May 4, 1943. E. F. MARTINET 2,318,088

SUCTION CLEANING APPARATUS

Filed May 15, 1939 3 Sheets-Sheet 1

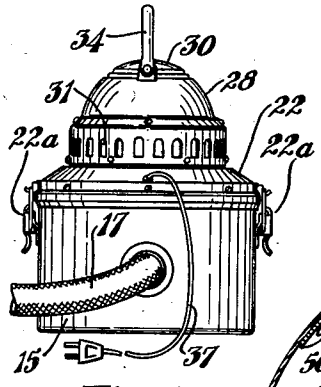


Fig. 1a

Fig. 1

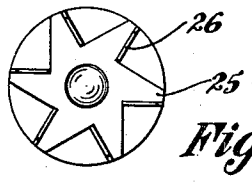


Fig. 13

Inventor

Eugene F. Martinet

By Frease and Bishop

Attorneys

May 4, 1943. E. F. MARTINET 2,318,088

SUCTION CLEANING APPARATUS

Filed May 15, 1939 3 Sheets-Sheet 2

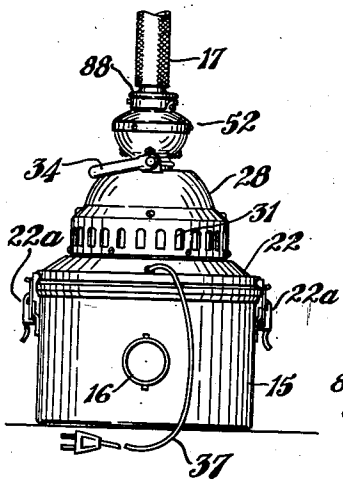


Fig. 2a

Fig. 2

Inventor

Eugene F. Martinet

By Frease and Bishop

Attorneys

May 4, 1943. E. F. MARTINET 2,318,088

SUCTION CLEANING APPARATUS

Filed May 15, 1939 3 Sheets-Sheet 3

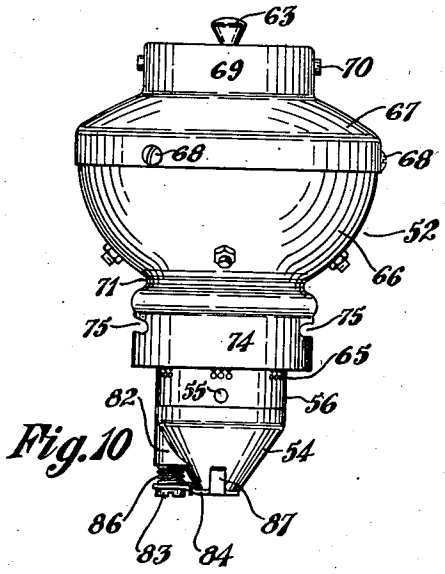


Fig. 10

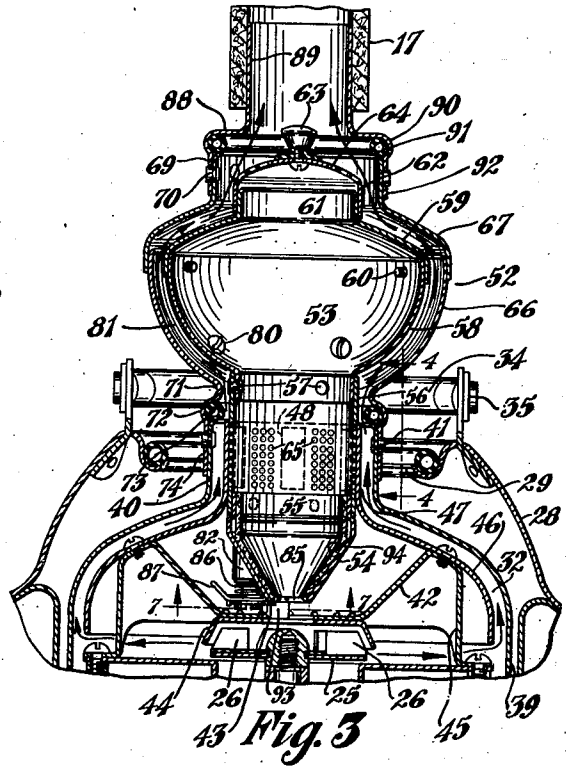


Fig. 3

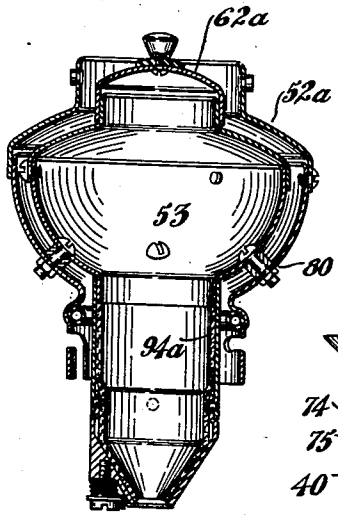


Fig. 12

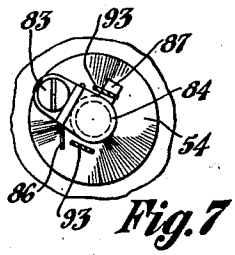


Fig. 7

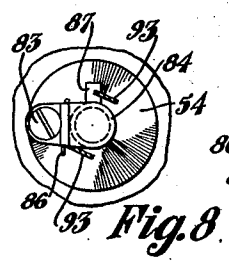


Fig. 8

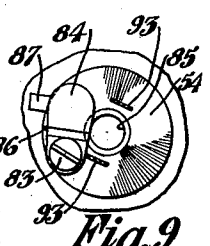


Fig. 9

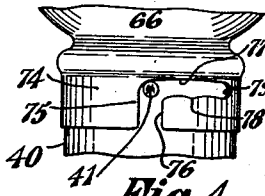


Fig. 4

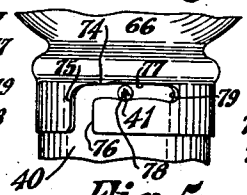


Fig. 5

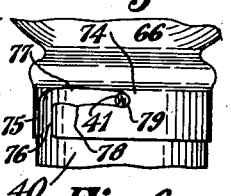


Fig. 6

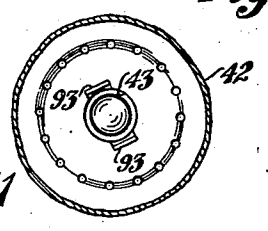


Fig. 11

Inventor

Eugene F. Martinet

By Fraser and Bishop

Attorneys

Patented May 4, 1943

2,318,088

UNITED STATES PATENT OFFICE

2,318,088

SUCTION CLEANING APPARATUS

Eugene F. Martinet, Cleveland, Ohio, assignor to The P. A. Geier Company, Cleveland, Ohio, a corporation of Ohio

Application May 15, 1939, Serial No. 273,636

15 Claims. (Cl. 21—127)

The invention relates to suction cleaners, and more particularly to an attachment for cleaners for storing and distributing paradichlorobenzene crystals or other similar germicides, insecticides, disinfectants or moth control reagents. Moreover, the present invention relates to a combined suction cleaner and crystal storage and distributing construction and arrangement and constitutes an improvement upon the construction shown in my copending application, Serial No. 135,005, filed April 5, 1937.

