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L. ELL

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VACUUM CLEANER

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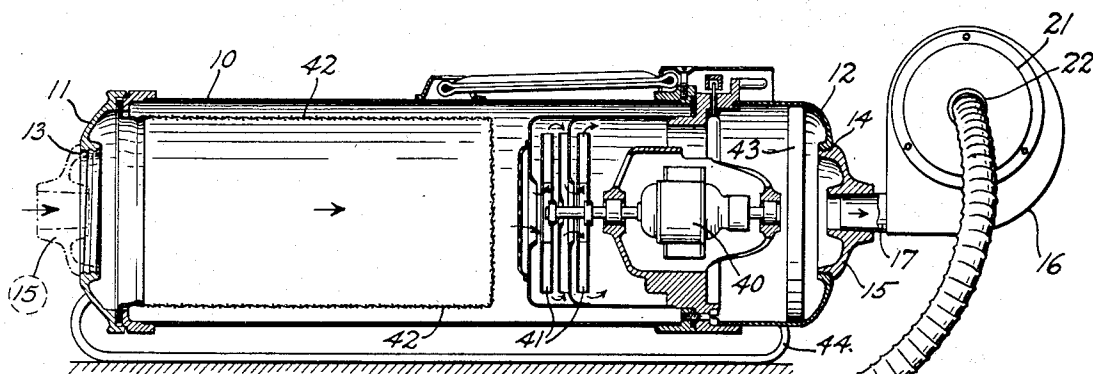


Fig. 1.

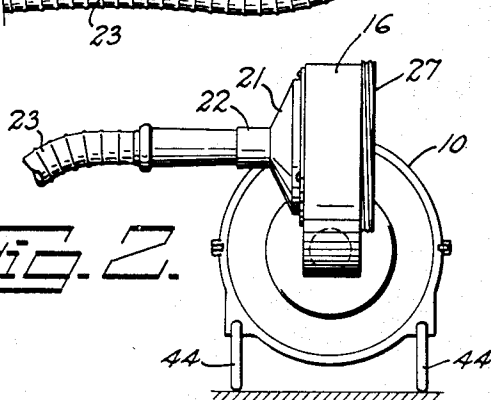


Fig. 2.

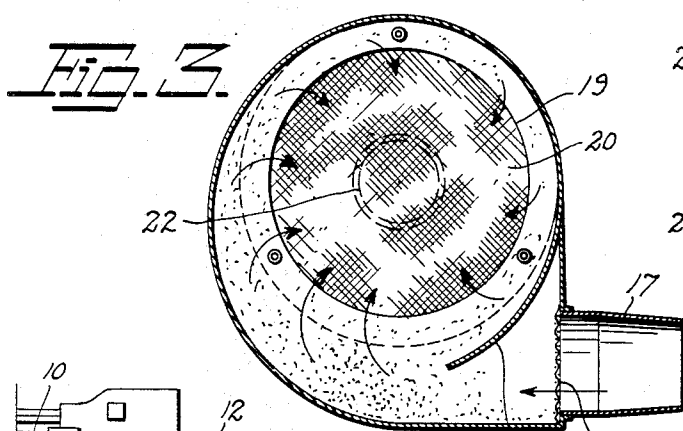


Fig. 3.

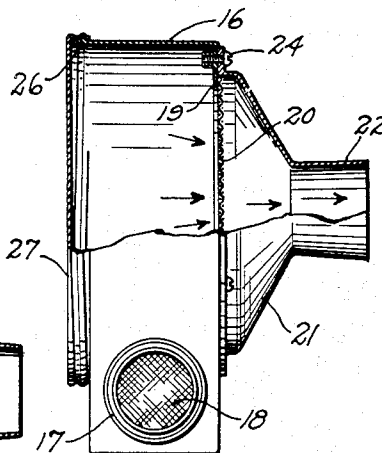


Fig. 4.

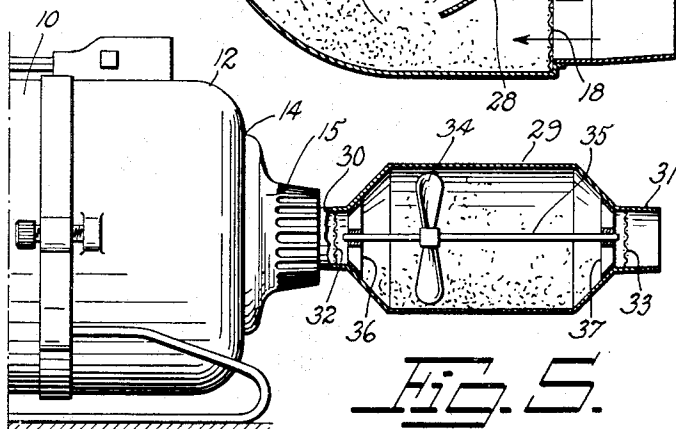


Fig. 5.

