May 19, 1931. C. D. COLLINS 1,806,192

APPARATUS FOR SPRAYING

Filed Aug. 21, 1925

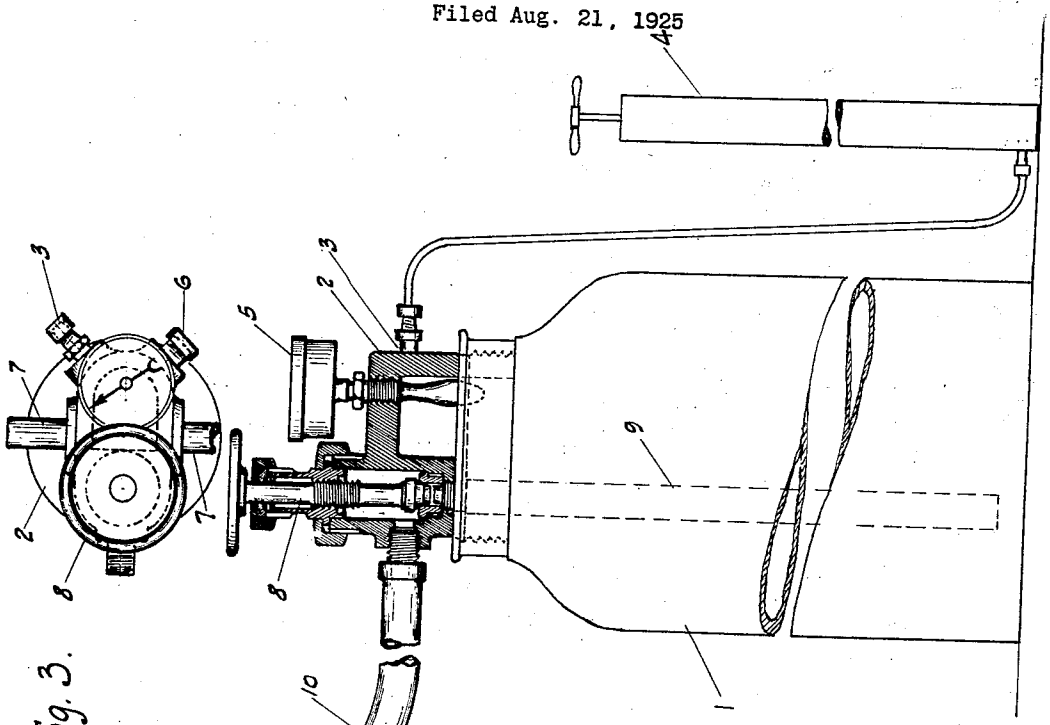


Fig. 3.

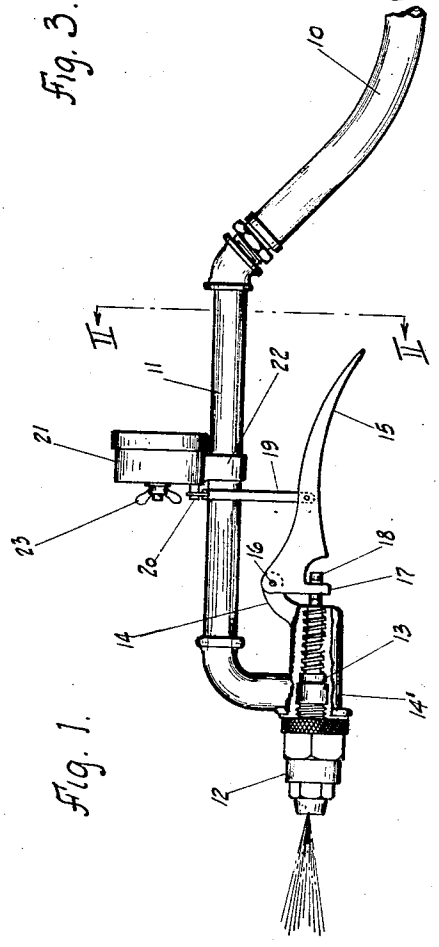


Fig. 1.

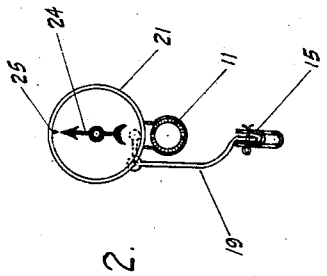


Fig. 2.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR SPRAYING

Application filed August 21, 1925. Serial No. 51,560.