The control or extermination of moths may be accomplished by discharging a blast of air impregnated with the vapors of or minute particles of paradichlorobenzene crystals into or onto the places where moths are located or may frequent. However, with prior constructions, the heat emanating from the cleaner has caused the crystals to cake in the crystal storage compartment, particularly when the compartment for discharging crystals or crystal vapors into the air stream blown from the cleaner, without removing the dust collector, is permanently or semi-permanently located on and communicates with the exhaust side of a cleaner fan in the type of cleaner having a dust collector preceding the fan.

When the crystals cake in the storage compartment, which may occur when temperatures of from 95° F. to 105° F. are reached therein, the crystals are not only rendered substantially useless, but are difficult to remove.

Moreover, a suction cleaner is not utilized for moth control or moth extermination every time it is used, but only at certain times. However, when it is so used, large quantities of crystals may be distributed, so that a relatively large crystal storage compartment is necessary. On the other hand, in the interest of convenience and economy, the size of a cleaner should not be increased merely to provide a large crystal storage compartment therein.

It is therefore an object of the present invention to provide a detachable crystal storage and distributing attachment for a cleaner, constructed and arranged so that crystal caking due to heating from the cleaner is reduced, minimized or eliminated.

It is a further object of the present invention to provide a detachable crystal storage and distributing attachment for a cleaner which has a large crystal storage capacity without materially increasing the size of the cleaner.

It is also an object of the present invention to provide a suction cleaner construction including a detachable large capacity crystal storage and distributing attachment which may be readily removed to prevent caking of the crystals when the cleaner is normally operated, and which is constructed and arranged to minimize or eliminate crystal caking from the heat of the cleaner when crystals or voltaile crystal vapors are being discharged from the cleaner.