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VACUUM CLEANER

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13 Claims. (Cl. 167—3)

This invention relates to vacuum cleaners and like devices employing an air-current. More particularly the invention relates to vacuum cleaners and like apparatus employing an air conditioning substance, such as a disinfectant or insecticide and still more particularly to such apparatus comprising, in combination with other parts thereof, a receptacle for holding solid particles of such air conditioning substance in the path of the air current generated in the apparatus.

One object of the invention is to provide a receptacle for use in conjunction with such apparatus containing solid material in finely divided or powdered form, such as crystals of disinfectant, insecticide or perfuming materials, provision being made for readily applying the receptacle to the vacuum cleaner or other such apparatus in the path of the air stream to cause the air stream to contact the divided material. Other objects of the invention are: to heat the air before passing the same in contact with the solid particles; to provide means for agitating the solid particles while the air is being passed in contact therewith, as by causing the air to whirl in the receptacle or by a mechanical agitator; to provide means whereby the air may become saturated with the vapor from the particles while preventing the solid particles themselves from being incorporated in the air stream; to provide for supplying air to the receptacle after the air has first been passed through the vacuum cleaner and purified; and to provide a relatively simple, dependable, highly efficient and convenient device or combination of the type above indicated.

The invention also includes certain other new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which

Fig. 1 shows a vacuum cleaner embodying the present invention; Fig. 2 is an end elevation thereof, Fig. 3 is a longitudinal section through the receptacle; Fig. 4 is an end elevation thereof, partly in section, and Fig. 5 is a side elevation of a portion of a vacuum cleaner showing in section a modified form of receptacle.

Like reference characters denote like parts in the several figures of the drawing.

In the following description and in the claims parts will be identified by specific names for convenience, but they are intended to be as generic in

their application to similar parts as the state of the art will permit.

Referring to the drawing more in detail, there is shown a vacuum cleaner unit having a barrel 10, to one end of which is secured a bell 11 and to the other end of which is secured a housing 12 containing a motor 40 and a fan 41 driven by the motor to produce a current of air through the cleaner unit in the direction of the arrows. Bell 11 and housing 12 are provided with central suction and blower openings 13 and 14, respectively, in which a coupling member 15 may be inserted. Said coupling member has an internal bore which is adapted to receive the tapered end of an air hose in a manner well known in the art. A dust bag 42 is removably contained in barrel 10, clamps being provided for releasing bell 11 to remove the dust bag. There is also a cloth filter 43 through which all the air must pass, the cloth of which is of such nature as to prevent passage therethrough of certain impurities. Barrel 10 may be provided with a pair of runners 44 for the purpose of supporting the same and permitting movement thereof over a surface.

In accordance with the invention instead of a hose end being inserted in coupling 15, a receptacle is mounted in fixed or rigid relation thereon. The receptacle comprises a housing 16 which is preferably of spiral conformation and to which is attached a nipple 17 which is adapted to seat within the bore of coupling 15. The receptacle may be formed of any light material, such as aluminum, cardboard or the like. A screen 18 which may be formed of any convenient material such as wire cloth is placed across the end of nipple 17 at the point of attachment to the housing 16.

One wall of the housing 16 is provided with a large opening 19, covered by screen 20 of wire cloth or similar material, which may be soldered or otherwise secured thereto. Adjacent to opening 19 a funnel shaped member 21 is secured as by screws 24. Said member 21 terminates in a connector 22 which is adapted to receive the tapered end of a flexible air hose 23; the receptacle then being connected between the main unit of the cleaner and the hose.

In the opposite side of housing 16 there is provided an opening 26 which is normally closed by screw cover 27. A flange 28, forming a continuation of the outer wall of housing 16, is mounted within said housing and bent into a spiral form whereby a spiral air passage is obtained.

In operating the above described apparatus for disinfecting or insecticide purposes, as for example, for killing moths, an insecticide material in solid form is placed within housing 16 through aperture 26 after which cover 27 is replaced. The material is preferably of low surface tension whereby it is easily vaporized by the air current.