This invention relates to spraying, more particularly to the spraying of volatile liquids which vaporize and act as fumigants.

The use of liquids as fumigants, such as liquid hydrocyanic acid or mixtures containing the same, is of growing importance, being used in the fumigation of ships, warehouses, factories, rooms, trees and the like. Various types of apparatus for applying the same have been devised and are in use, and among them is the apparatus described and claimed in my copending application Serial No. 29,639, filed May 11, 1925, for ship fumigating apparatus. Because of the construction thereof it is possible to accurately measure out either large doses or comparatively small doses of the fumigant, and it has gone into extensive use on ships, since a single piece of apparatus was made applicable both to the largest hold and to the smallest stateroom.

My present invention is designed to provide another type of apparatus for fumigating purposes which is different from that set forth in my copending application above identified, it being among the objects thereof to devise an apparatus therefor which shall be efficient, flexible in that it shall allow of the accurate and rapid measurement of greatly varying doses, and which shall involve a minimum amount of skill and effort on the part of the operator.

In practicing my invention I provide a container for the fumigant, which may be a liquid mixture containing about 20% cyanogen chloride in hydrocyanic acid, and secure thereto a source of pressure, such as a hand operated air pump. The liquid outlet pipe of the container terminates in a nozzle, through which the fumigant is sprayed under the pressure within the container, the said pressure being maintained approximately constant, generally not varying more than say five pounds, whereby the volume of liquid passing through the nozzle is constant within very narrow limits. The nozzle is normally closed by a spring-pressed valve provided with an operating handle which is connected to an indicator mechanism for determining the amount of liquid passing through the nozzle, the indicator being mounted on the apparatus. It consists generally of a spring-actuated escapement device, such as is commmonly used in clocks and the like, which is normally held in locked position by a latch. When the valve is opened by the movement of the handle, the latch is released, allowing the clockwork to function and causing a pointer attached thereto to move over a scale which is calibrated as desired to indicate dosage delivered by the nozzle. When the proper amount has been delivered the operator releases the handle which shuts off the flow of fumigant and stops the movement of the escapement mechanism. The apparatus, without further manipulation by the operator, is ready for another operation.

In the accompanying drawings constituting a part hereof and in which like reference characters indicate like parts:

Fig. 1 is a side elevational view of my new apparatus, some parts being broken away for clearness;

Fig. 2 is a cross-sectional view taken along the line II—II of Fig. 1, and

Fig. 3 is a plan view of the combined valve and closure for the container.

The container 1 is provided with a cover 2 which is threaded into place to make a leak proof joint and has an opening on one side thereof to which is connected tubing 3 provided with a spring-pressed air valve of well-known construction, the fore end of tubing 3 being connected with the hand operated air pump 4. An air pressure gauge 5 is threaded into the top of the cover 2, a cap 6 closes an opening in the said cover, and a pair of extensions 7 thereon constitute handles to facilitate removal thereof. A valve 8 is adapted to close off pipe 9 which extends to the bottom of the container or cylinder, and tubing 10 is connected to the cover so that fluid from pipe 9 may flow therethrough when the valve 8 is open.

The free end of tubing 10 is connected to a pipe 11 carrying spray nozzle 12 which is normally closed by a spring-pressed valve 13 within the casing 14, which carries a rearwardly extending projection 14'. An oper-

ating handle 15 is pivoted to projection 14' at point 16, and has a projection 17 extending into a slot in the stem 18 of the valve 13. A lever 19 pivoted to the handle 15 is suitably secured to a member 20 adapted to operate a latch within the casing 21 of the indicator. The indicator generally includes an escapement mechanism or clockwork which is actuated by a coil spring and the movement of which is controlled by a latch, as is well-known in the construction of clock mechanisms. The indicator casing 21 is secured to pipe 11 by band 22 and it is provided with a key 23 for placing the coil spring under tension. A pointer 24 is secured to the clockwork and is adapted to move over the face of a dial 25.

