Dec. 28, 1943. G. E. LOFGREN 2,337,906

VAPORIZER

Filed Jan. 12, 1940

Fig. 1.

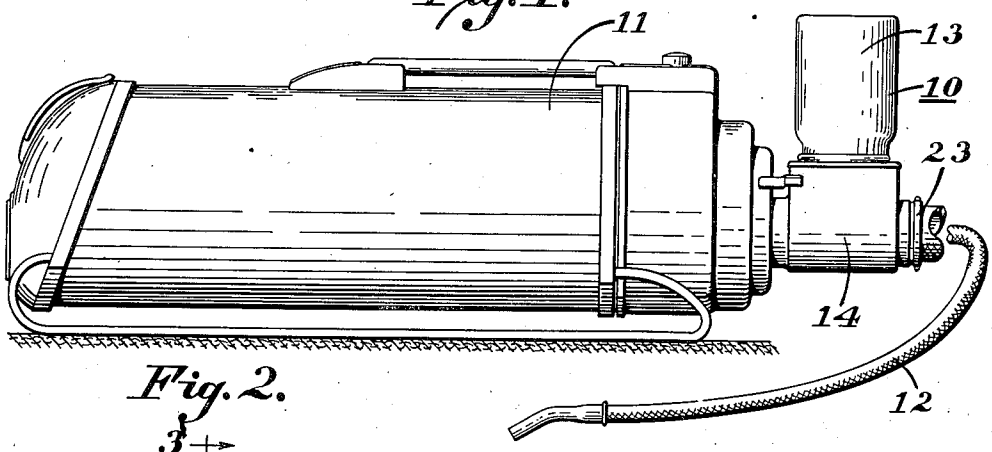


Fig. 2.

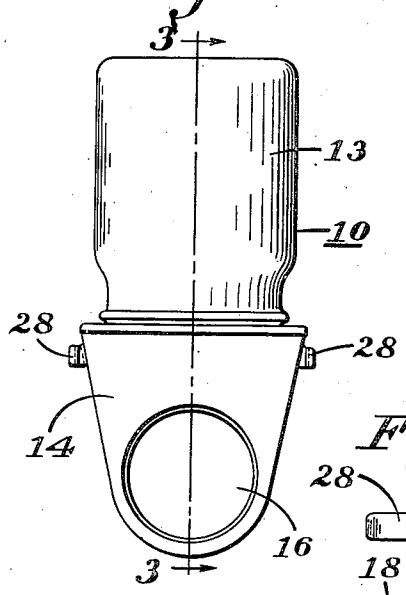
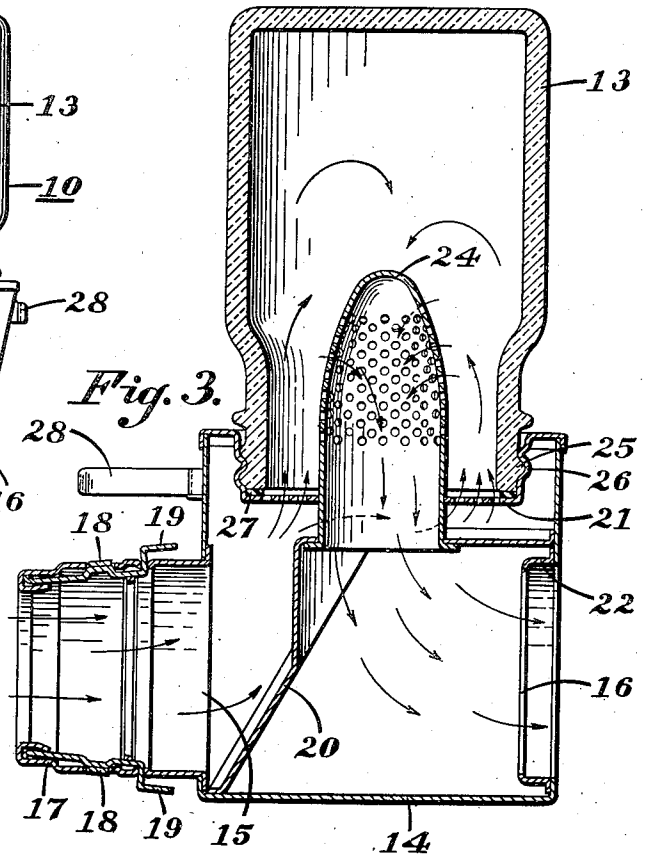


Fig. 3.



