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3,444,582

SUCTION CLEANER NOZZLE CONSTRUCTION

Original Filed Nov. 26, 1965

Sheet 1 of 2

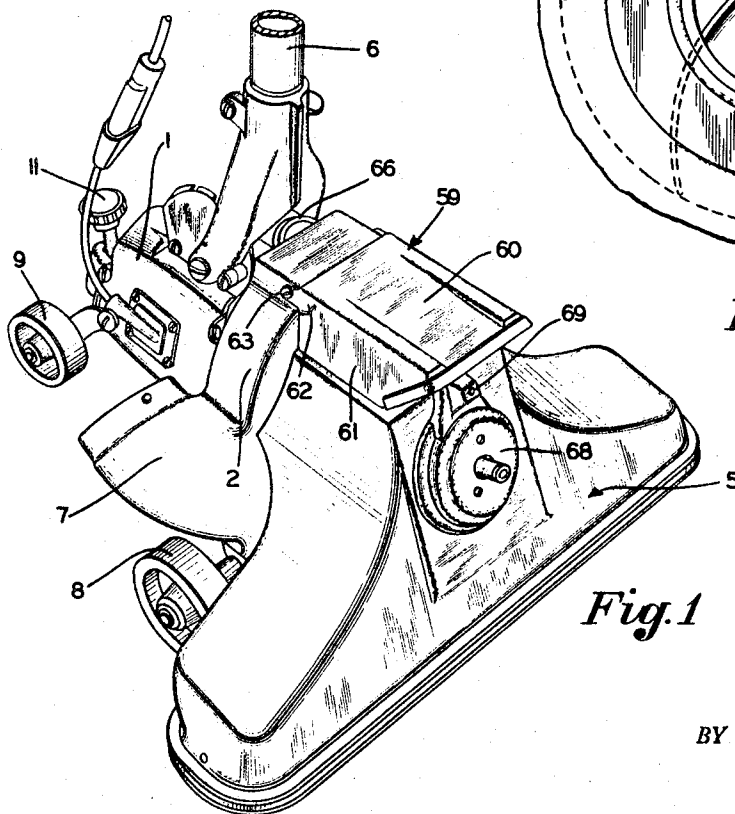
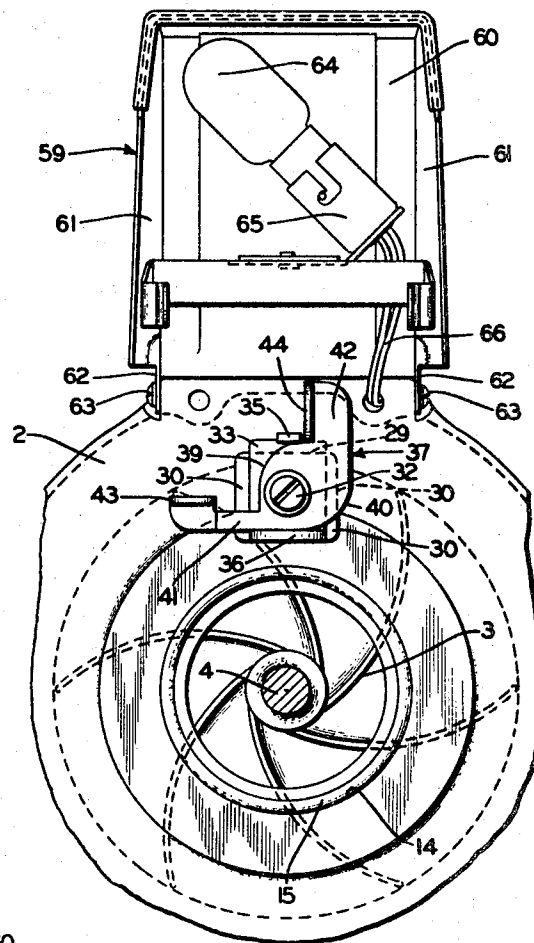
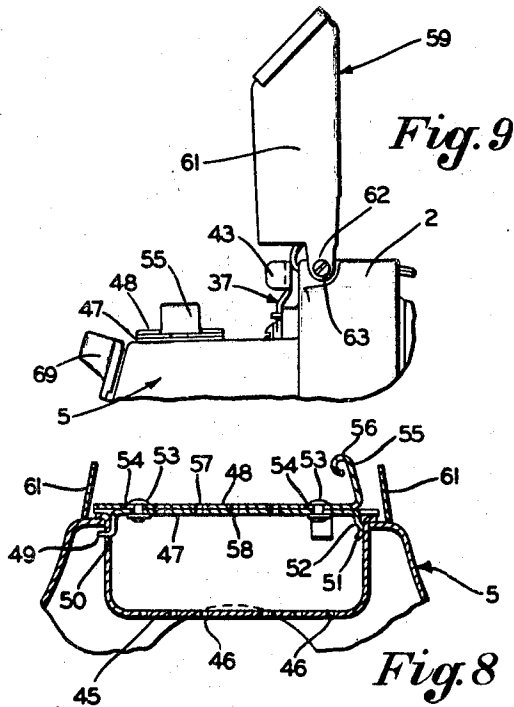