The operation of the device is as follows:

The container 1 may be filled with liquid by removing the tubing 10, opening valve 8 and securing in place of said tubing a hose connected to the source of liquid, which is generally of a toxic character. Cap 6 is removed and a hose is connected thereto leading to a distant point to act as a vent during the filling operation. Liquid is caused to flow into the container 1 to the desired point, after which the connection with the source of liquid is broken and the cap 6 and tubing 10 are replaced. Valve 8 is closed and the pump 4 is actuated until the gauge 5 shows that the pressure within the container 1 has been built up to the desired point, say 25 to 30 pounds. In order to fumigate with the apparatus, the operator opens valve 8, grasps the nozzle arrangement in his hand and introduces the same into the space to be fumigated. He presses the handle 15, opening valve 13 and allowing the liquid from container 1 to be ejected through the nozzle 12 by the pressure within the container. Simultaneously therewith the movement of the handle releases the latch controlled by member 20, allowing the pointer 24 to move over the dial 25. The dial is calibrated so that each complete revolution of the pointer 24 indicates a unit of liquid passing through the nozzle under the given pressure. The operator merely notes the number of revolutions and without any calculation determines the number of units which have been ejected into the space being fumigated and then releases the handle, thereby cutting off the further flow of liquid, and at the same time stopping the revolution of the pointer 24. Without any further manipulation the apparatus is ready for another fumigation, which is accomplished merely by pressing of the handle 15. Only periodically is it necessary to operate the pump 4, since the pressure in the container does not vary greatly and only a few strokes of the pump at rather infrequent intervals are necessary to keep the pressure within the desired limits.

My invention provides an apparatus which is comparatively inexpensive inasmuch as it utilizes parts of simple construction, most of which are standard and may be readily obtained at low cost. It is an easy matter for the operator to manipulate the apparatus as all he is required to do is to give the pump a few strokes to bring the pressure in the container up to the required point, after which a number of fumigations may be made until the pressure in the container has dropped, say five to ten pounds. The act of fumigation is extremely simple; the operator merely presses the handle and counts the number of revolutions of the pointer or the units on the dial that it passes and he thus obtains the proper dosage. The measurement of the doses is rapid and accurate and no errors creep in regardless of the size of the dose, which may vary within very wide limits. It will be seen that the operation of this apparatus requires very little skill, effort or intelligence on the part of the operator.

Although I have described my invention giving a detailed description of an apparatus for fumigating, my invention is not limited to these details as various changes may obviously be made therein within departing from the principles set forth. For instance, a different type of operating means for the spring-pressed valve may be used and the indicator mechanism may be operated by other than a direct connection with the handle and even independently thereof but simultaneously therewith. The indications need not be given by a pointer moving over the face of a dial, but some other type of signal may be given, for example, the movement of the escapement mechanism may periodically sound a bell or the like. In place of an air pump, one may use a cylinder containing air or other gas under high pressure and connect the same to the container through a regulating or a reducing valve, which will give the desired constant pressure on the liquid. These and other changes may be made in my invention, the scope of which is defined in the claims appended hereto.

What I claim is:

1. Apparatus for spraying which comprises a container for liquid, means for placing pressure thereon, a spray nozzle connected to said container to receive liquid therefrom, means for controlling the flow of liquid through said nozzle, and means actuated by said controlling means for indicating the amount of liquid flowing through said nozzle.

2. Apparatus for spraying which comprises a container for liquid, means for placing pressure thereon, a spray nozzle connected to said container to receive liquid therefrom, a valve and an operating handle therefor for controlling the flow of liquid through said nozzle, and an indicator actuated by the movement of said handle for indicating the amount of liquid flowing through said nozzle.

3. Apparatus for spraying which comprises a container for liquid, means for placing pressure thereon, a spray nozzle connected to said container to receive liquid therefrom, a valve and an operating handle therefor for controlling the flow of liquid through said nozzle, and an indicator containing clockwork adapted to be released by the movement of said handle for indicating the amount of liquid flowing through said nozzle.

4. Apparatus for spraying which comprises a container for liquid, means for placing pressure thereon, a spray nozzle connected to said container to receive liquid therefrom, a valve and an operating handle therefor for controlling the flow of liquid through said nozzle, and an indicator adapted to be actuated by the movement of said handle during the period when liquid is flowing through said nozzle to indicate the amount thereof.

In testimony whereof, I have hereunto subscribed my name this 14th day of August, 1925.

CHARLES D. COLLINS.