June 5, 1934. F. RIEBEL, JR 1,961,167

APPARATUS FOR CLEANING, FUMIGATING, ETC

Filed April 7, 1928 2 Sheets-Sheet 1

Fig. 5

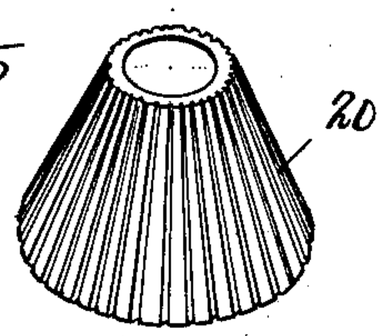
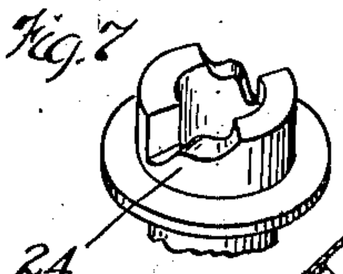


Fig. 6

Fig. 7



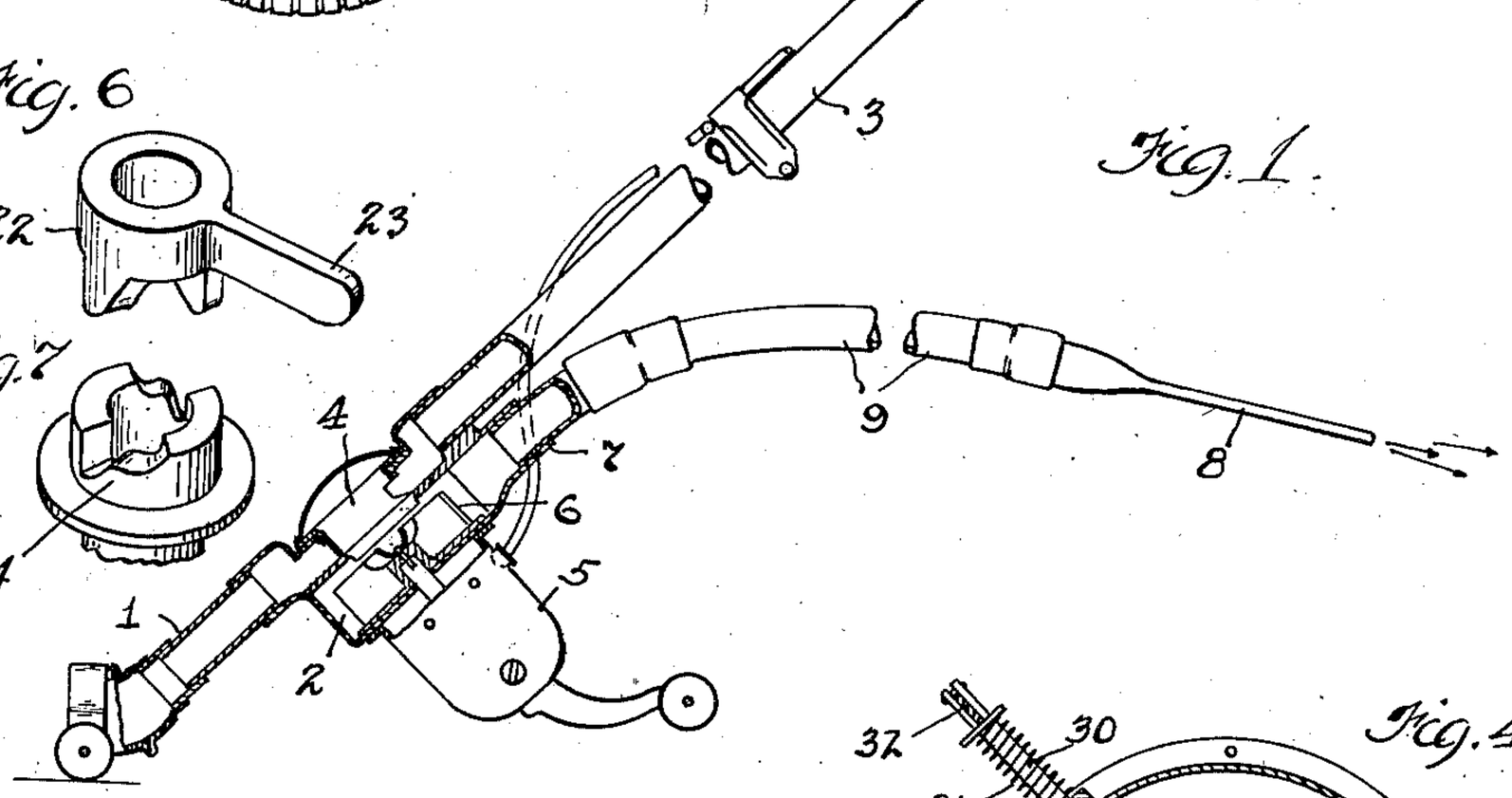


Fig. 1.