It is likewise an object of the present invention to provide a suction cleaner construction including a pulverizing device communicating with the cleaner air duct on the exhaust side of the cleaner fan, a dust filter in the cleaner air duct on the suction side of the fan, and a detachable large capacity crystal storage and distributing attachment having passages and compartments communicating with the pulverizing device and cleaner air duct whereby a large quantity of crystals may be pulverized by the cleaner and discharged therefrom without caking the crystals due to the heat of the cleaner.

Moreover, it is an object of the present invention to provide a vertical suction cleaner construction having a dust filter, a motor provided with a single or multiple stage fan above the filter, and air duct means leading from the fan, with a pluverizing device above the motor and fan communicating with the air duct means, and with a detachable large capacity crystal storage and distributing attachment having passages and a compartment communicating with the pulverizing device and cleaner air duct and forming therewith a by-passing outlet for the cleaner for the discharge of crystals or volatile crystal vapors.

And finally, it is an object of the present invention to incorporate one or more of the aforesaid desideratum in suction cleaner construction in a simple, inexpensive, convenient and readily operated manner.

These and other objects may be obtained by the improvements, elements, combinations, attachments, arrangements and constructions comprising the present invention, preferred embodiments of which are illustrated in the accompanying drawings, and are hereinafter described and claimed.

The invention may be stated in general terms as including in suction cleaner construction an attachment having walls forming a crystal reagent reservoir or storage bin or compartment, walls spaced from and around said compartment walls forming therewith a passageway, a valve for said compartment, there preferably being a

series of openings formed in one of the compartment walls, adjustable securing means for said attachment, and preferably an asbestos and tin foil lining for a portion of the inner surface of the compartment.

The invention furthermore may be stated in general terms as including a suction cleaner attachment described in the preceding paragraph combined with a suction cleaner preferably having a power driven pulverizing device communicating with the cleaner air duct on the exhaust side of the cleaner fan, a valve operating device, preferably an opening covering and uncovering wall, and securing means, whereby upon engagement of the cleaner and attachment securing means the valve operating device engages the attachment valve to open the same so that crystals are discharged from the compartment to the pulverizing device, and whereby upon engagement of the cleaner and attachment securing means the attachment passage completes a by-pass from the cleaner air duct for the discharge of a blast of pulverized crystal laden air through the attachment from the cleaner fan and from the cleaner pulverizing device. If the attachment and cleaner are provided with openings as preferred, the securing means is selectively arranged, in another position, to permit the valve to remain closed and to discharge a portion of the air blast through the openings and through and around the crystals in the compartment to charge the air blast blown from the cleaner and the attachment passageway with volatile vapors of the crystals.

In the drawings,

Figure 1 is a vertical section through an improved vertical type cleaner construction having parts for cooperative connection with the improved attachment, the cleaner being shown in normal arrangement for cleaning;

Fig. 1*a* is a smaller side elevation of the improved cleaner construction shown in Fig. 1;

Fig. 2 is a view similar to Fig. 1, but showing the improved attachment connected with the cleaner in one position of adjustment;

Fig. 2*a* is a view similar to Fig. 1*a*, illustrating the parts shown in Fig. 2;

Fig. 3 is a view similar to a portion of Fig. 2, but showing the attachment in another position of adjustment;

Fig. 4 is a view looking in the direction of the arrows 4—4, Fig. 3, showing the securing means as the attachment is being connected to cleaner;

Fig. 5 is a view similar to Fig. 4 showing the adjusted position of the securing means for the position of the parts shown in Fig. 2;

Fig. 6 is a view similar to Figs. 4 and 5 showing the adjusted position of the securing means in Fig. 3;

Figs. 7, 8 and 9 are views looking in the direction of the arrows 7—7, Fig. 3 and correspond respectively to the position of the parts indicated in Figs. 4, 5 and 6;

Fig. 10 is a side elevation of the improved attachment shown in Figs. 2 to 9;

Fig. 11 is a section taken on line 11—11, Fig. 1;

Fig. 12 is a vertical section through a modified form of attachment; and

Fig. 13 is a section on line 13—13, Fig. 1.

Similar numerals refer to corresponding parts throughout the various figures of the drawings.

The suction cleaning apparatus shown in the drawings is a "vertical" type suction cleaner and as illustrated in Figs. 1, 1*a*, 2 and 2*a*, includes a pan-like base or receptacle 15 having an inlet opening connector 16 with which a flexible hose 17 may be detachably connected at 18; and the hose may be provided with a suitable nozzle or other tool for cleaning any desired surface or article in the usual manner.