Paradichlorobenzol or paradibromobenzol crystals, for example, may be used for this purpose. After housing 16 is inserted in coupling 15 and air hose 23 is attached to connector 22, the cleaner 5 may be operated in the usual manner, thereby causing air to be drawn in through suction opening 13, passed through the dust bag 42, over the motor 40, through filter 43, and through nipple 17 into contact with the crystals in housing 16. 10 The air stream is caused to whirl around in said housing, due to the spiral form of the housing, agitating the crystals and becoming permeated with the vapor therefrom and is then discharged through screen 20 into hose 23. Screen 18 prevents the crystals from entering the vacuum cleaner and at the same time permits free passage of air.

It is to be noted that screen 20 is arranged vertically in the plane of movement of the crystals so that the crystals are not forced against said screen by the air currents nor caused to lodge therein. The rigid mounting of the receptacle in the outlet opening assures that the screen is retained in proper position to prevent such 25 lodging of crystals thereon. The agitation of the crystals and the whirling motion of the air insures an intimate contact of the air with the surface of the crystals and accelerates the vaporization thereof.

In the modified form of the invention shown in Fig. 5 a cylinder 29 is shown provided with a nipple 30 for attachment in coupling 15 and a connector 31 for receiving air hose 23. The ends of said cylinder are closed by screens 32 and 33, respectively, which prevent the discharge of the solid particles. Within cylinder 29 is mounted a fan 34 which is supported on a shaft 35, carried in bearings in spiders 36 and 37.

In this form of the invention, after the crystals 40 have been placed in the cylinder 29 and the apparatus started, the air in passing through said cylinder causes fan 34 to rotate and to mechanically agitate the various crystals. The air stream accordingly makes an intimate surface contact 45 with the crystals and absorbs a maximum amount of vapor therefrom.

Instead of the tapered friction connection between the receptacle and the cleaner unit and between the hose and the receptacle, obviously 50 other forms of connections, such as screw connections, may be employed.

It is to be noted that in the above described apparatus the air is purified by passing through the dust bag and the filter of the vacuum cleaner 55 before it is applied to the crystals for adsorbing the disinfectant vapor. In a sense, all are air treating members, the dust bag and filter separating out material by screening, and the crystals giving off an insecticide vapor. They may all be used in combination, with different functions. To illustrate, the dust bag removes dirt, the filter removes certain bacteria of nature 60 to permit isolation by screening, and the crystals serve to give the exhausted air a character such as for killing moths.

Furthermore, the air in passing through the vacuum cleaner is heated to a certain extent and thereby heats the surface of the crystals and facilitates the vaporization thereof. It is also 70 to be noted that the crystals may be stored in the receptacle which may be readily applied to the cleaner whenever it is desired to use the same for disinfecting purposes.

The above described receptacle may be mounted 75 ed at either the suction or blower ports of the

cleaner, and a liquid or gaseous material adsorbed in a solid such as infusorial earth may be used in place of the solid crystals if desired.

The invention has been described as applied to insecticidal crystals, although it is obvious 80 that other crystals, such as disinfectants or perfumes, may be employed instead of or in combination therewith. Furthermore the device may be operated for the usual cleaning purposes simultaneously with the above if such procedure 85 should prove desirable.

While certain novel features of the invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes 90 in the forms and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A receptacle for solid particles having a spiral housing, means for supplying an air stream thereto, a screen for preventing escape of said particles, means for causing said air stream to pick up the particles in said receptacle and impart a whirling motion thereto, and means for discharging said air stream in a direction at right angles to the incoming air stream. 95

2. A receptacle for solid particles including a spiral housing having an air entrance, said housing having an opening in one side thereof covered by a screen, an air discharge member mounted adjacent to said opening, the arrangement being such that the movement of the solid 100 particles caused by the air current in said receptacle is parallel to the surface of said screen.

3. In combination with a vacuum cleaner unit comprising means to produce a stream of air and having an air discharge opening, a receptacle 105 connected to receive air through said opening, said receptacle being of spiral form whereby the air is caused to whirl therein, one side of said receptacle having a discharge opening and a screen in front of said opening, said screen being 120 perpendicular to the axis of the spiral.

4. In combination with a vacuum cleaner unit comprising means to produce a stream of air and having an air discharge opening, a receptacle of generally rounded contour having a 125 chamber therein for the reception of vaporizable solid particles, means to connect said receptacle to said air discharge opening, a screen in said receptacle forming a wall of said chamber, said receptacle having an outlet and said screen being 130 positioned between said chamber and said outlet, said outlet being adapted for connection to a hose, and said receptacle comprising means for directing the air admitted to said chamber tangentially and parallel to said screen and into 135 contact with said solid particles to cause whirling movement of the particles parallel to the screen.

