April 8, 1969 S. E. ERBOR 3,437,424

SUCTION CLEANER NOZZLE CONSTRUCTION

Filed Nov. 26, 1965 Sheet 1 of 2

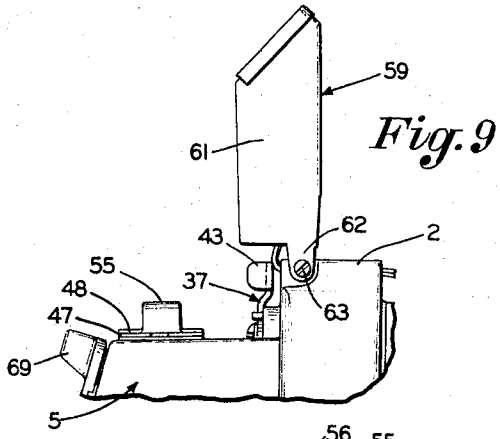


Fig. 9

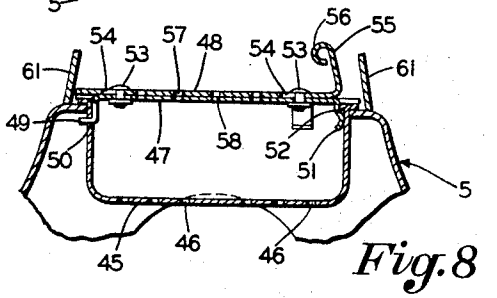