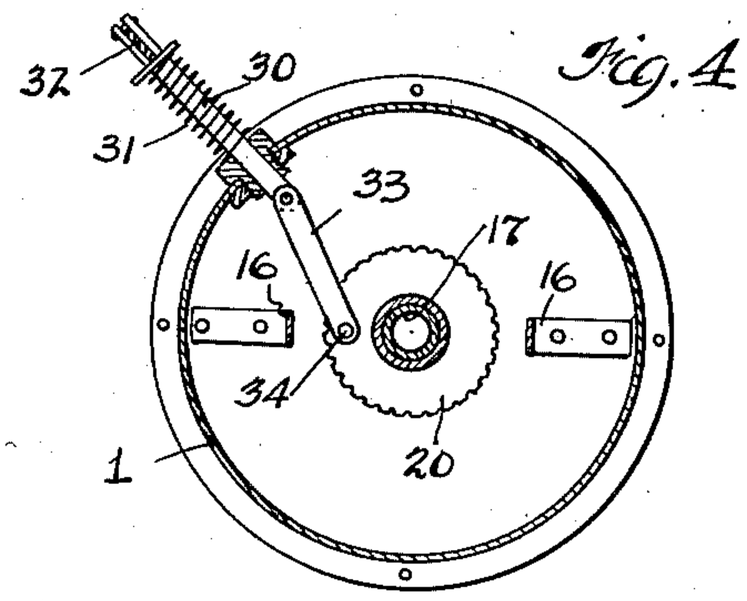


Fig. 4

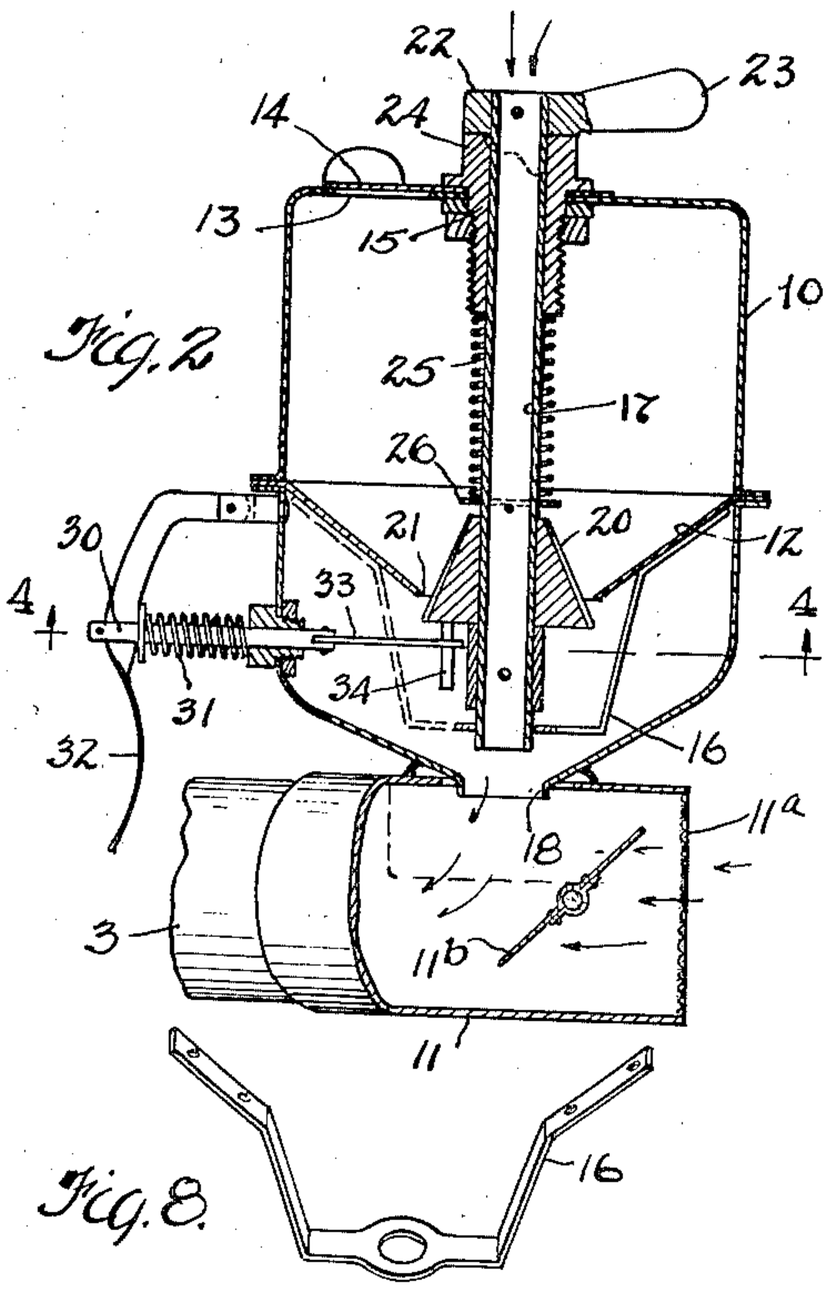


Fig. 2

