

July 5, 1938.

J. L. BIGGS

2,122,853

MEANS FOR FUMIGATING MATERIALS

Filed Dec. 20, 1933

2 Sheets-Sheet 1

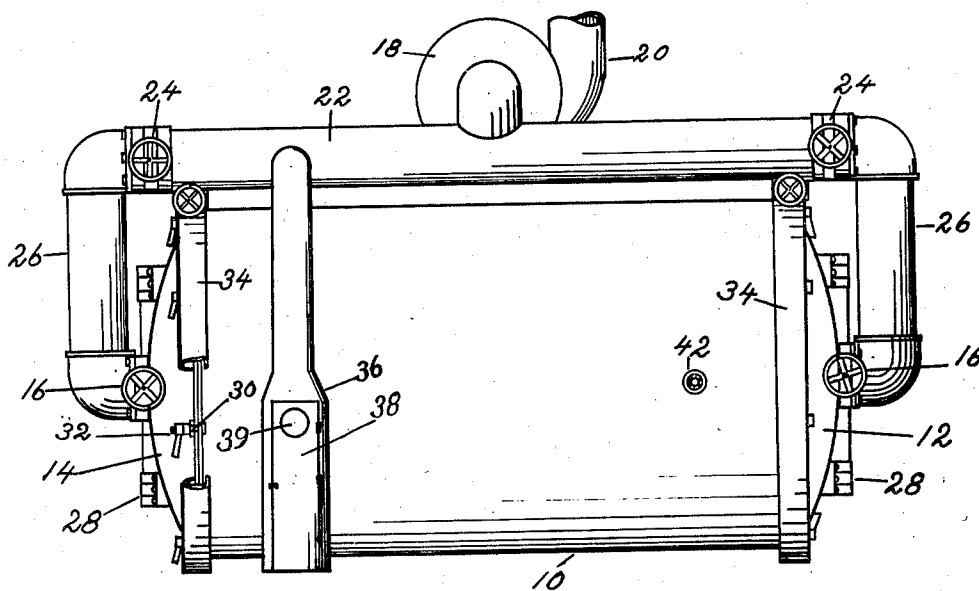


FIG. 1

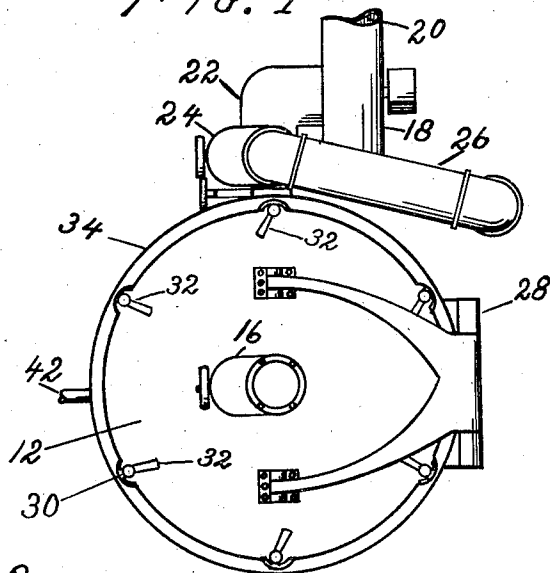


FIG. 2

JOHN L. BIGGS
INVENTOR

BY Leon T. Hooper

ATTORNEY.