Fig. 8

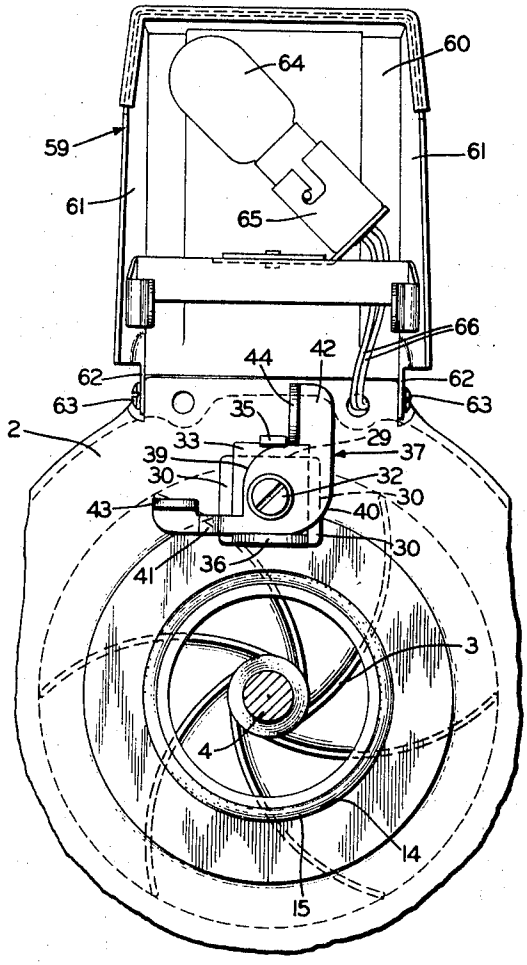


Fig. 7

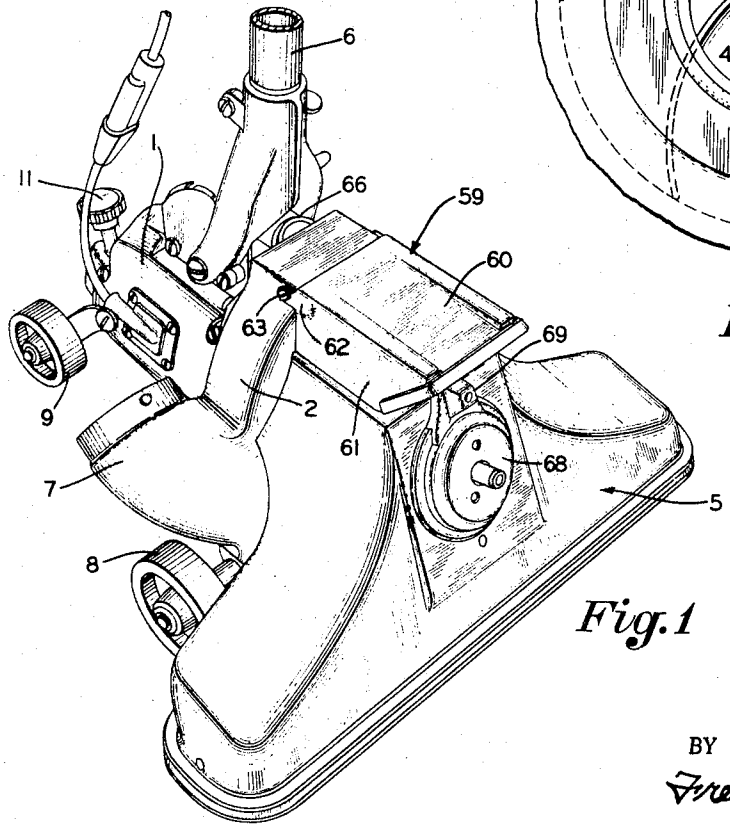


Fig. 1

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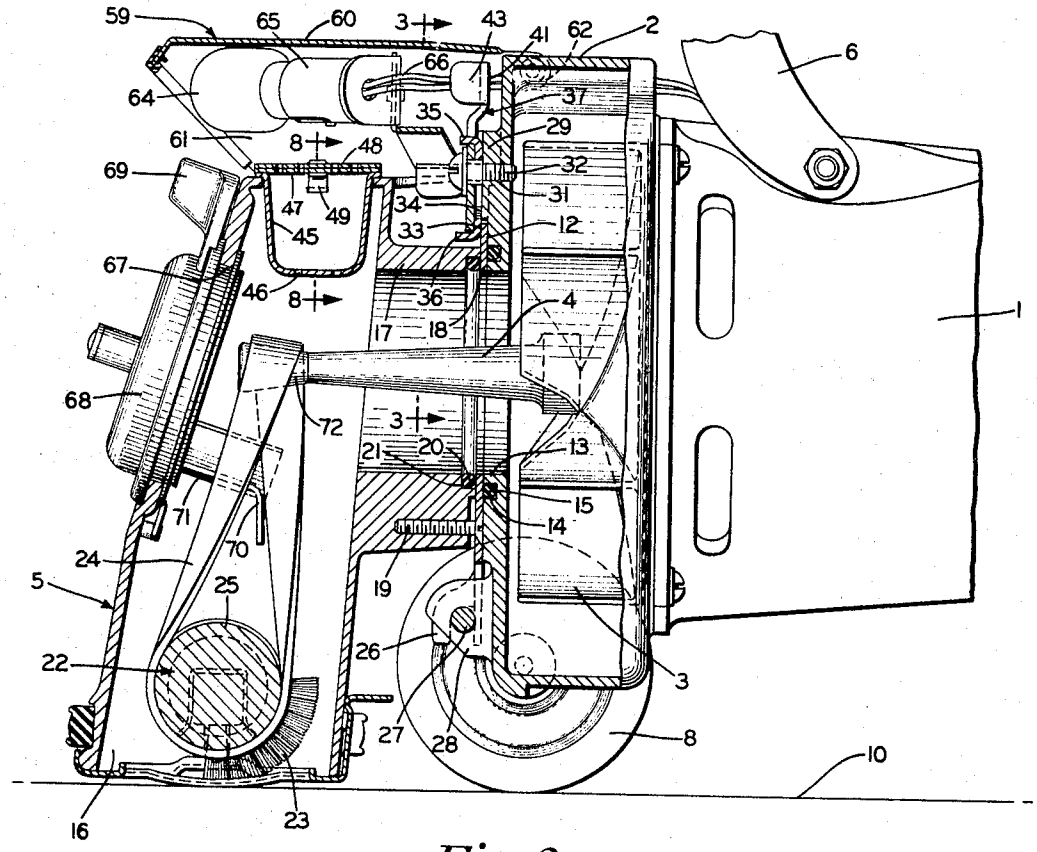