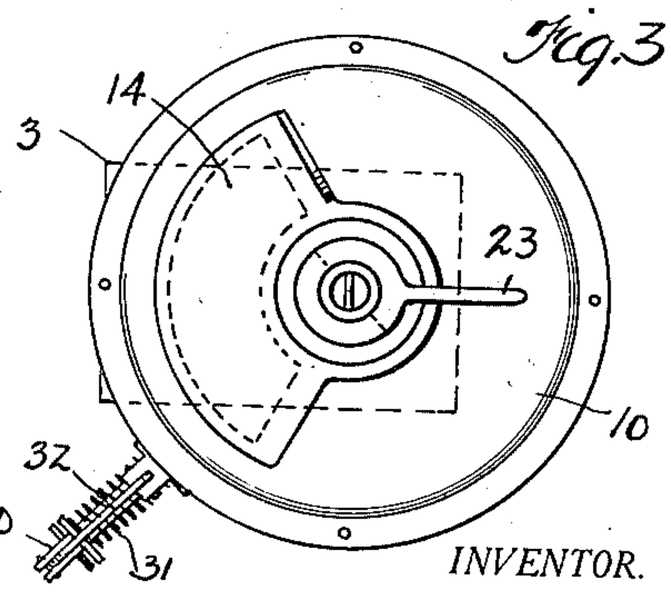


Fig. 3

INVENTOR.

Frederick Riebel Jr.

BY

Fay, Oberlin & Fay

ATTORNEYS.

Fig. 8.

