F. M. DUNCAN & W. S. EISENBERG.

APPARATUS FOR A PROCESS OF FUMIGATION.

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1,037,744.

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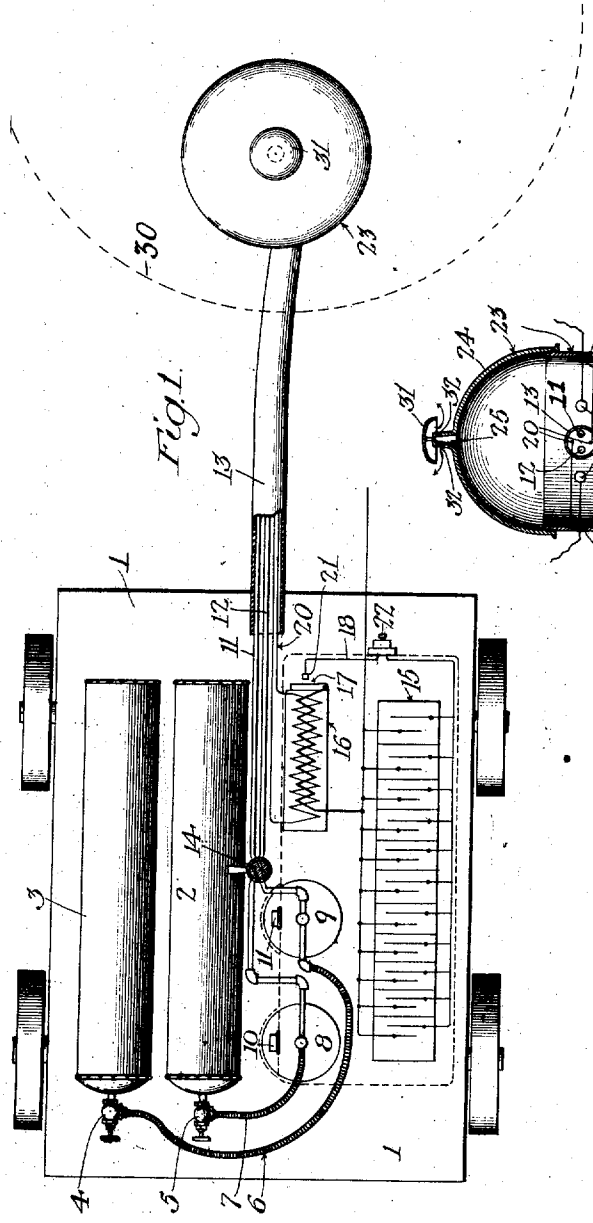

Fig. 1.

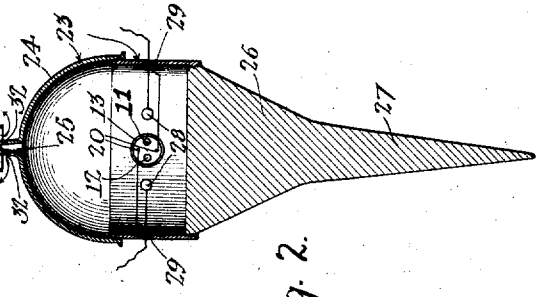

Fig. 2.

Witnesses:

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UNITED STATES PATENT OFFICE.

FRANCIS M. DUNCAN, OF LOS ANGELES, AND WILLIAM S. EISENBERG, OF ALHAMBRA, CALIFORNIA; SAID DUNCAN ASSIGNOR OF ONE-FOURTH OF THE WHOLE RIGHT TO EUGENE H. FOSDICK, OF LOS ANGELES, CALIFORNIA.

APPARATUS FOR A PROCESS OF FUMIGATION.

1,037,744. Specification of Letters Patent. Patented Sept. 3, 1912.

Application filed June 25, 1910. Serial No. 568,892.

To all whom it may concern:

Be it known that we, FRANCIS M. DUNCAN and WILLIAM S. EISENBERG, both citizens of the United States, residing, respectively, at Los Angeles and at Alhambra, in the county of Los Angeles and State of California, have invented a new and useful Apparatus for a Process of Fumigation, of which the following is a specification.

This invention relates to an improved apparatus for carrying out a process of fumigation of trees for the destruction of orchard pests, buildings, etc., by use of hydrocyanic acid gas, and the main object of the invention is to provide an apparatus which will carry out a continuous process for producing and delivering the hydrocyanic acid gas in a more economical, safe and convenient manner than is possible with the usual apparatus employed in such process.

The apparatus utilized in the usual process of producing hydrocyanic acid gas for the purpose of fumigation, by the use of potassium cyanid and sulfuric acid, is expensive and involves considerable inconvenience, labor and danger in depositing the pots and in collecting the same after the operation is over.