Preferably a conical paper or fabric dust filter 19 is supported against collapse on the truncated, foraminous, conical support 20, within receptacle 15, for separating dust and dirt laden air drawn into the cleaner and depositing the dust and dirt in receptacle 15. In the drawings, the openings in foraminous conical support 20 are only shown in section and diagrammatically in elevation, the preferred limits of the same being indicated in dot-dash lines.

The motor 21 is mounted on the cover member 22, which cover member 22 is supported by and clamped to receptacle 15 by clamps 22*a*. The motor 21 preferably extends downwardly from cover member 22 within the recess of truncated conical member 20, as shown; and motor shaft 23 has mounted thereon, centrifugal fans 24, and at the upper end thereof a crystal grinding or pulverizing device, which preferably consists of a rotor 25 having a series of blades 26.

The two centrifugal fans 24, and fan housing and deflecting walls generally indicated at 27 form a two stage suction or exhaust device for inducting a flow of air into and discharging a blast of air out of the cleaner in the general path shown by the arrows on Fig. 1. The cover member 22 also supports a dome shaped deflector shell generally indicated at 28, which encloses the fan housing 27 and is provided with an upper central outlet opening 29 normally closed by a removable closure member 30, as shown in Fig. 1.

The deflector shell 28 also has formed therein side outlet openings 31 and when the parts of the suction cleaner are in the relative positions shown in Fig. 1, after the blast of air is discharged by fans 24 from fan housing 27, it passes, as shown by the arrows, through passage 32 and is deflected by the interior surface of closure 30 and deflector shell 28 downwardly about the exterior of the fan housing 27 and finally laterally outwardly through the side outlet openings 31, which may be interiorly covered with a fine mesh wire screen 33, as shown.

A carrying handle 34 may be pivotally mounted at 35 on deflector shell 28, and a handle 36 may also be mounted on closure 30 in any suitable manner. An electrical conductor 37 may be connected with any suitable source of power and extends through cover member 22 to motor 21. A preferably foot operated or push button control switch 38 for the cleaner motor 21 may be mounted on cover member 22.

The parts thus far described, with the exception of the pulverizing device 25—26 and certain portions of the cleaner air duct only form a preferred environment for the present improvements presently to be described more in detail. While special advantages accrue when the present improvements are incorporated in a vertical type suction cleaner, it is understood that the invention is not limited to the use of the improvements in connection with a vertical type cleaner, because the improvements may also be used in tank or floor type cleaner constructions.

The dust filter and motor and fan mounting construction shown and described but not claimed herein is claimed in my copending application filed of even date herewith, Serial No. 273,637; the fan construction shown but not claimed herein, is the subject matter of a patent application of

Elmer J. Kasper, Serial No. 261,476, filed March 13, 1939; and the air flow arrangement shown but not claimed herein is claimed in my copending application Serial No. 288,167 filed August 3, 1939.

Fan housing 27 may support a generally tubular, inverted, funnel-shaped wall 39 terminating in a restricted neck 40 having pins 41 projecting therefrom; and fan housing 27 also supports a trough member 42, having a central opening 43, and a shield member 44, extending downward around pulverizing device 25—26. The trough member 42 is supported by spider-like legs 45 on fan housing 27.

Trough member 42 in turn has mounted thereon a generally tubular, inverted, funnel-shaped member 46 terminating in a restricted neck 47 having spaced preferably rectangular apertures 48 therein. The walls of members 46 and 39 form the passage 32 previously described.

Pins 41 provide for the telescopic bayonet joint attachment of member 49 provided on the inside of closure member 30 whereby closure member 30 may be removably seated in air-tight relation with gasket 50 carried in annular socket 51 surrounding opening 29.

The improved crystal storage and distributing attachment generally indicated at 52 in Figs. 2, 3 and 10, includes an inner reservoir or storage bin or compartment 53 formed by conical nose member 54 secured by rivet or other means 55 to tubular member 56. Member 56 is secured by rivet or other means 57 with the neck of funnel-shaped member 58 having a top member 59 secured thereto preferably by screws 60 and terminating in a reduced neck 61. Neck 61 is closed by a cup-shaped cap member 62 having a handle 63 and preferably formed with apertures 64 for a purpose to be later described.

Tubular member 56 may also be provided if desired with a spaced series of apertures 65 for a purpose to be later described.

Attachment 52 also has an outer wall formed by funnel-shaped member 66 having a top member 67 preferably secured thereto by screws 68 and terminating in a reduced neck 69 provided with pins 70. The lower end of member 66 is provided with an inturned rib 71 forming a rounded socket 72 for the reception of the internal gasket 73. The lower end of member 66 terminates in a tubular portion 74 having elongated bayonet joint slots generally indicated at 75, each of which includes an entry portion 76, and an adjusting portion 77 having an intermediate stop 78 and an end stop 79.