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VAPORIZER

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7 Claims. (Cl. 21—127)

My invention relates to vaporizers adapted to vaporize material which is subject to sublimation. More particularly, my invention relates to a vaporizer of the type that is adapted to be connected in the outlet opening of a vacuum cleaner.

In vaporizers of this type, there are two major problems. The first problem is to insure contact between the air passing through the container of the vaporizer and the vaporizable material located therein. The second problem is to maintain a substantially constant air flow through the container independently of the amount of vaporizable material that may be located therein.

In accordance with my invention, an improved vaporizer is provided which insures contact between the air flow through it and the vaporizable material within it, regardless of the amount of material located therein.

In addition, my improved vaporizer provides a substantially constant flow of air through the container regardless of the amount of vaporizable material.

What I consider to be novel and my invention may be better understood by reference to the following specification and appended claims when considered in connection with the accompanying drawing, in which

Fig. 1 shows my improved vaporizer connected in the outlet opening of a vacuum cleaner of the inside-dust bag type;

Fig. 2 shows a front view of the vaporizer; and

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2, somewhat enlarged.

Referring to the drawing, the numeral 10 indicates my improved vaporizer connected in an outlet opening of a vacuum cleaner unit 11 of the inside-bag type. A flexible hose 12 is connected in the outlet opening of the vaporizer 10. The vaporizer 10 includes a glass container 13, which is supported on a vertical axis with its mouth extending downwardly by a vaporizer unit 14.

Vaporizer unit 14 has an inlet opening 15 at one end and an outlet opening 16 at the other end. A coupling member 17 is secured in the inlet opening 15, and is adapted to be inserted in the outlet opening of vacuum cleaner unit 11. Coupler 17 is provided with a plurality of latches 18, which may be released by means of fingers 19. A wall 20 is positioned within the unit 14 between the inlet opening 15 and the outlet opening 16, and serves to deflect the air entering inlet opening 15 upwardly through a screen 21 into container 13. In the outlet opening 16, a flange 22 is provided for receiving the hose coupling member 23. A perforated tubular nipple 24 is secured to wall 20 and extends upwardly through the screen 21 into the container 13. The perforations in the nipple 24 are located above the mouth of the container 13. The container 13 is provided with threads 25 for cooperation with corresponding threads 26, provided in the unit 14. A gasket 27 is interposed between the container 13 and the screen 21. The container 13 is held in a vertical position by means of two fingers 28 which engage the adjacent portion of the vacuum cleaner unit 11, when the vaporizer unit 14 is secured in the outlet opening thereof.

When it is desired to produce a vapor-laden air for the purpose of mothproofing a closet, or for a similar purpose, as for producing an insect-destroying atmosphere, the vaporizable material in the desired quantity is placed in the container 13. The container 13 is secured in position in the vaporizer unit 14, and the unit 14 may be connected in the outlet opening of the vacuum cleaner, such as vacuum cleaner unit 11. The vacuum cleaner 11 is then operated to produce a flow of air through the vaporizer unit 14. As best indicated in Fig. 3, the air enters the inlet opening 15 and passes through the screen 21 into the container 13. The air entering the container 13 must pass within it a sufficient distance to reach the perforations in the nipple 24.

Under ordinary circumstances, the air will travel into the container a greater distance than necessary simply to reach the perforations of the nipple 24. The air must flow over any crystals located within the container 13 because the force of gravity holds the vaporizable material against the screen 21. If the velocity of the air is sufficiently high and the weight of the vaporizable material is sufficiently low, the air may raise the vaporizable material a certain distance, providing, of course, that the container 13 is not entirely full. In any event, the air must contact the vaporizable material in its passage through the container 13. Also, regardless of the amount of vaporizable material within the container 13, the resistance to the air flow therethrough cannot be greatly increased because the air does not have to pass through all of the vaporizable material located therein, but only through a sufficient portion to enter the nipple 24. The air entering the nipple 24 then passes downwardly to the outlet opening 16.