Fig. 2

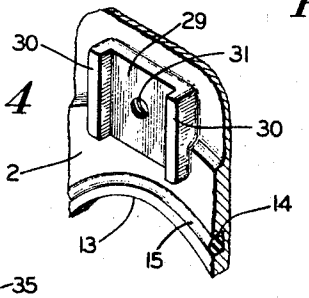


Fig. 4

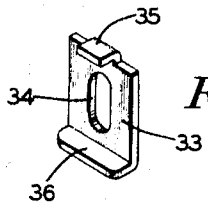


Fig. 5

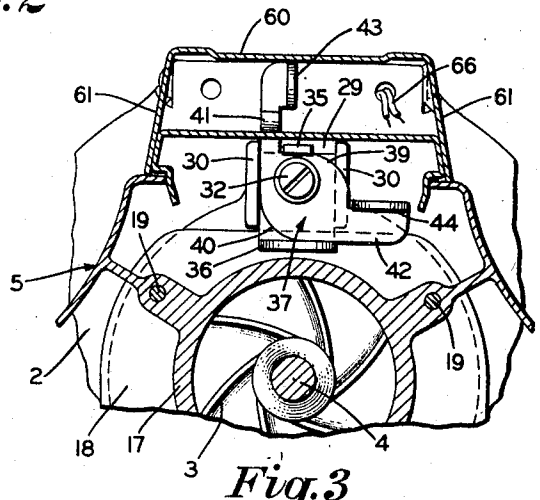


Fig. 3

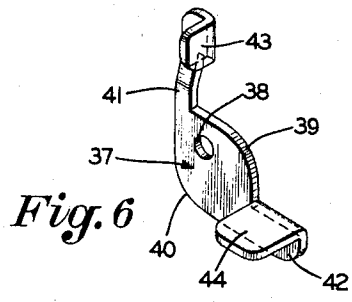


Fig. 6

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SUCTION CLEANER NOZZLE CONSTRUCTION

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Int. Cl. A61l 9/02; A47l 7/04
U.S. Cl. 21—127 4 Claims

ABSTRACT OF THE DISCLOSURE

A suction cleaner having a fan housing with an inlet and a suction nozzle having an entrance mouth at its lower end and a passage therefrom to the fan housing inlet. A crystal container is positioned entirely within said passage in the upper portion of the nozzle and has perforations in its lower side providing communication with said passage.

Valve means at the top of the crystal container provides communication with room atmosphere. A pivotally mounted lamp is positioned close to said valve means at the top of the crystal container when the lamp is in cleaner operating position, for heating and volatilizing the crystals in the container.

The invention relates to portable suction cleaners including a removable nozzle, and more particularly to a pivotally mounted lamp housing in combination with a crystal valve, a novel latch construction for attaching the nozzle, and an O-ring seal arrangement.

Suction cleaners have previously been provided with removable nozzles, movable lamp housings, and with crystal containers, but not to my knowledge with a pivotally mounted lamp located close to the crystal valve to heat the crystals, when the lamp is in cleaner operating position. Nor have suction cleaners been provided with the particular latch construction, hereinafter disclosed, for attaching the nozzle to the fan casing.

It is also not known that suction cleaners have been previously provided including the combination of the crystal valve and the particular latch, both enclosed by a pivoted lamp housing.

Furthermore, it is not known that the hereinafter described O-ring seal arrangement has ever been used upon a suction cleaner.

It is, therefore, an object of the present invention to provide a portable suction cleaner with a removable nozzle having a crystal container in the nozzle and a pivotally mounted lamp located close to the crystal container, to heat the crystals, when the lamp is in cleaner operating position.

Another object of the invention is to provide such a suction cleaner in which a valve adjacent a crystal heating lamp is provided upon the top of the crystal container.

A further object of the invention is to provide a suction cleaner of the character referred to, in which a novel latch construction is provided for attaching the removable nozzle to the fan housing of the suction cleaner.

A still further object of the invention is to provide a suction cleaner of this type, in which the latch construction includes a pivotally mounted cam member for operating a reciprocally slidable latch member.

It is likewise an object of the present invention to provide such a suction cleaner, in which the crystal valve and the latch means are both enclosed by the pivoted lamp housing.

And finally, it is an object of the invention to provide a portable suction cleaner of the character referred to with a removable nozzle having a novel O-ring seal arrangement.