The outer wall formed by members 66 and 67 is secured to the inner wall formed by members 54, 56, 58 and 59 by any suitable means as by screw and spacer sleeve means 80 so as to form a passageway 81 around compartment 53.

A boss 82 is provided eccentrically of the lower end of conical member 54 to receive a shouldered screw 83 on which valve plate 84 is pivotally mounted. Valve plate 84 is normally in the position shown in Figs. 2, 7 and 10 where it is held by spring means 85 and stop member 87 on valve member 84, which stop member 87 engages the outer wall of member 54. In this position, valve 84 closes the bottom opening 85 of member 54.

Members 16, 40 and 69 all have the same outer diameter and the bayonet joint locking pins 18, 41 and 70 are similarly located so that each of members 16, 40 and 69 may selectively receive hose coupling member 88, which has a reduced shank 89 to which hose 17 may be connected. Member 88 also has a gasket receiving recess 90 for internal gasket 91 and a usual bayonet slotted portion 92.

Thus, connector 88 and hose 17 may be connected to member 16 when the suction cleaner is being normally operated as shown in Figs. 1 and 1a. Upon removal of cover 30, connector 88 and hose 17 may be connected with member 40 if it is desired to use the cleaner as a straight blower with some blowing tool or spray attachment on the blower end of flexible hose 17.

When the improved cleaner is arranged with the improved crystal storage and distributing attachment 52, cover 30 is removed, attachment inner walls formed by members 54 and 56 are telescoped within neck 47 of member 46, and tubular portion 74 of the attachment telescopes over reduced neck 40 by entering pins 41 in the entry portion 76 of modified bayonet slot 75, as best shown in Fig. 4. The connector 88 with hose 17 may then be connected to the tubular neck 69 of attachment 52, as best shown in Fig. 2.

Referring more particularly to Figs. 3 to 9 inclusive, hopper member 42 is provided with one or more upwardly extending ears or tangs 93 (Figs. 3, 7, 8, 9 and 11) which are located on one side of or straddle valve plate 84 (Fig. 7) so that one of the ears 93 will engage plate 84 and rotate it to an open position uncovering opening 85 when attachment 52 is rotated on neck 40 to bring the end stop portions 79 of bayonet locking slots into engagement with pins 41 (Figs. 3, 6 and 9).

Thus, a connection of attachment 52 to the cleaner, and movement thereof to the limit of movement of the bayonet joint connection 41—75 automatically operates valve 84 to uncover opening 85 at the bottom of crystal storage compartment 53.

There is another adjusted position of the attachment 52, as shown in Figs. 2, 5 and 8, wherein the pins 41 are in engagement with the middle or intermediate stop recesses 78 of bayonet locking slots 75 (Fig. 5); and in this position, the ears 93 have not moved valve plate 84 out of a position closing opening 85. However, in this position, the spaced series of apertures 65 in attachment member 56 are aligned with the spaced windows or openings 48 in neck 47, so that air or gas can pass in and out through apertures 65 and openings 48. In all other positions of attachment 52, the wall of neck 47 closes apertures 65, as shown in Fig. 3, for a purpose to be later described.

The inner surface of member 54 may be and preferably is lined with a layer of asbestos 94 preferably provided with an inner coating of tin foil or the like. The asbestos keeps heat emanating from the cleaner motor from being transmitted to the contents of compartment 53 and the tin foil surface on the asbestos not only reflects any heat, but also provides a slippery inner surface for member 54.

In using the attachment 52 for moth extermination or control, compartment 53 is filled with paradichlorobenzene crystals and attachment 52 and hose 17 are connected with each other and to the cleaner as shown in Figs. 2 and 2a. The cleaner motor is started by operation of switch 38 and attachment 52 is then turned to "crystal grinding" position at the limit of movement of the bayonet locking joint 41—75, as shown in Figs. 3, 6 and 9, whereupon the crystals drop from the storage compartment 53 out through opening 85 and through opening 43 in hopper member 42 onto the rotating pul-

verizing rotor and blades 25—26, where they are ground by impact with the blades to a finely divided state.

The clearance between shield member 44 and pulverizing device rotor and blades 25—26 determines the size of particles to which the crystals are ground; and this clearance is ordinarily established by the manufacturer in course of assembly, but may be changed by shimming up rotor 25—26 when mounting the same on shaft 23, or by shimming up the spider portion 45 of hopper member 42 when mounting the same on fan housing 27.