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2 Sheets-Sheet 2

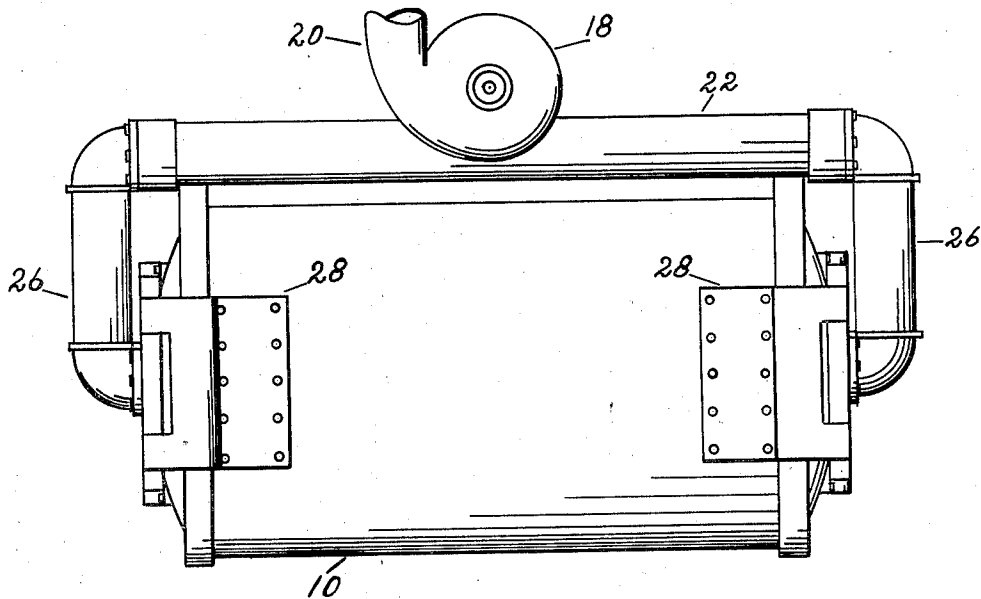


FIG. 3

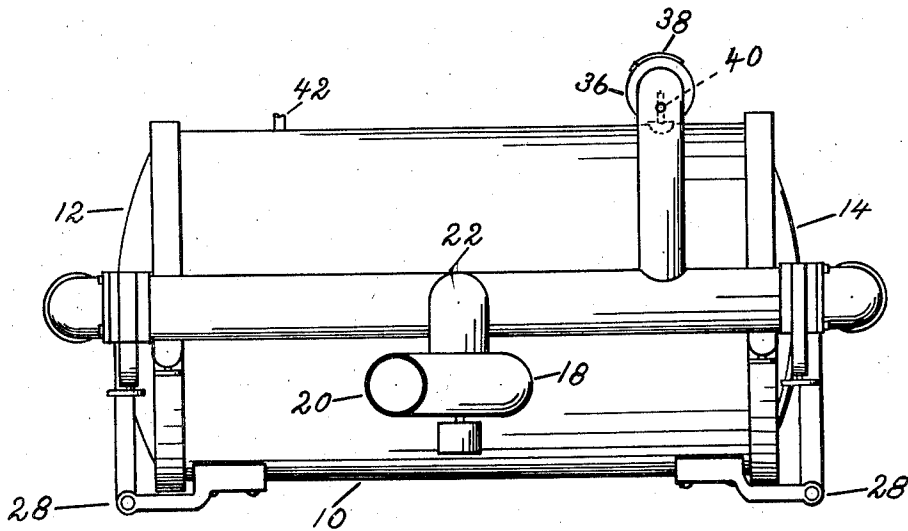


FIG. 4

JOHN L. BIGGS
INVENTOR

BY *Leon T. Hooper*
ATTORNEY

UNITED STATES PATENT OFFICE

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MEANS FOR FUMIGATING MATERIALS

John L. Biggs, Calumet City, Ill.

Application December 20, 1933, Serial No. 703,171

6 Claims. (Cl. 99—258)

This invention relates to an improved means for using hydrocyanic acid or other deadly gas for fumigating edible products and has for its principal object the provision of means whereby the fumigation may take place in safety in a congested factory or in close proximity to other workers.

Another and still further important object of this invention resides in the provision of means for fumigating the product after it is packed for shipment.

Still another and further important object of this invention resides in the provision of means for exhausting the fumigating chamber of the deadly gas to enable workers to enter for removing the fumigated product immediately after fumigating.

Another and further important object of this invention is the provision of means for immediately removing the fumigant from the body of the fumigator regardless of atmospheric conditions.

A still further important object of this invention is the provision of a safety appliance for holding the gas cylinder and removing any gas which may escape through a broken hose connection or leaky valve.

Another and still further important object of this invention resides in the provision of means for opening either end of the fumigating chamber for loading or unloading the product.

A still further important object of the fumigator of this invention resides in the provision of means whereby the exhaust pipe on either closure may be swung aside to permit the opening or closing of said closure.

Other and further important objects of this invention will be apparent from the disclosures in the accompanying drawings and following specifications. This invention, in the preferred form, is illustrated in the drawings, and hereinafter more fully described.

In the drawings:

Figure 1 is a front elevation of the fumigator and shows the relative positions of the fumigating chamber, the safety compartment for the gas cylinder, and the exhaust system.

Figure 2 is an end view of the fumigating chamber and shows the exhaust pipe swung to the side to allow the air-tight hinged closure to be opened.

Figure 3 is a rear elevation of the fumigator of this invention and shows the relative positions of the various parts.