These and other objects, apparent from the drawings and following description, may be attained, the above described difficulties overcome and the advantages and results obtained, by the apparatus, construction, arrangements and combinations, subcombinations and parts which comprise the present invention, a preferred embodiment of which, illustrative of the best mode in which applicant has contemplated applying the principle, being set forth in detail in the following description and illustrated in the accompanying drawings.

In general terms the invention may be briefly described as a portable suction cleaner including a motor and fan housing located upon a horizontal axis, and mounted upon a carriage for movement to and fro upon a floor or other horizontal objective surface.

The fan housing has a vertical front wall provided with a central inlet opening, through which the fan shaft projects forwardly, the forward end portion thereof being formed to provide a belt pulley. A removable nozzle is provided with a horizontal, rearwardly disposed tubular portion having an attaching plate thereon for contact with the vertical front wall of the fan housing.

The removable nozzle also includes a downwardly directed lateral nozzle portion in which is located a rotatable brush upon a shaft located at right angles to the axis of the fan shaft.

As in usual practice, the brush shaft is driven by means of a belt, which is twisted to provide an upper loop engaging the pulley portion of the fan shaft and a lower loop which extends around the brush shaft.

Means upon the lower end of the attaching plate of the nozzle engages mating means upon the fan housing, and latch means upon the fan housing engages the upper edge of the attaching plate for detachably connecting the nozzle to the fan housing. The latch means comprises a reciprocally sliding latch member operated by a rotatable cam member.

A novel O-ring seal arrangement is provided comprising an O-ring located in an annular groove in the end of the horizontal tubular portion of the nozzle and contacting and compressed by the adjacent surface of the attaching plate, and another O-ring located in a groove in the vertical front wall of the fan housing and contacting and compressed by the adjacent surface of the attaching plate.

There is a crystal container formed in the upper portion of the nozzle having perforations providing communication with the interior of the nozzle. A valve is provided at the top of the crystal container for opening or closing the same to the room atmosphere.

A lamp housing is pivotally mounted upon the front of the fan housing and adapted to enclose both the latch and the crystal valve, and carries a lamp bulb which is located close to the crystal valve when the lamp is in cleaner operating position, so as to heat the crystals and help to vaporize them.

The nozzle is shown as provided with a belt lifter comprising an adjustable belt-engaging member for supporting the upper loop of the belt, clear of the fan shaft, for detaching the nozzle from the fan housing or attaching it thereto. However, the above mentioned features of the invention may be accomplished with or without this belt lifter.

Reference is now made to the accompanying drawings, in which;

FIG. 1 is a front perspective view of a suction cleaner showing the new nozzle construction;

FIG. 2 is an enlarged fragmentary, side elevational sectional view;

FIG. 3 is a fragmentary sectional view, on the line 3—3, FIG. 2;

FIG. 4 is a fragmentary perspective view of the guide,

on the front wall of the fan housing, for the latch for detachably connecting the nozzle to the fan housing;

FIG. 5 is a detached perspective view of the sliding latch member;

FIG. 6 is a detached perspective view of the rotatable cam member which operates the latch;

FIG. 7 is a fragmentary front elevation of the lamp housing with the nozzle removed, showing the latch in unlocked position and showing the pivoted lamp housing in raised position;

FIG. 8 is a sectional view through the crystal container and valve, taken on the line 8—8, FIG. 2; and

FIG. 9 is a fragmentary side elevation, on a smaller scale, of the upper portion of the fan housing and nozzle, showing the pivoted lamp housing in raised position.

Referring now more particularly to the embodiment of the invention illustrated, in which similar numerals refer to similar parts throughout, an electrically operated, portable suction cleaner, with detachable nozzle, is shown. The suction cleaner includes a motor located in the motor housing **1**, associated with a fan housing **2** having a fan **3** and secured upon the motor extension shaft **4**.

A suction nozzle, indicated generally at **5**, is detachably connected to the fan housing as will be later described. An operating handle **6** and a conventional dust bag (not shown) connected with exhaust **7** of fan housing **2** are also provided for the cleaner. The motor housing **1**, fan housing **2** and nozzle **5** are mounted on front casters **8** and preferably adjustable, double rear casters **9**, for ambulent motion over a surface to be cleaned, are provided, as indicated at **10** in FIG. 2. Conventional means is indicated at **11** in FIG. 1 for adjusting the rear casters **9**.