June 5, 1934. F. RIEBEL, JR 1,961,167

APPARATUS FOR CLEANING, FUMIGATING, ETC

Filed April 7, 1928 2 Sheets-Sheet 2

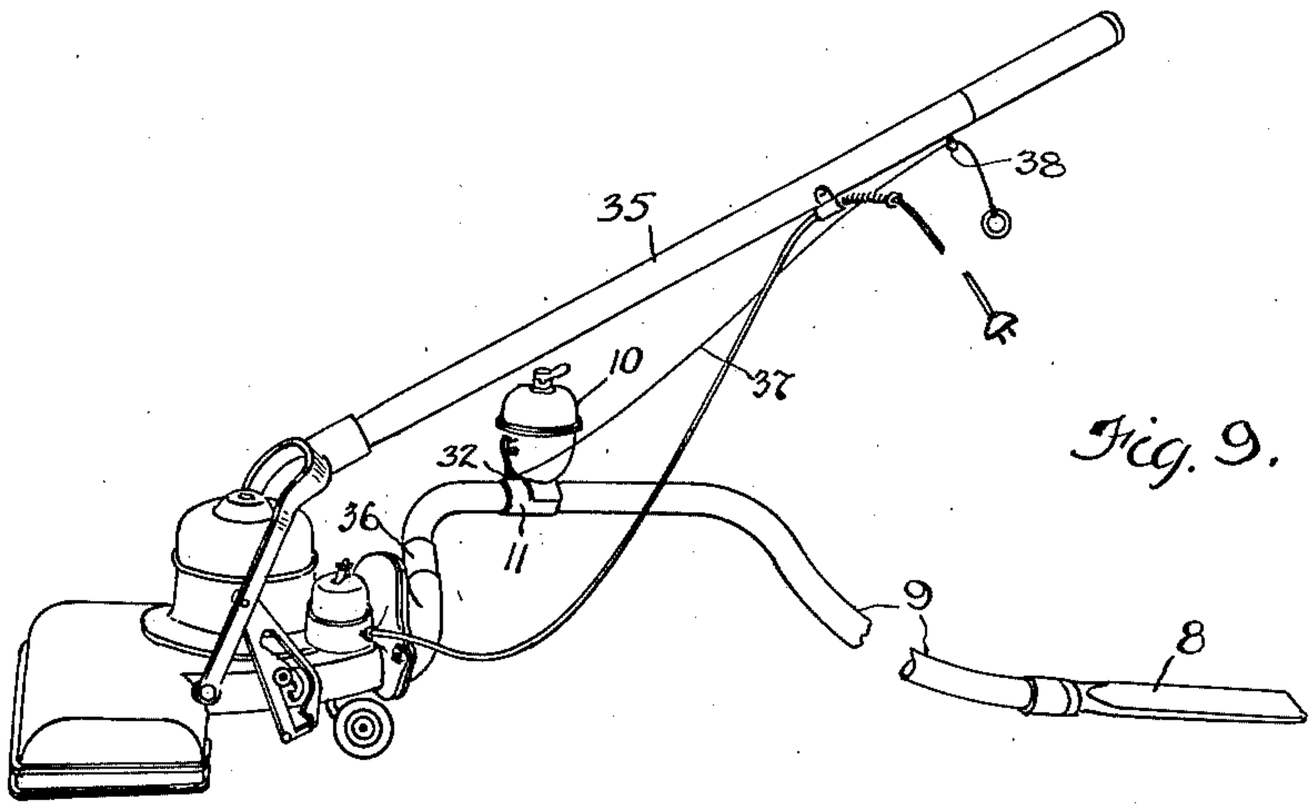


Fig. 9.