Figure 4 is a top plan view of the improved fumigator of this invention and shows particu-

larly the location of the fan and the gate valves of the exhaust system.

As shown in the drawings:

The reference numeral 10 indicates in a general way the body of the fumigator which, in the preferred form, is constructed of metal and is cylindrical in shape, as shown in the drawings. However, it will be apparent that choice may alter the shape to any number of various designs.

Hingedly positioned on each end of the body are closures 12 and 14 which, in the preferred form, are slightly bulged, as is best shown in Figures 1, 3 and 4 of the drawings.

Positioned on the closures 12 and 14 are gate valves 16 which are used to open or close the passageway into the body of the fumigator. Positioned on top of the fumigator body 10 is an exhaust system comprising a fan 18, an outlet pipe 20, and an intake pipe 22. The intake pipe 22 extends along the top of the fumigator body and is parallel thereto.

Positioned on each end of the intake pipe and protruding beyond the end of the fumigator body is a gate valve 24. Swingably secured to the gate valve 24 are downwardly extending members 26 of the intake pipe 22. The openings in the lower ends of these members abut and engage the outer openings of the gate valve 16 and may be removably secured thereto by bolts or other suitable means. The members 26 may be swung aside and upwardly, as is best shown in Figure 2 to permit the closure to open or close and also to give unobstructed access to the interior of the fumigator body.

Secured to each end of the fumigator body 10 are hinges 28 for supporting the closures 12 and 14 when they are swung open.

Positioned at equally spaced distances around the periphery of the closures 12 and 14 are slots 30 which coact with the bolts and nut assembly 32, to make an air tight joint.

Extending downwardly from the intake pipe 22 are valved members 34 which cover the joint between the body 10 and the closures 12 and 14. These members are open on the side facing the joint, as is best shown in Figure 1, to take up any leakage from the interior of the fumigator body.

Secured to the pipe 22 and extending downwardly is a gas cylinder safety chamber 36 into which a cylinder of fumigating gas, or other fumigant supplying member, may be placed. A door 38 hingedly secured to the chamber 36 provides a means of access thereto. Any leakage

from the gas cylinder, valves or hose connections is immediately taken up and passed into the pipe 22 thence through the fan to the exhaust pipe 20. A hand hole 39 in the door 38 provides a means for opening or closing the valve of the gas cylinder without opening the door. Provision is made for introducing the fumigant into the body 10 through the opening 40. An outlet 42 adapted to be connected to a vacuum pump provides a means for evacuating the air from the interior of the body 10.

In practically all food products such as candy, cereals, nuts and the like, and also tobaccos, retailed in cartons, considerable difficulty has been encountered in having the product reach the consumer in edible condition. Due to the fact that the goods are usually displayed where it is warm enough to hatch the eggs of vermin, it is quite often that the purchaser finds worms in the product purchased. Therefore, a safe means for and method of fumigating food or other products with HCN or other similarly deadly gas has been long desired by the trade. However, the use of HCN has been precluded in former tanks because of the fact that if the fumigator is placed in a poorly ventilated space, such as a basement, or if an attempt is made to use the gas during damp or rainy weather, or when atmospheric conditions are not favorable, the gas cannot be removed from the fumigator tank with a vacuum pump, if used in the former systems, even by numerous washings.

The method of producing the result desired in the fumigator of this invention is extremely simple and, moreover, the safety factors included make the use of this fumigator even when used with the deadly HCN, much safer to operators than the former fumigators are when using a mild fumigant.

Furthermore, the use of HCN in former type fumigators is costly, slow and dangerous because the air washing period must extend over periods ranging from six to twenty-four hours and even then operators entering the fumigator chamber are compelled to wear safety masks as the complete removal of the fumigant is uncertain.

The safe use of an efficient fumigant such as HCN in the fumigator of this invention is accomplished in the following manner: The body of the fumigator is loaded with the product to be treated, the closures sealed, then the fan 18 is started and the valves 16 and 24 are closed to make the body of the fumigator air tight. The air within the body is then evacuated through the outlet 42 and a vacuum of approximately 27" built up within. The member 26 in front of the closure to be removed for unloading is swung aside. At this point the outlet 42 is closed and the fumigant admitted through the opening 40. A bypass on the outlet 42 is then opened to admit air into the body of the fumigator to expand the fumigant and to reduce the vacuum to approximately atmospheric pressure. This mixture is allowed to stand to permeate the containers or product within the fumigator. This mixture is then evacuated and a 27" vacuum is again built up within the body of the fumigator. At this point the nuts 32 are slacked off, and the gate valve 16 opened slightly to release the vacuum. The fan 18 being in operation, the gate valves 16 and 24, at the end opposite to the closure to be removed, are opened, and the vacuum line closed. The gate valve 16 on the unloading end of the fumigator is then opened to permit the unrestrained inflow of air.