Thereafter, the ground crystal particles are discharged radially outwardly from rotor 25 as indicated by the arrows in Fig. 3, and into the air blast issuing from the fan chamber, then through passage 32 and into passage 81 and then outward through connector 88 and hose 17 to any nozzle or other attachment on the end of the hose for being blown onto or into a region or place where it is desired to kill or control moths.

It is essential, if apertures 65 have been provided, that these be covered by portions of the neck 47 when the attachment 52 is in crystal grinding position so that the small ground crystal particles do not stop up apertures 65 as the particles entrained in the air blast pass through passages 32 and 81 and particularly past the restriction in the passage formed by gasket 73 and inturned rib 71.

A blast of air containing pulverized paradichlorobenzene crystals is used principally for killing moths by contact with the crystals or continued presence of the crystal particles until they evaporate in the places where moths frequent or are present or to drive moths out of such places.

Sometimes, for moth control purposes, when it is desired to discourage moths from frequenting or inhabiting certain places, the places or areas may be subjected to a blast of air containing vapors from the crystals and this may be accomplished by adjusting the attachment 52 to the intermediate or "vapor" position shown in Figs. 2, 5 and 8. In this position, no crystals are discharged from the attachment to be pulverized or ground, but some of the air blast from the fan in passing along passage 32 enters window openings 48 and aligned apertures 65 and then passes through the crystal containing compartment 53 to there pick up volatile vapors of the crystals which are discharged through openings 64 in cap 62 and thence into the air blast passing out through hose 17.

The adaptation of the attachment for discharging crystal vapors is not desired or used in all cases, so that apertures 65 may be eliminated. Fig. 12 shows an attachment 52a which does not have the crystal vapor apertures, but is otherwise the same as attachment 52, excepting that an imperforate cover 62a is preferably used and the asbestos inner lining 94a may extend upward within the compartment 53 further than in attachment 52, as shown.

Moreover, while paradichlorobenzene crystals is the usual reagent used for moth extermination and control, other crystal or pulverulent germicide, insecticide, or disinfectant reagents may be discharged in finely divided form into the air blast blown from a cleaner by depositing the same into the storage and distributing attachment and operating the cleaner as described.

When the crystal blowing operation has been completed, attachment 52 may be readily and quickly detached from the cleaner and stored in a cool place so that any crystals remaining in the storage compartment do not cake therein. The attachment can, however, be vigorously shaken just prior to connecting it to the cleaner so as to shake up and separate any partial caking of crystals that may have occurred therein.

Caking of the crystals when the machine is in operation is substantially prevented or eliminated, more particularly because a large portion of the attachment is exposed to the outside air, and because there is a continuous current of fast moving air passing around the storage compartment 53 when the attachment is being used. Moreover, when the attachment is being used to discharge crystals to the pulverizing device, there is a flow of crystals from the attachment automatically upon movement of the attachment to crystal grinding position, which prevents caking.

Likewise, the inner lining of asbestos and tin foil further reduces any heating effect on the crystals which tends to cake them.

The large capacity of attachment 52 provides for the storage and distribution of a large quantity of crystals without increasing the size of the cleaner to any extent.

It is evident that the use of the improved attachment in connection with a vertical type suction cleaner provides many advantages, but the improved attachment can also be used on a horizontal or floor type cleaner for discharging crystals to a separate pulverizing rotor 25—26 on the exhaust side of the fan of such cleaner, or for discharging crystals on the suction side of the usual single stage fan used on floor type cleaners.

The improved attachment has been described as preferably having an asbestos and tin foil lining in the lower portion of compartment 53. This construction is desirable, but the asbestos and tin foil lining is not absolutely necessary for carrying out the purposes of the present invention, as it is only one of the aids in preventing caking and promoting free flow of crystals, as previously described.

The purpose of gaskets 50, 73 and 91 is primarily to provide an air-tight connection for the parts abutting the same; but these gaskets also serve another purpose of holding the associated bayonet joints tight when a connection is made.

Referring more particularly to Figs. 1 and 2, the passage for the flow of air through the cleaner in normal operation shown by the arrows in Fig. 1, doubles back upon itself by the deflection of cover 30 and wall 28. However, when attachment 52 is connected to the cleaner as shown in Fig. 2, the passage or duct through the attachment, by-passes or cuts off a portion of the normal cleaner air flow passage, to direct all of the air flow from the cleaner outwardly through the attachment.

This by-passing arrangement resulting from the cooperative location of the attachment and cleaner passages when the attachment is connected to the cleaner, not only permits the blower hose to be connected to the cleaner, but also enables a restriction to be placed in the passage as at 71, which speeds up the velocity of the air flow through the passage to assist in entraining all of the ground particles distributed into the air stream from the pulverizing device.