Fan housing **2** has a flat, vertical, front wall **12** having a central inlet opening **13** therein. Surrounding inlet opening **13** is an annular groove **14**, within which is located an O-ring **15** for a purpose to be later described.

Suction nozzle **5** preferably includes walls forming a transversely elongated brush housing mouth **16** and the rearwardly disposed tubular neck **17** leading to the fan chamber, as best shown in FIG. 2. A flat plate **18** is connected to the rear end of tubular neck **17**, as by screws **19**.

An air-tight seal is formed between the rear end of tubular neck **17** and flat plate **18** by O-ring **20**, located in annular groove **21** formed in the rear end of tubular neck **17** and adapted to be compressed when flat plate **18** is drawn against the rear end of tubular neck **17** by means of attaching screws **19**.

A rotary brush, indicated generally at **22** and provided with bristles **23**, may be detachably and adjustably, rotatably mounted in the suction mouth **16**, in conventional manner. Brush **22** is adapted to be motor driven, as best shown in FIG. 2, preferably by an endless, flat band, rubber belt **24** which passes over brush pulley surface **25** and pulley surface **72** of motor shaft extension **4**.

Downwardly open bifurcations **26** are provided on the lower end of flat plate **18** and are adapted to be engaged over rod **27** carried by lugs **28** on the lower portion of the front side of the fan housing, as shown in FIG. 2.

Nozzle **5** is detachably connected to fan housing **2** by a novel latch construction. This latch comprises guide **29** having spaced vertical guide flanges **30** formed upon the upper portion of the forward side of the fan housing.

A threaded aperture **31** is formed in guide **29** to receive attaching screw **32**, on which sliding latch member **33** is vertically slidably mounted between guide flanges **30**, by means of the vertical slot **34** therein.

Forwardly disposed shoulders or projections are formed at the upper and lower ends of sliding latch member **33** comprising angular outturned flange **35** at the upper end of said latch member and angular outturned flange **36** at the lower end thereof.

The operating cam member **37** is provided with the eccentric aperture **38** by means of which it is pivoted upon screw **32**. This cam member has cam surface **39** contacting flange **35** of sliding latch member **33**, and cam surface **40** contacting flange **36** of said sliding latch member.

Operating cam **37** is provided with an operating handle **41** which extends upward when sliding latch **33** is in latched position over the upper edge of flat plate **18**, as shown in FIGS. 2 and 3, and with an operating handle **42** which extends upward when the latch plate is in unlatched position, as shown in FIG. 7. Handle **41** is provided with angular lug **43** and handle **42** with an angular lug **44**, for manipulating cam **37**.

The upper portion of nozzle **5** is provided with a conventional container **45** for containing crystals such as are commonly used in suction celaners of this type for killing germs, moths and the like. This container has apertures **46** therein communicating with the passage within the nozzle from mouth **16** through tubular neck **17** to the fan chamber inlet.

The top of the crystal container is provided with means for adapting it to communicate with the room atmosphere, which means may be in the form of a valve comprising detachable perforate cover plate **47** and perforate closure plate **48** slidably associated therewith.

Perforate cover plate **47** may be provided at one end with an offset spring **49**, adapted to be inserted into a suitable aperture **50** in the adjacent end wall of container **45**, and at its other end with a spring tang **51**, adapted to frictionally engage a projection **52** upon the other end wall of the container to detachably retain the valve upon the top of the crystal container.

Perforate sliding plate **48** of the valve is slidably connected to perforate cover plate **47** for longitudinal slidable movement thereon by means of studs **53** attached to plate **47** and passing through elongated slots **54** in sliding plate **48**. One end of sliding plate **48** may be turned up as indicated at **55** and provided with bead **56** forming a handle for reciprocating the same.

The valve is in open position when sliding plate **48** is moved to the position shown in FIG. 8, with apertures **57** therein registering with apertures **58** in cover plate **47**. When sliding plate **48** is moved to the right, from the position shown in FIG. 8, solid portions thereof will cover apertures **58** in the cover plate so as to close the valve and cut off communication with the room atmosphere.