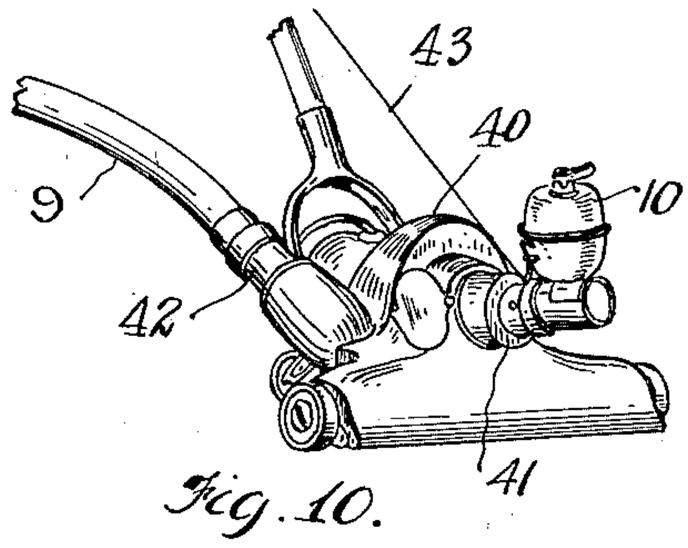


Fig. 10.

INVENTOR.
Frederick Riebel Jr.
BY
Fay, Oberlin & Fay
ATTORNEYS

Patented June 5, 1934 1,961,167

UNITED STATES PATENT OFFICE

1,961,167

APPARATUS FOR CLEANING, FUMIGATING, ETC.

Frederick Riebel, Jr., Toledo, Ohio, assignor to Air Way Electric Appliance Corporation, Toledo, Ohio, a corporation of Delaware

Application April 7, 1928, Serial No. 268,132

20 Claims. (Cl. 43—124)

The present improvements have more particular regard to the provision of an apparatus which may be attached to or incorporated in the structure of a so-called portable vacuum cleaner whereby a current or blast of air discharged from such cleaner may be utilized to disseminate through a room or discharge onto articles of furniture and the like a suitable powdered or crystalline fumigating material, i. e., one for destroying insects and vermin.

One principal object of the invention is to provide an apparatus for the use indicated which may be readily attached to existing types of portable vacuum cleaners. Another object is to provide an apparatus which is simple and easily adjustable and will enable the operator readily to vary the amount of material discharged or disseminated.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a side elevation with parts appearing in section of one standard type of portable vacuum cleaner wherein the present improved apparatus has been incorporated; Fig. 2 is a central vertical section of the apparatus by itself and on a somewhat larger scale than in Fig. 1; Fig. 3 is a plan view of the same; Fig. 4 is a horizontal section looking upwardly, the plane of the section being indicated by the line 4—4, Fig. 2; Figs. 5, 6, 7 and 8 are perspective views of various component parts of the apparatus; Fig. 9 is a perspective view of the apparatus as applied to another type of portable cleaner from that shown in Fig. 1; and Fig. 10 is a view similar to Fig. 9, but showing the device applied to still another type of cleaner.

The general construction of the portable cleaner illustrated in Fig. 1 is substantially the same as that shown and described in U. S. Letters Patent Re. No. 16,244 to D. B. Replogle, dated December 15, 1925. Such cleaner, which is of the manually portable type, comprises a suction chamber 1, a fan chamber 2 and a tubular handle 3, arranged in the order indicated, such suction chamber and handle being aligned with each other and a suitable valve 4 being interposed therebetween whereby the fan casing may be connected with said suction chamber or handle as desired. Extending downwardly and rearwardly from the fan chamber is a motor 5 whereby the fan 6 in said chamber is rotated to draw in the air and discharge the same through a discharge connection 7.

Ordinarily when the device or apparatus is being used strictly as a cleaner, a dust collecting bag (not shown) will be attached to such fan discharge connection 7 to receive and retain the dust that is drawn in through the nozzle or equivalent implement attached to the lower end of the suction chamber 1 or to the outer end of the handle 3 through the medium of a flexible hose, as will be readily understood.

In utilizing the foregoing apparatus for fumigating purposes, the valve 4 will be properly turned to connect fan chamber 2 with the handle 3 and a suitable discharge nozzle 8 will be connected through the medium of a flexible hose 9 with the fan chamber outlet 7. It will accordingly be seen that, as indicated by the arrows in Fig. 1, the air will be drawn in through the handle to the fan chamber and thence discharged through such hose 9 and nozzle 8.