Accordingly, the present invention provides a crystal storage and distributing attachment for

suction cleaners, which may be removably connected to a cleaner so that it may be kept in a cool place except when used for crystal distribution, which is constructed and arranged to reduce, minimize or eliminate crystal caking, which has a large crystal containing capacity for distributing large quantities of crystals without increasing the size of the cleaner, and which may be used in connection with various types of cleaners, but which has special advantages in connection with a vertical type suction cleaner.

Moreover, the present invention provides a combined suction cleaner and crystal storage and distributing attachment construction, which minimizes or eliminates crystal caking when in use, which is associated with a pulverizing device for automatically discharging crystals to the pulverizing device when the crystal storage and distributing means is moved to crystal grinding position, and which provides a by-passing outlet for a cleaner for the discharge of crystals or volatile crystal vapors when desired.

The embodiments of the present improvements illustrated and described herein are by way of example and the scope of the present invention is not limited to the same or to the particular details thereof, but is commensurate with any and all improvement subject matter contained herein, which may at any time properly under the United States patent laws be set forth in claims hereof or originating herein, the elements of any of such claims being intended to include their reasonable mechanical equivalents obvious to those skilled in the art.

I claim:

1. An attachment for a suction cleaner including walls forming a crystal reagent compartment terminating in a restricted nose forming a crystal discharging opening, walls spaced from said compartment walls forming therewith a passageway around said compartment, valve means for said opening, and a heat repellant lining on the inner surface of the compartment walls adjacent said opening.

2. An attachment for a suction cleaner including inner funnel-shaped annular walls forming a crystal reagent compartment having a truncated conical nose provided with an outlet opening, outer funnel-shaped annular walls spaced from said inner walls and forming therewith a passageway surrounding said compartment, and valve means for said opening including a spring pressed valve plate pivotally mounted exteriorly on said nose having a stop finger engaging said nose wall to normally hold the valve plate in a position closing said opening.

3. An attachment for a suction cleaner including walls forming a crystal reagent compartment provided with a conical nose forming an outlet opening, walls spaced from said compartment walls forming therewith an annular passageway around said compartment, valve means on said nose for said opening, and said compartment walls being provided with a series of apertures communicating between said compartment and passageway.

4. An attachment for a suction cleaner including walls forming a crystal reagent compartment terminating in a restricted nose forming a crystal discharging opening, walls spaced from said compartment walls forming therewith a passageway around said compartment, valve means for said opening, said compartment walls being provided with a series of apertures communicating between said compartment and passageway, and a heat repellant lining on the inner surface of the compartment walls between said opening and apertures.

5. An attachment for a suction cleaner including walls forming a crystal reagent compartment provided with a conical nose forming an outlet opening, walls spaced from said compartment walls forming therewith an annular passageway around said compartment, valve means on said nose for said opening, said compartment walls being provided with a series of apertures communicating between said compartment and passageway, and one of said walls being provided with bayonet joint slots having entry portions, an intermediate notch and an end stop notch.

6. In combination with a suction cleaner having walls forming an annular air duct, a crystal storage and distributing attachment including inner annular walls forming a crystal reagent compartment terminating in a restricted nose forming a crystal discharging opening, outer annular walls spaced from said inner walls and forming therewith an annular passageway surrounding said compartment, valve means for said opening, and means on the cleaner and attachment for detachably connecting the attachment to the cleaner with the opening communicating with the duct and with the annular duct and annular passageway in alignment whereby air passing from said annular duct is discharged through said annular passageway.

7. In combination with a suction cleaner having walls forming an air duct, a crystal storage and distributing attachment including funnel-shaped walls forming a crystal reagent compartment having a reduced nose provided with an outlet opening, walls spaced from said funnel-shaped walls forming therewith a passageway around said compartment, means detachably connecting the attachment to the cleaner with the opening communicating with the duct, valve means for said opening having a portion projecting from said nose, and means on the cleaner engageable with said projecting portion for operating said valve means automatically to uncover said opening upon connecting the attachment to the cleaner.

8. In combination with a suction cleaner having walls forming an air duct, a crystal storage and distributing attachment having spaced walls forming a crystal reagent compartment and a passageway around the compartment, the compartment walls being provided with an outlet opening, valve means for said opening mounted on the compartment walls exteriorly thereof, means on the cleaner and attachment for detachably connecting the attachment to the cleaner with the opening and passageway communicating with the duct, and projections on the cleaner engageable with the valve means for operating said valve means automatically to uncover said opening upon connecting the attachment to the cleaner.

