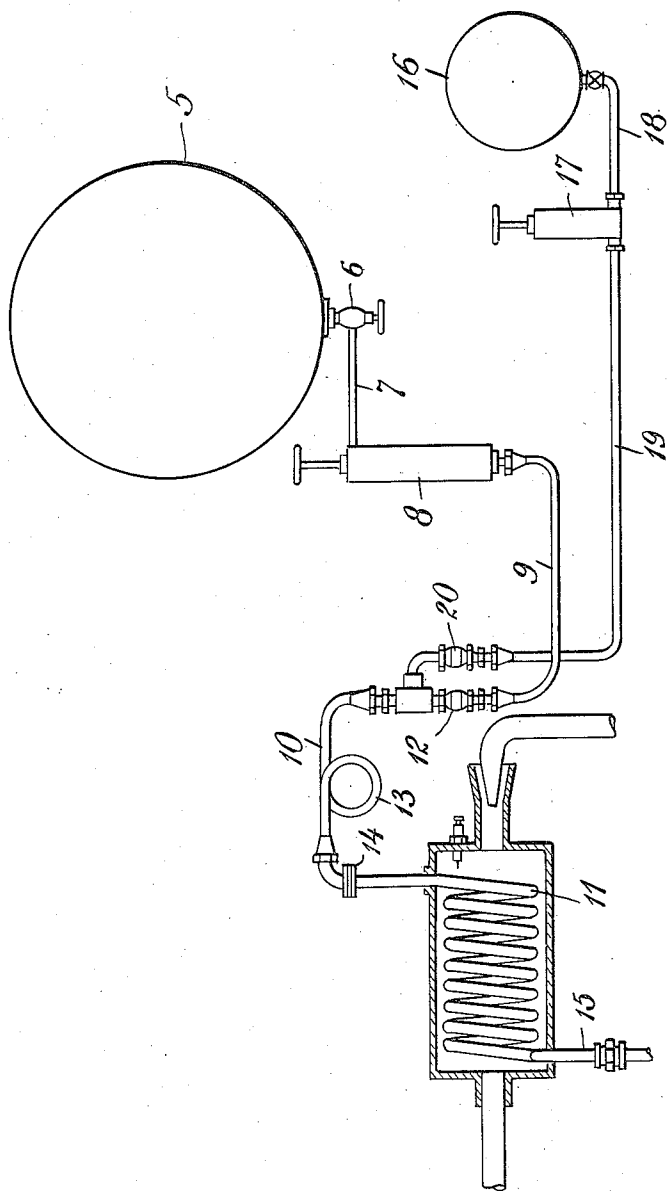
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F. W. BRAUN ET AL

METHOD OF AND APPARATUS FOR FUMIGATION

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INVENTOR

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FREDERICK W. BRAUN, OF PASADENA, AND JOSEPH D. NEULS, OF LOS ANGELES, CALIFORNIA, ASSIGNORS TO CALIFORNIA CYANIDE COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

METHOD OF AND APPARATUS FOR FUMIGATION.

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To all whom it may concern:

Be it known that we, FREDERICK W. BRAUN, a citizen of the United States, residing at Pasadena, in the county of Los Angeles, State of California, and JOSEPH D. NEULS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented certain new and useful Improvements in Methods of and Apparatus for Fumigation; and we 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.

This invention relates to fumigation and particularly to a method of and apparatus for safely generating and handling poisonous gases which are utilized in destroying insects.

Hydrocyanic acid gas is an effective and economical lethal agent for the destruction of insect pests and with reasonable care in handling it may be used without danger. A method of and apparatus for utilizing it especially in the fumigation of vegetation has been developed. The hydrocyanic acid is stored as a liquid in portable containers. Measured quantities of the liquid are delivered from the container to a vaporizer wherein the liquid is converted into gas. The gas is then delivered through a flexible hose to the interior of a tent or other enclosure which surrounds the vegetation to be treated. When the treatment is completed the hose is withdrawn and placed beneath another tent.

In conducting fumigation as described it has been observed that after the dose of hydrocyanic acid has been vaporized and the hose is withdrawn from the tent, occasional puffs of gas emerge from the end thereof. This gas is apparently produced by after-generation of some small part of the liquid which remains in the vaporizer and connections. As the gas is very poisonous it is desirable to eliminate all traces thereof from the vaporizer and hose before the latter is withdrawn from the tent. By so doing the possibility of accidents due to inhalation of the gas is averted.

It is the object therefore of the present invention to safeguard the use of hydrocyanic

acid by purging the vaporizer and hose of poisonous gas after each application. Further objects and advantages of the invention will be apparent as it is better understood by reference to the following specification and accompanying drawing in which the figure diagrammatically illustrates an apparatus which may be utilized for the accomplishment of the stated objects.