The device of present interest comprises as its principal element a container 10 for the material that is to be disseminated in the manner above described, such container in the case of a vacuum cleaner of the type shown in Fig. 1 being designed to be detachably mounted on the end of tubular handle 3. The lower end of the container, which is of conical or funnel shape, enters and is fixedly secured to a sleeve 11 that is in turn adapted to be frictionally mounted on such handle end, as best shown in Fig. 2. A transverse partition 12, likewise of conical or funnel form, is located within the container and forms the bottom of the space in which the aforesaid material is placed, an opening 13 in the top of the container, such opening being normally closed by a movable plate 14, being provided for filling such space.

Rotatably journaled as well as reciprocably movable in a bearing 15 in the upper end of the container and in a bracket 16 lying between such partition 12 and the bottom of the container is a tubular spindle 17, the bore of which provides a free passage from the exterior of the container to a point just above the opening 18 in the bottom thereof through which the material is designed to be discharged. Actually such spindle 17 is intended merely to be oscillated in the bearing thus provided incidentally to its reciprocation,

as will be presently described, and such reciprocation serves merely to adjust the position of a fluted conical distributor 20 that is in turn rotatably mounted on said spindle so as to lie within the opening 21 in partition 12. Depending upon the vertical position of the spindle, the distributor will leave clear a larger or smaller annular space between the edge of such opening and its own fluted conical surface. Furthermore, adjustment of the spindle is accomplished by means of a cam 22 that is fixedly secured to its upper end, said cam being provided with a radial handle 23 (see Fig. 6) and co-operating with a fixed cam 24 that is integral with the bearing 15. Each such cam, it will be observed, (see Fig. 7) has two complementary cam faces and furthermore each such face in the case of the fixed cam has a plurality of steps (two as shown) so that by appropriately rotating handle 23, the shaft 17 may be caused to assume a corresponding number of positions longitudinally of its axis. A compression spring 25 is interposed between the lower end of bearing 15 and a stop washer 26 that is fixed to the spindle at an intermediate point within the container, such spring serving normally to pull the spindle downwardly so that the upper cam will remain in engagement with selected faces of the lower cam.

Transversely reciprocably mounted in the side wall of the container 10 at a point below partition 12 is a plunger 30, said plunger being normally pressed outwardly by a spring 31 and a lever 32 being connected with its outer end whereby it may be pressed inwardly by the operator's thumb when grasping the handle 3 of the vacuum cleaner at a point adjacent sleeve 11 by which container 10 is secured to the outer end of said handle, as previously described. The inner end of the plunger 30 is connected by means of a link 33 with a pin 34 that is fixed to and projects downwardly from the lower face of conical distributor 20, such pin being long enough to permit said distributor to be vertically adjusted without causing the disengagement of the lever.

From the foregoing description the operation of the device should be readily understood. When the motor 5 is set running, a current of air will be drawn through handle 3 and then discharged from the fan casing through the nozzle 8. In this condition the lever 32 is actuated to oscillate the distributor 20 with the result that the powdered or granular material in the upper portion of container 10 is gradually fed through the opening 21 in partition 12 and thence discharged through opening 18 into such current of air, by which it is carried along and discharged through nozzle 8, as will be readily understood. Where the material is in finely powdered condition, the space between the distributor and the edge of opening 21 will of course be desirably narrower than where a coarser crystalline material is employed, and it is for this purpose that the vertical adjustment of the tubular shaft 17 is provided. Irrespective of the position of the latter, the distributor remains freely oscillatory under the impulse of lever 32 which is conveniently located adjacent the hand of the operator by which the handle 3 would naturally be grasped, the operator's other hand being free to hold the nozzle 8 and direct the blast of air carrying the fumigating material wherever desired.