Our present invention provides an apparatus for production of the hydrocyanic acid gas in such manner that there is no danger of the operator being brought in contact with the fumes and all handling of pots or similar utensils is dispensed with.

The method of operation of the apparatus consists essentially in bringing nitrogen and acetylene gases into contact in a continuous manner, subjecting the said gases to the action of an electric discharge while they are thus brought into contact, thereby producing hydrocyanic acid gas and delivering the hydrocyanic acid gas as produced, to the object to be fumigated. By such method of operation, the hydrocyanic acid gas is carried away and applied as rapidly as it is produced and the materials, namely, nitrogen and acetylene, which are used, are innocuous, so that there is little danger incident to the operation.

The accompanying drawings illustrate our improved apparatus for carrying out the process:

Figure 1 is a plan of the apparatus. Fig. 2 is a vertical section of the device for mixing and combining the gases and delivering the hydrocyanic acid.

The apparatus which may be supported on a truck 1 or any suitable support, whereby it may be transported to the required location, comprises main tanks 2 and 3 containing nitrogen and acetylene respectively, said tanks being connected through valves 4 and 5 and pipes or flexible hose 6 and 7 with auxiliary tanks 8 and 9, said tanks 8 and 9 respectively being provided with pressure gages 10 and 11, whereby the amount of pressure of the gas admitted to the said auxiliary tanks may be determined. From said auxiliary tanks pipes 11 and 12 lead through a flexible hose 13 to the combining device hereinafter described. A valve 14 may be provided to control the flow of gas through pipes 11 and 12 so that gas may be turned on or cut off simultaneously in these pipes. A storage battery 15 may also be mounted on the truck 1, together with an induction coil 16 for producing high tension oscillatory current from the energy furnished by the battery, said induction coil having its primary winding connected through the armature 17 operating as the circuit breaker for a primary circuit 18 connected to the battery and having its secondary coil connected to a secondary circuit 20 extending to discharge electrodes in the combining device. A bell 21 may be operated by the armature 17 to notify the operator that the electric discharge apparatus is in operation, and a switch 22 may be provided in the circuit 18 for closing or opening the operating circuit of the electric discharge means.

The combining device indicated at 23 may consist of a case having a removable dome-shaped cover 24, said cover having a small opening or laterally arranged outlet 25 in its center provided preferably with a hood 31 and with outlet perforations 32 beneath said hood to distribute or spread the gas, and said case being mounted on a standard or plug 26 which may be tapered as shown at 27, so as to be readily driven into the ground. The circuit wires 20 for the electric discharge lead through electrodes 28 passing through insulated bushings 29 in the case 23, said electrodes being adjusted within said bushing, so as to extend in proper discharging proximity.

The operation is carried out as follows:

The gases in combining proportion are admitted into the respective reservoirs 8 and 9, the amount admitted depending on the space to be fumigated, it being possible by means of the pressure gages to control the amount of gas in accordance with the size of the tree or room to be fumigated, or, if desired, a uniform amount may be admitted corresponding to the maximum size of tree in a given orchard. The apparatus is brought to the location where fumigation is required and the combining device 23 is placed within the inclosure indicated by dotted lines at 30 in Fig. 1, representing, for example, a tent around a tree. Valve 14 controlling the discharge from tanks 8 and 9 is then opened and the gases are allowed to stream into the combinator 23 through the pipes 11 and 12, the outlet of said pipes being located adjacent or opposite to the space between the electrodes 28 in said combining device and the discharge current being caused to pass between said electrodes by the operation of the induction coil 16, so that the gases issuing from the pipes 11 and 12 are combined to form hydrocyanic acid gas as fast as they enter the case, sufficient electric energy being furnished for this purpose. The hydrocyanic acid gas so formed passes out in a continuous stream through the outlet 25 at the top of the case and into the space within the inclosure 30 where it operates to effect the fumigation. When the contents of the tanks 8 and 9 have become exhausted, the combinator is withdrawn from the inclosure and placed within the next inclosure to be fumigated and the operation repeated, a new supply of nitrogen and acetylene being admitted to the auxiliary or measuring tanks 8 and 9.

What we claim is:

An apparatus for a process of fumigation comprising main tanks having valves and containing nitrogen and acetylene respectively, auxiliary tanks for measuring the respective gases, provided with pressure gages, pipes connecting the main tanks with the auxiliary tanks respectively, valved pipes leading from the auxiliary tanks, a discharge circuit and means for generating high tension discharge therein, a combining device consisting of a case, with which the pipes connect, and through which the discharge circuit passes, said case being provided with an outlet, and electrodes within the case in the discharge circuit.

In testimony whereof, we have hereunto set our hands at Los Angeles, California, this 18th day of June, 1910.

FRANCIS M. DUNCAN.
WILLIAM S. EISENBERG.

In presence of—
ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.