5. A device of the character set forth comprising a receptacle of generally rounded contour 140 having a chamber therein for the reception of vaporizable solid particles, means for connecting said receptacle to a source of air under pressure, a screen in said receptacle forming a wall of said chamber, said receptacle having an outlet 145 and said screen being positioned between said chamber and said outlet, said outlet being adapted for connection to a hose and said receptacle comprising means for directing air admitted to said chamber tangentially and parallel to said 150

screen and into contact with said solid particles to cause whirling of the particles parallel to the screen.

6. An accessory for use with a vacuum cleaner unit comprising a casing adapted to hold a vaporizable and agitable substance and having a chamber, a centrally disposed outlet, a screen between said chamber and said outlet, and an inlet connection connected to said chamber, said connection and the wall of said chamber being formed to give spiral flow of air from the inlet to the outlet and whirling of said substance in said chamber parallel to said screen.

7. An accessory for use with a vacuum cleaner unit comprising a casing adapted to hold a vaporizable and agitable substance and having a chamber, a centrally disposed outlet, a screen between said chamber and said outlet, and an inlet connection connected to said chamber, said connection and the wall of said chamber being formed to give spiral flow of air from the inlet to the outlet and whirling of said substance in said chamber parallel to said screen, and said connection being attachable rigidly to said unit so that said screen is held in vertical position.

8. An accessory for use with a vacuum cleaner unit comprising a casing adapted to hold a vaporizable and agitable substance and having a chamber, a centrally disposed outlet, a screen between said chamber and said outlet, and a tangential inlet connection connected to said chamber and attachable to said unit so that the connection is at the bottom of said chamber, said connection and the wall of said chamber being formed to give spiral flow of air from the inlet to the outlet and whirling of said substance in said chamber parallel to said screen.

9. An accessory for use with a vacuum cleaner unit comprising a casing having a peripheral wall curved above an axis adapted to hold a vaporizable and agitable substance and having a chamber, an outlet connection, a screen between said chamber and said outlet, and an inlet connection connected to said chamber rigidly attachable to said unit so that the screen is vertical and said axis is horizontal, and means for causing air passing through the chamber to whirl around said axis parallel to said screen.

10. The combination with a vacuum cleaner comprising a cleaner unit having an air inlet opening and an air outlet opening, means for producing flow of air through said unit in the direction from the air inlet opening to the air outlet opening, an air hose and means for connecting the air hose selectively to the air inlet opening or the air outlet opening, of a receptacle for air-conditioning material of the class of para-dichlorobenzol and para-dibromobenzol having

an inlet, an outlet and a peripheral wall curved about an axis, a screen between the inlet and the outlet and means to cause whirling of air adjacent to and parallel to the screen, means for rigidly connecting the inlet of said receptacle to the air outlet opening of the cleaner unit so that said axis is horizontal, and means for connecting said air hose to the outlet of said receptacle, so that, when the receptacle is connected between the cleaner unit and the air hose, air passes first through the cleaner unit, then through said receptacle, while whirling adjacent the screen, and then through the air hose, the screen serving to retain the material in the receptacle.

11. In combination with a vacuum cleaner unit having an outlet port and means for mounting the unit so that the outlet has a horizontal axis, a receptacle for a vaporizable and agitable substance having an inlet adapted to engage said port, an outlet connection having a horizontal axis with the receptacle mounted on the cleaner unit, a screen in said receptacle angularly disposed to said axis, and means associated with said receptacle for rotating air therein about a horizontal axis.

12. An accessory for use with a vacuum cleaner unit comprising a casing adapted to hold a vaporizable and agitable substance and having a chamber, a centrally disposed outlet, a screen between said chamber and said outlet, a tangential inlet connection connected to said chamber and attachable to said unit so that the connection is at the bottom of said chamber, and a vane in said chamber associated with said inlet, said connection and vane and the wall of said chamber being formed to give spiral flow of air from the inlet to the outlet and whirling of said substance in said chamber parallel to said screen.

13. The combination with a vacuum cleaner unit including means for producing flow of air and having an air outlet, of a receptacle having an inlet connection adapted to be connected to said air outlet and comprising a casing enclosing a chamber adapted to hold a divided vaporizable and agitable substance and having a peripheral wall curved about an axis, said receptacle being mountable on said unit so that said axis is horizontal, said receptacle having an outlet for air charged with vapor of said substance, a screen between said chamber and said outlet, said receptacle being formed to conduct air from said inlet connection into said chamber tangentially of said axis below the axis to cause the air to pick up said substance and whirl the same in said chamber.

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