As the capacity of the fan per minute is substantially twelve times greater than the capacity of the body of the fumigator, by volume, the fumigant cannot escape from the opened gate valve or opened end of the body.

The operator then proceeds to remove the nuts 32 in preparation to removing the closure itself, which is done in absolute safety after an elapse of from six to ten minutes after the gate valve on the closure has been opened. The product is now removed for shipment or storage.

Although the packages within the fumigator give off small quantities of gas, it is carried away from the worker and toward the rear of the tank by the incoming air.

It will be apparent from the foregoing that herein is provided a means for and method of safely destroying infestation of food or other products in an efficient and economical manner.

Moreover, because the time required for washing the air after fumigation is so materially reduced, a great savings will be made by following the teachings of this method. Furthermore, the fumigant is removed, regardless of atmospheric conditions in the vicinity.

While fumigation of food and other products has been carried on for some time, none of the devices or methods previously used will successfully and efficiently handle HCN or other similar fumigant.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention and I, therefore, do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention:

1. A fumigator comprising in combination a hollow body, means for creating a vacuum within said body, means for admitting a fumigant into said body, means for expanding said fumigant therein, means for admitting free air into one end of the hollow body and means for passing the fumigant laden air out of the opposite end, said last named means including a removable closure at each end of said body, a valved port positioned on each closure, a driven fan, and valved passageways extending from said valved ports to the fan and detachably secured at said ports.
2. A fumigator adapted to use HCN gas at room temperature and comprising in combination a cylinder having a removable closure on each end thereof, means for creating a vacuum within said cylinder, means for admitting a fumigant into said cylinder, means for expanding said fumigant therein, and means for admitting free air into one end of the cylinder and passing said air laden with said fumigant out of the opposite end, said last named means including a valved port positioned on each closure, a driven fan, and a valved passageway detachably secured at and extending from at least one of said valved ports to said fan.
3. A fumigator comprising in combination a hollow body, hinged mounted closures on each end of said hollow body, means for removably securing said closures to the hollow body to form an airtight compartment, means for creating a vacuum within said compartment, means for admitting a fumigant into said compartment, means for expanding said fumigant therein, and means for admitting free air into one end of the hollow body and passing said air together with the fumigant out of the opposite end, said last named

means comprising valved ports positioned on said closures, a driven fan, and a valved passageway detachably secured at and extending from at least one of said ports to said fan.

5 4. A fumigator adapted to treat edibles with HCN gas and comprising in combination a cylinder, hingedly mounted closures on each end of said cylinder, exhaust members covering the joints between said cylinder and said closures, a 10 valved fumigant intake, an exhaustible safety chamber covering said intake, means for admitting free air into one end of the cylinder, said means comprising a valved port positioned on each removable closure, and means for passing 15 said air out of the opposite end of said cylinder, said means including a driven fan and a valved passageway extending from said closures to said fan, said valved passageway being detachably secured to said closures, and said safety chamber 20 and said exhaust members being in exhaustible connection with said driven fan.

5 5. A fumigator adapted to treat edibles with HCN gas and comprising in combination a cylinder, hingedly mounted closures on each end of 25 said cylinder, exhaust members covering the joints

between said cylinder and said closures, a valved port positioned on each closure, a driven fan, a valved passageway detachably secured at and extending from said port to said fan, said exhaust members being operably connected to said 5 valved passageway, a valved fumigant intake on the cylinder, a safety chamber covering said intake, said safety chamber being connected with said valved passageway, and means for creating a vacuum within the cylinder. 10

6. In a fumigator adapted to use as a fumigating agent HCN gas and comprising a cylinder, an apertured closure hingedly secured to each end of said cylinder, a gate valve operable in each 15 aperture, a driven fan, a valved exhaust member detachably secured at and extending from each valved aperture to said fan, a valved gas intake member projecting outwardly from said cylinder, a gas bottle receiving chamber positioned over said gas intake member and extending 20 upwardly and being connected to the said valved exhaust member, an apertured door hingedly secured to said bottle receiving chamber, and means for creating a vacuum within the cylinder.

JOHN L. BIGGS. 25