9. In combination with a suction cleaner having a bladed rotor and walls forming an annular air duct leading from the rotor, a crystal storage and distributing attachment having spaced walls forming a crystal reagent compartment and an annular passageway around the compartment, the compartment walls being provided with an outlet opening, valve means for said opening, means detachably connecting the attachment to the cleaner with the opening communicating with said bladed rotor and with the annular passageway communicting with the annular duct,

and means on the cleaner for operating said valve means to uncover said opening upon connecting the attachment to the cleaner.

10. In combination with a suction cleaner having a power driven fan and an air duct leading from the fan, and having a dust filter on the suction side of said fan and power driven pulverizing means communicating with said duct, a crystal storage and distributing attachment having spaced walls forming a crystal reagent compartment and a passageway around the compartment, the compartment walls being provided with an outlet opening communicating with the pulverizing means, valve means for said opening, means detachably connecting the attachment to the cleaner with the passageway communicating with the duct, and means for automatically operating said valve means upon connecting the attachment to the cleaner.

11. In combination with a suction cleaner having a power driven fan and an annular air duct leading from the fan, and having a dust filter on the suction side of said fan and power driven pulverizing means communicating with said duct, a crystal storage and distributing attachment having inner funnel-shaped walls forming a crystal reagent compartment provided with an outlet opening communicating with the pulverizing means, walls spaced from said funnel-shaped walls forming therewith an annular passageway around said compartment and communicating with said annular duct, valve means for said opening, means for detachably connecting the attachment to the cleaner, and means for automatically operating said valve means upon connecting the attachment to the cleaner.

12. In combination with a suction cleaner having a power driven fan and an air duct, and having a dust filter on the suction side of said fan and power driven pulverizing means communicating with said duct, a crystal storage and distributing attachment having spaced walls forming a crystal reagent compartment and a passageway around the compartment, the compartment walls being provided with an outlet opening communicating with the pulverizing means, a heat repellent lining on the inner surface of the compartment walls adjacent said opening, valve means for said opening, means detachably connecting the attachment to the cleaner, and means for automatically operating said valve means upon connecting the attachment to the cleaner.

13. In combination with a suction cleaner having a power driven fan and an annular air duct leading from the fan, and having a dust filter on the suction side of said fan and power driven pulverizing means communicating with said duct, a crystal storage and distributing attachment having spaced walls forming a crystal reagent compartment and an annular passageway around the compartment, the compartment walls being provided with an outlet opening communicating with the pulverizing means, valve means for said opening, means for automatically operating said valve means upon connecting the attachment to the cleaner, and means detachably connecting one of said passageway forming walls to the cleaner to align said annular duct and annular passageway and to by-pass the air flowing through said air duct through said passageway.

14. In combination with a suction cleaner having a power driven fan and walls forming an air duct leading from the fan and provided with window openings, the cleaner having a dust filter on the suction side of said fan and power driven pulverizing means communicating with said duct, a crystal storage and distributing attachment having spaced inner and outer walls, the inner walls forming a crystal reagent compartment, and the inner and outer walls forming a passageway around the compartment, the compartment walls being provided with an outlet opening communicating with the pulverizing means and with a series of apertures, said apertured compartment walls being adapted to be assembled in telescoped relation with the duct walls provided with said window openings, valve means for said opening, and means for detachably connecting the attachment to the cleaner; said last mentioned means being operable to either of two positions, one of which automatically operates said valve means to uncover said opening, and the other of which locates said windows in uncovering relation with respect to said apertures.

15. In suction cleaner construction, walls forming a receptacle provided with an inlet, a dust filter in said receptacle, a power driven fan supported by said receptacle above the filter, walls forming a compartment around said fan and an air duct leading upwardly therefrom and thence outwardly and downwardly to a discharge outlet, one of said walls including a tubular neck and another of said walls including a tubular neck provided with windows within and spaced from said first mentioned tubular neck, power driven pulverizing means above said fan, walls forming a shield around said pulverizing means, hopper means above the shield provided with an opening communicating with the pulverizing means, and a detachable crystal storage and distributing device having spaced walls forming a crystal reagent compartment and a passageway around the compartment, the compartment walls being provided with an outlet opening located above said hopper opening for communication with the pulverizing means, valve means for said outlet opening, means detachably connecting one of said device walls with said first mentioned tubular neck, said compartment walls being telescoped within said second mentioned tubular neck, said compartment walls being provided with a series of apertures; and said detachable connecting means being operable to either of two positions, one of which automatically operates said valve means to uncover said outlet opening, and the other of which locates said windows in uncovering relation with respect to said apertures.

EUGENE F. MARTINET.