We have discovered that the elimination of the poisonous gas may be accomplished in a simple and effective manner by delivering a small quantity of a non-poisonous liquid such as water to the vaporizer as soon as the charge of liquid hydrocyanic acid has been converted into gas and before the hose is withdrawn from the tent. The liquid is immediately vaporized and sweeps through the connections to the end of the hose. The vapor forces every trace of hydrocyanic acid gas from the apparatus and the hose may be withdrawn thereafter and handled with assurance of safety. The introduction of water has an additional advantage that the steam upon entering the tent warms the atmosphere thereof and causes currents which serve to distribute the lethal gas more thoroughly throughout the atmosphere.

Referring to the drawing for a more detailed explanation of the invention and its mode of application, 5 indicates a container for the liquid to be vaporized, for example hydrocyanic acid or a solution or mixture thereof with water. The liquid is withdrawn through an outlet 6 and passes through a pipe 7 to a measuring pump 8 which may be of any suitable form and construction. The function of the pump 8 is to withdraw a predetermined volume of the liquid from the tank and to deliver it through pipes 9 and 10 to a vaporizer coil 11. A check valve 12 is provided to prevent the return of liquid or gas to the pump and as an additional precaution the pipe 10 is preferably provided with a loop 13. A heat-insulating flange 14 is disposed between the coil 11 and the pipe 10 to prevent transfer of heat by conduction through the pipe connections. The coil 11 may be heated in any suitable manner, for example, by placing it in a combustion chamber in which the exhaust gases from an internal combustion engine are burned. The end of the

coil 11 is connected to a flexible hose 15 through which the gas is delivered to a tent or enclosure (not shown).

In carrying out the present invention a tank 16 is provided which is adapted to contain a quantity of water or other non-poisonous liquid. A pump 17 is connected by a pipe 18 to the tank 16 and a pipe 19 delivers the liquid from the pump through a check valve 20 to the pipe 10.

In conducting the operation the end of the hose is disposed beneath the tent or within the enclosure to be fumigated. The coil 11 is heated as hereinbefore described and the pump 8 is set to measure the desired quantity of liquid from the tank 5. The pump 8 is then actuated to deliver the liquid to the coil 11 where it is vaporized. The pressure generated causes the gas to flow through the hose 15 into the tent or enclosure. When sufficient time has elapsed to permit vaporization of the poisonous liquid the pump 17 is actuated to force a quantity of water through the pipe 19. All of the poisonous liquid in the pipe 10 is carried over into the coil 11 and the large volume of steam generated by vaporization of the water thoroughly purges the system of poisonous gas, all of which, together with the steam, is delivered from the hose 15 to the tent or enclosure. The hose may be withdrawn with safety and transferred to the next enclosure. The purging might be accomplished likewise by introducing a gas or a vapor produced externally thereof to the vaporizer coil. The introduction of liquid as described is, however, simpler as it avoids the necessity of maintaining a supply of gas or vapor.

Various changes may be made in the details of the structure and the mode of operation as described without departing from the invention or sacrificing any of the advantages thereof.

We claim:—

1. A method of safeguarding the generation and delivery of poisonous gases in fumigation, which comprises gasifying a poisonous liquid by the application of heat, conducting the resulting gas to an enclosure, and purging the gasifying and conducting means of the poisonous gas by conducting a non-poisonous vapor therethrough to the same enclosure.

2. A method of safeguarding the genera-

tion and delivery of poisonous gases in fumigation, which comprises gasifying a poisonous liquid by the application of heat, conducting the resulting gas to an enclosure and purging the gasifying and conducting means of the poisonous gas by introducing a non-poisonous liquid thereto, vaporizing the liquid therein and conducting the vapor to the same enclosure.

3. A method of safeguarding the generation and delivery of gaseous hydrocyanic acid, which comprises gasifying a liquid containing hydrocyanic acid by the application of heat, conducting the resulting gas to an enclosure and purging the gasifying and conducting means of the poisonous gas by introducing water thereto, vaporizing the water therein and conducting the steam to the same enclosure.

4. In an apparatus for safeguarding the generation and delivery of poisonous gases in fumigation, the combination of a vaporizer, means for delivering poisonous liquid thereto, a conductor to deliver the gas formed in the vaporizer to an enclosure and means for delivering a non-poisonous liquid to the vaporizer whereby the vaporizer and conductor are purged of the poisonous gas.

5. In an apparatus for safeguarding the generation and delivery of poisonous gases in fumigation, the combination of a vaporizer, means for delivering poisonous liquid thereto, a conductor to deliver the gas formed in the vaporizer to an enclosure, a tank for non-poisonous liquid and means for delivering the non-poisonous liquid from the tank to the vaporizer whereby the vaporizer and conductor are purged of the poisonous gas.

6. In an apparatus for safeguarding the generation and delivery of poisonous gases in fumigation, the combination of a vaporizer, means for delivering poisonous liquid thereto, a conductor to deliver the gas formed in the vaporizer to an enclosure, a tank for non-poisonous liquid and means, including a pump, for delivering the non-poisonous liquid from the tank to the vaporizer whereby the vaporizer and conductor are purged of the poisonous gas.

In testimony whereof we affix our signatures.

FREDERICK W. BRAUN.
JOSEPH D. NEULS.