As a result of the opening through spindle 17, a part of the current of air that is drawn through handle 3 is drawn through such opening in the form of a jet, which insures the thorough dissemination of the powdered material in the main current to which it is thus supplied. Such jet, furthermore, is in operation all the time to keep the lower chamber of the device clear of crystals or powder, by injecting them into sleeve 11. A screen 11*a* is desirably placed in the open end of said sleeve in order to prevent any such material from escaping and dropping onto the floor. A butterfly valve 11*b* may also be employed at this point to restrict the entrance of air through such sleeve and correspondingly increase the effectiveness of the jet.

Instead of attaching the container 10 on the outer end of handle 3, it could of course be mounted on the discharge connection 7 leading from fan casing 2. In fact such location will be necessary where as in another familiar type of portable vacuum cleaner, illustrated in Fig. 9, the handle 35 is solid and serves merely to manipulate the cleaner, i. e., at no time forms an air conduit. In such case the sleeve 11 is mounted on the outlet or discharge connection 36 and hose 9 carrying nozzle 8 is connected to the other end of such sleeve. Since the container, when located in this manner, does not present the lever 32 conveniently to the hand of the operator, a cord 37, or equivalent means, will be connected with said lever 32 and carried through a ring 38 adjacent the free end of handle 35.

In Fig. 10 is illustrated still another type of vacuum cleaner in which provision exists for attaching the device of present interest directly onto the front of the main casing 40 of the cleaner, where a normally closed air intake opening 41 exists. The hose 9, as before, is attached to the fan discharge 42, and a cord 43 (like cord 37) serves to control the device. The manner of using the device will be obvious.

It will be understood that where the word "portable" is used in the claims herein, reference is had to the ordinary domestic type vacuum cleaner used in largest quantities in dwelling houses although also used in many instances in office buildings; the type that may be moved around over a rug or the like during cleaning operations.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In an apparatus for dusting or dry spraying comminuted insecticide material for demothing furniture and the like, the combination with a domestic type vacuum cleaner including a fan and an air passage leading to and from said fan, of means for feeding said material in solid form into said air passage and into the air stream passing therethrough without obstructing the air flow.

2. In an apparatus for dusting or dry spraying comminuted insecticide material for demothing furniture and the like, the combination with a domestic type vacuum cleaner including a fan and an air passage leading to and from said fan, of readily attachable and detachable means for feeding said material in solid form into said air passage and into the air stream passing therethrough without obstructing the air flow.

3. In an apparatus for dusting or dry spraying comminuted solid insecticide material for demothing furniture and the like, the combination

with a domestic type vacuum cleaner including a high speed fan and an air passage leading to and from said fan, of means for feeding said insecticide material into said air passage ahead of the fan whereby the air stream will draw the material through the fan, and whereby the fan will thoroughly reduce said material to a finely divided state.

4. Apparatus for dusting or dry spraying comminuted insecticide material for demothing furniture and the like, comprising a domestic type vacuum cleaner including a high speed fan and air intake and discharge ducts communicating therewith, and means attached to the air intake duct for feeding comminuted material into the air stream which passes therethrough when the fan is being operated, whereby said material will pass through the fan, and whereby the fan will thoroughly reduce said material to a finely divided state.

5. In an apparatus for dusting or dry spraying insecticide powders, the combination with a differential pressure device, of means detachably connected with said device on the intake side of the fan thereof, providing a concentrated suction chamber communicating therewith, and means for supplying comminuted insecticide material into said concentrated suction chamber.

6. In an apparatus for dusting or dry spraying insecticide powders, the combination with a differential pressure device having a high speed fan, of means detachably connected with said device on the intake side of the fan, providing a concentrated suction chamber communicating therewith, and means for supplying comminuted insecticide material into said concentrated suction chamber.

7. In an apparatus for dusting or dry spraying insecticide powders, the combination with a differential pressure device, of means detachably connected with the intake of said device providing a concentrated suction chamber communicating therewith, and means for supplying comminuted insecticide material into said concentrated suction chamber.

8. In an apparatus for dusting or dry spraying comminuted insecticide material, the combination with a differential pressure device, of an insecticide material containing receptacle, means detachably connecting the receptacle to the suction intake of said device and providing a suction passage from the receptacle to said intake, and means for feeding the insecticide material from said receptacle into said suction passage.