Fig. 7

Fig. 1

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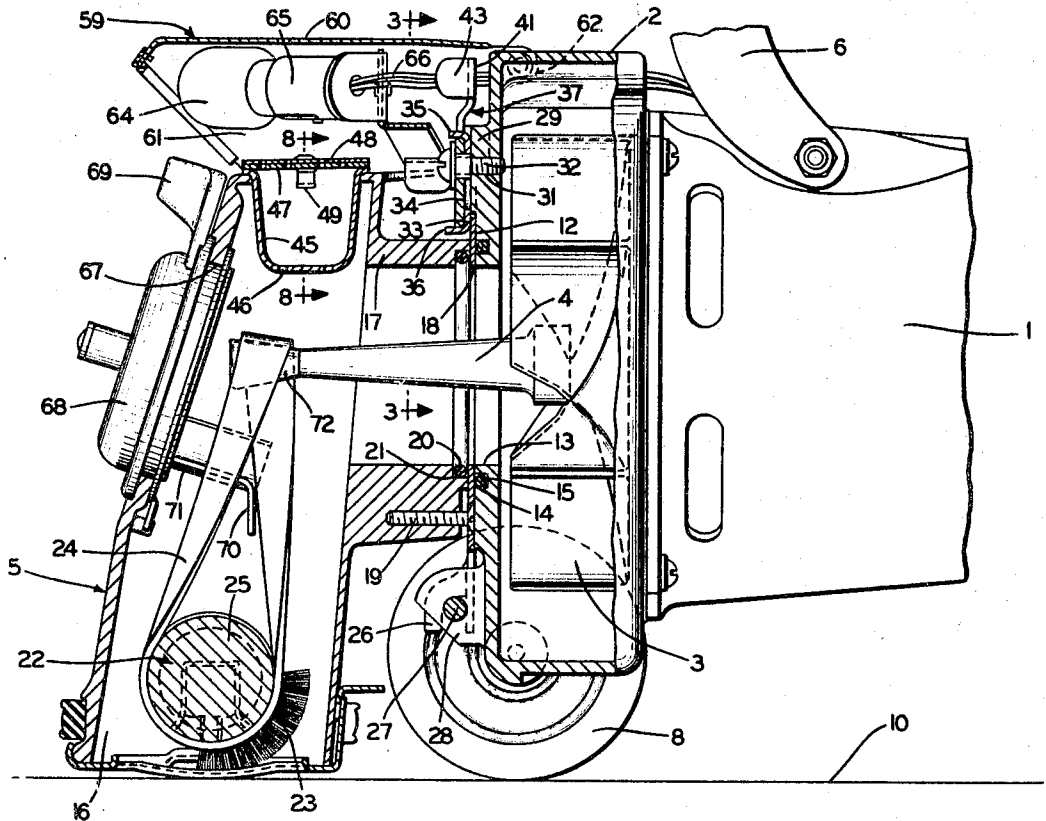