A lamp housing, indicated generally at **59**, is pivotally mounted upon the upper portion of the fan housing. This lamp housing comprises top wall **60** and side walls **61**, and is pivotally mounted upon the fan housing by means of ears **62**, formed upon side walls **61**, and screws **63** pivotally connect the ears to the fan housing.

The headlight comprises a lamp bulb **64** located in a conventional lamp socket **65** mounted within the pivoted lamp housing and connected by electric wires **66** associated with a source of power for the motor, bulb **64** preferably being lighted when the motor and fan are in operation, as in usual practice.

As best shown in FIG. 2, the pivotally mounted lamp bulb **64** is located close to the crystal valve when the lamp housing is in the lowered or cleaner operating position, so as to heat the crystals in the container **45** in order to evaporate the crystals. In this lowered position of the pivoted lamp housing both the crystal valve and the latch for the nozzle are enclosed by the pivoted lamp housing.

The embodiment of the invention illustrated shows means for supporting the belt **24** wholly by the nozzle in a position such that the fan shaft **4** is free to move out of or into the upper belt loop as the nozzle is detached from or attached to the fan housing, and that is movable from its belt-supporting position to re-engage the belt with the fan shaft.

While no claim is made to this belt-supporting means, it is preferred that the same be used. As shown, this comprises a circular opening **67** in the front wall of the nozzle within which is rotatably mounted circular closure member **68** having a suitable handle **69** for rotating the same within the opening **67**.

A suitable arm **70** projects inwardly from rotatably mounted closure member **68** and is adapted to be moved into and out of engagement with belt **24**. As shown in FIG. 2, closure member **68** turns about an axis which is disposed at an angle to the axis of fan shaft **4**, and arm **70** is so positioned on the member **68** that when the rotary closure member **68** is rotated in counterclockwise direction for about one-half turn, arm **70** engages in the upper loop of the belt **24** and raises the same from shaft **4**, supporting the belt entirely within the nozzle upon belt-carrying portion **71** of arm **70** and pulley portion **25** of brush **22**.

As the upper loop of belt **24** is thus supported clear of shaft **4**, the shaft is free to move easily out of the belt loop when nozzle **5** is detached from fan housing **2**. In the same way, the nozzle may be again attached to the fan casing and circular opening closure **68** again rotated to the position shown in FIG. 2 to replace the upper loop of the belt upon pulley portion **72** of fan shaft **4**. While the above is a preferred construction because of its convenience, no claim is made to the same.

Thus a construction of suction cleaner nozzle is provided in which a pivotally mounted lamp is adapted to be located close to the valve of the crystal container, to heat the crystals and vaporize the same, when the lamp is in the lowered or cleaner operating position.

Also, a novel latch construction is provided for detachably securing a suction cleaner nozzle upon cleaner fan casing, and that both this latch and the crystal valve are enclosed by the pivoted lamp housing when the same is in the lowered or cleaner operating position.

Further, a novel and efficient O-ring sealing arrangement is provided, including O-rings carried in grooves in the front face of the fan housing and in the rear end of the tubular neck of the nozzle and forming seals between the fan housing and nozzle and the adjacent faces of the plate **18**. This construction provides a positive seal without requiring the expensive operations of machining tapered conical complementary surfaces on the neck and fan housing in accordance with prior practice to form an air-tight connection.

In the foregoing description certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. In a suction cleaner, a fan housing having an inlet, a suction nozzle detachably connected directly to the fan housing, said nozzle having an entrance mouth at its lower end and a passage therefrom to said fan housing inlet, a crystal container located entirely within said passage in the upper portion of said nozzle, there being perforations in said crystal container providing communication with said passage, means at the top of said crystal container providing communication with the room atmosphere, and a pivotally mounted lamp located close to said means at the top of said crystal container when the lamp is in cleaner operating position, to heat said crystals.

2. In a suction cleaner as defined in claim **1**, in which said means at the top of said crystal container is a valve.

3. In a suction cleaner as defined in claim **2**, in which the valve comprises a perforate cover plate for the crystal container and a perforate slide plate slidably associated with the perforate cover plate.

4. In a suction cleaner as defined in claim **1**, said lamp comprising a lamp socket and a lamp bulb located in a lamp housing pivotally mounted upon the fan housing.

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U.S. Cl. X.R.

15—257.1, 324; 21—120; 43—129