If it is not desired to locate the vaporizer 10 and the vacuum cleaner unit 11 in a closet, or other space, in which the vapor-laden air is to be

discharged, it may be desirable to connect a flexible hose 12 in the outlet opening 16, as shown in Fig. 1. The hose 12 may then be connected to an opening in the container, in which it is desired to produce the vapor-laden air. During the progress of vaporizing the material located in the container 13, the use of a glass container would make it possible to examine the vaporizer to ascertain the amount of material still located therein without disturbing its continued operation. The size of the container 13 does not limit the operation of the vaporizer 10, because it makes no material difference in the air flow through the vaporizer what the size of the container 13 may be.

When the operation of the vaporizer has been completed, it may be removed from the vacuum cleaner 11 simply by depressing the fingers 19 to disengage the latches 18. The vacuum cleaner unit 11 may then be used with, or without, the vaporizer 10.

What I claim is:

1. A container comprising air impervious side and top walls and a perforated bottom wall, an air impervious thimble lying within the container with its open end adjacent the bottom of the container, said thimble having perforations in its wall at a height above the bottom of the container, and means adapted to be connected to a source of airflow for guiding air into the container through the perforations in the bottom wall and out through the thimble perforations.

2. A vaporizing unit adapted to be located in an airline comprising a container having a bottom wall formed with one or more air inlet orifices and adapted to support substance to be vaporized, said container also having a substantially vertically projecting wall provided with one or more air outlet orifices spaced from said inlet orifices, whereby the substance to be vaporized normally fills said container up to a level which is above the level of said outlet orifices in said container, and whereby air passing into said inlet orifices and through said outlet orifices must pass through said substance and the resistance to air flow through the container remains substantially constant regardless of the amount of said substance present above said air outlet orifices.

3. A device of the character described comprising a container for vaporizable substance adapted to be placed in an airline, said container having an air inlet providing a support for the substance to be vaporized, said container being also provided with an air outlet spaced from said support and also from the top of the container through which space air must travel in contact with the substance, the construction causing the mass of substance between said support and said outlet to be constantly replenished by gravity from the mass above the outlet as vaporization takes place to thereby maintain the resistance to air flow offered by the mass substantially constant until the upper surface of the mass lowers to a point below said outlet.

4. In a device of the character described, a container having a wall adapted to support substance to be vaporized, said wall having an air inlet opening therein, means providing an air outlet spaced from said air inlet and also from the top of the container through which space air must travel in contact with the substance, the construction causing the mass of substance between the inlet and outlet to be constantly replenished by gravity from the mass above the outlet as vaporization takes place to thereby maintain the resistance to air flow offered by the mass substantially constant until the upper surface of the mass lowers to a point below said outlet.

5. A vaporizer unit adapted to be located in an airline in order that air may be introduced thereto and allowed to pass therefrom, said unit including a container for vaporizable material adapted to be disposed in a substantially fixed definite position, means in said container providing a supporting surface for the substance to be vaporized, said surface having one or more air inlet openings therein, said container being also provided with an air outlet spaced from said inlet, said container having walls defining a restricted space between the inlet and outlet such that the vaporizable substance received between said inlet and outlet will be maintained substantially constant as long as there is sufficient substance to cover said inlet and outlet, and whereby the resistance to air flow offered by the entire mass in the container is maintained substantially constant throughout the vaporizing operation.

6. A container for holding vaporizable crystals, means to retain said container in a fixed position, said means having two series of openings therein and means to cause air entering one of the series of openings to leave through the other series of openings, the openings being located near the bottom of said container so that both are covered so long as there is any substantial amount of crystals in the container and so that the resistance to air flow through the container is substantially constant regardless of the amount of crystals present above said openings.

7. In a device of the character described a container for a substance to be vaporized having intake and discharge air passages adjacent the bottom of the container, the lower portion of the container being restricted in a manner to maintain substance to be vaporized across and bridging the gap between said air intake and discharge passages and providing a substantially constant resistance to air flow when the vaporizable substance is sufficient to cover both intake and discharge passages.

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