9. In an apparatus for dusting or dry spraying insecticide powders, the combination with a differential pressure device, of means detachably connected with the intake of said device providing a concentrated suction chamber communicating therewith, and means for supplying insecticide powder into said concentrated suction chamber in a continuous uninterrupted stream.

10. In an apparatus for dusting or dry spraying insecticide powders, the combination with a differential pressure device, of an insecticide powder containing receptacle, means detachably connecting the receptacle to the suction intake of said device and providing a suction passage from the receptacle to said intake, and means for automatically feeding powder from said receptacle to said suction passage in a continuous uninterrupted stream.

11. An attachment for a differential pressure device, comprising a hollow casing provided with an opening to register with the intake of said device, means for detachably connecting said casing to said intake, and an insecticide powder containing receptacle detachably connected to said casing.

12. An attachment for a differential pressure device, comprising a hollow casing provided with an opening to register with the intake of said device, means for detachably connecting said casing to said intake, an insecticide powder containing receptacle detachably connected to said casing and arranged to discharge loose solid material thereinto, and means effective by the suction currents in said casing for drawing the material from said receptacle into said casing in a continuous uninterrupted stream.

13. In combination with a differential pressure device, a powder dusting attachment therefor comprising a hollow casing removably connected to the inlet of said device, and providing a suction chamber therein, a receptacle attaching member connected therewith detachably securing an insecticide containing receptacle, and means for establishing suction communication from said receptacle to said casing for continuously withdrawing powder from said receptacle.

14. Apparatus for dusting or dry spraying insecticide powders comprising a differential pressure device, and means detachably connected with said device providing a suction chamber, an insecticide receptacle having an orifice communicating with said chamber, and auxiliary air suction means for supplying comminuted insecticide material through said orifice.

15. In combination with a differential pressure device, having an air passage, means for feeding comminuted insecticide material into said passage, including a receptacle for said material, provided with a bottom having an orifice communicating with said air passage, and an auxiliary air inlet, independent of the inlet to said passage, extending into said receptacle and discharging near said orifice, to maintain a flow of air through the orifice for feeding the material into the passage.

16. In an insecticide duster in combination with an adapter for attachment to a suction intake opening of a differential pressure device; said adapter comprising a casing having an outlet leading to said suction intake opening, an inlet for admitting air to said casing, and an orifice for admitting comminuted insecticide material and the like to said casing; means surrounding said orifice constituting a support for a loose material supply, and air suction means for maintaining a constant supply of material through said orifice.

17. An attachment for a differential pressure device having an air passage, comprising a receptacle having a bottom provided with an orifice to communicate with said passage, a tubular spindle extending into said receptacle and constituting an auxiliary air inlet, discharging near said orifice, and a distributor mounted on the spindle.

18. A device for disseminating comminuted solid volatile material comprising a casing, an annular partition therein dividing the casing into upper and lower chambers, the bottom of the casing having an orifice for communication with a moving air stream, an open ended tubular spindle extending through the top of the casing, through said annular partition and terminating near said orifice, and a distributor member mounted on said spindle and cooperating with the annular partition.

19. A device for disseminating comminuted solid volatile material, comprising a hopper having an apertured bottom wall, a distributor shaft assembly extending through the top wall of the hopper and including a distributor member cooperating with said apertured bottom, said top wall having an eccentric charging opening, and a slide cover plate pivoted on said shaft assembly and rotatable against said top wall to cover or uncover said charging opening.

20. A device for disseminating comminuted solid volatile material comprising a hopper having an opening in its bottom wall, a spindle projecting through the top wall of the hopper, a distributor member mounted on the spindle and coacting with said opening, and relatively rotatable cam means carried by the upper end of the spindle and by the top of the receptacle, respectively, for adjusting the spindle axially when rotated.

FREDERICK RIEBEL, JR.