Fig. 2

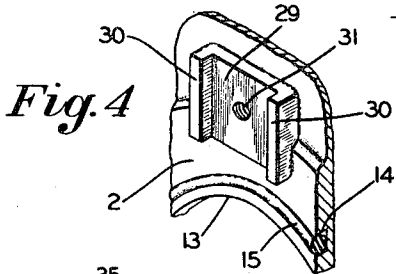


Fig. 4

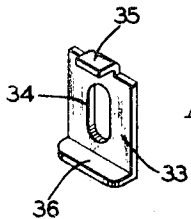


Fig. 5

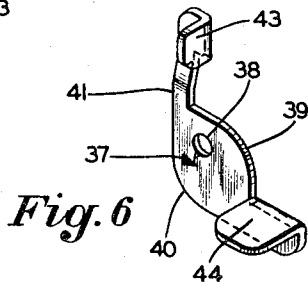


Fig. 6

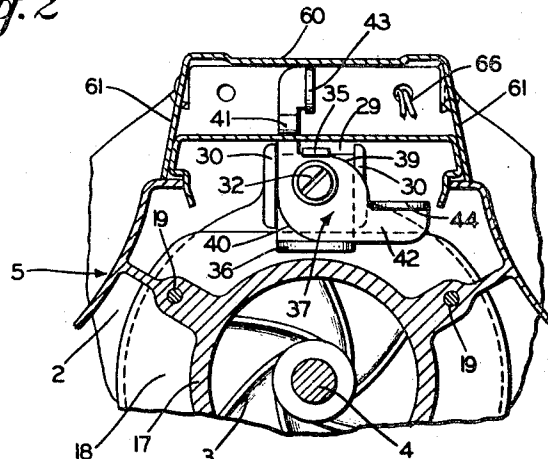


Fig. 3

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SUCTION CLEANER NOZZLE CONSTRUCTION
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Original application Nov. 26, 1965, Ser. No. 509,867.
Divided and this application Aug. 29, 1967, Ser.
No. 664,008

Int. Cl. A47I 5/10, 9/00, 11/20

U.S. Cl. 15—324

4 Claims

ABSTRACT OF THE DISCLOSURE

A suction cleaner having a fan housing with a flat vertical front wall having an inlet opening therein, an annular groove in the vertical front wall surrounding the inlet opening, an O-ring in the groove, a suction nozzle detachably connected to the fan housing, the suction nozzle having a rearwardly disposed tubular neck, a flat plate connected to the rear end of the tubular neck, an opening in the flat plate communicating with the interior of the tubular neck, the flat plate clamped to the vertical front wall compressing the O-ring with the suction nozzle communicating with the inlet opening.

A crystal container is located in the upper portion of the nozzle having perforations therein communicating with the interior of the nozzle and means providing communication with the room atmosphere. A pivotally mounted lamp is located above the crystal container to heat the crystals. Latch means is provided for clamping the nozzle to the fan housing.

CROSS REFERENCE TO RELATED APPLICATION

The present application is a division of my copending application Ser. No. 509,867, filed Nov. 26, 1965.

BACKGROUND OF THE INVENTION

Field of the invention

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.

Description of the prior art

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.

SUMMARY OF THE INVENTION

An 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.

Another 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 latch means is 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.

BRIEF DESCRIPTION OF THE DRAWINGS

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.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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 ambulant 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 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 out-turned flange 35 at the upper end of said latch member and angular out-turned 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 cleaners 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 counter-clockwise 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 a flat vertical front wall provided with an inlet opening therein, there being an annular groove in said vertical front wall and surrounding said inlet opening, an O-ring in said annular groove, a suction nozzle detachably connected to the fan housing, said suction nozzle having an entrance mouth at its lower end and a rearwardly disposed tubular neck spaced above the lower end, a flat plate at the rear end of said tubular neck, said flat plate having an opening therein communicating with the interior of said tubular neck, there being an annular groove in the rear end of said tubular neck, an O-ring in said last named annular groove, screws connecting the flat plate to the rear end of the tubular neck and compressing said last named O-ring, and means for clamping said flat plate against the vertical front wall of the fan housing and compressing said first named O-ring, with the opening in the flat plate communicating with the inlet opening in the fan housing.

2. In a suction cleaner as defined in claim 1, detachable interengaging means at the lower end of said flat plate and on the lower front portion of the fan housing, latch means comprising a latch plate slidably mounted on the upper front portion of the fan housing, spaced projections on the sliding latch plate, and an operating cam pivotally mounted on the upper front portion of the fan housing and having cam surfaces engaging said projections for sliding the latch plate over the upper end of said flat plate for clamping said flat plate against the flat vertical front wall of the fan housing with the opening in the flat plate communicating with the inlet opening in the fan housing.

3. In a suction cleaner as defined in claim 3, spaced guide ribs on the front of the fan housing between which the latch plate is slidably mounted, and angularly disposed operating handles on the pivoted operating cam.

4. In a suction cleaner as defined in claim 2, a lamp housing pivotally mounted upon the fan housing and adapted to enclose said latch means.

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ROBERT W. MICHELL, *Primary Examiner*.

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