CONVERSION AND HEADLIGHT ARRANGEMENT FOR SUCTION CLEANERS

Dal. C. Gerber, North Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio, a corporation of Ohio

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This invention relates to suction cleaners and more particularly to suction cleaners of the so-called tank type in which cleaning tools are connected to a motor-fan-filter unit by means of a flexible hose.

Motor-fan-filter units of tank cleaners have a suction inlet at one end and an exhaust inlet at the other end of the unit. The usual practice is to make the end of the hose which is to be attached to the cleaner in the form of a joint so that it may be interchangeable with either the suction inlet or the exhaust outlet of the unit whereby the unit may be used for suction cleaning or blowing dust and dirt from otherwise inaccessible places or for spraying, fumigating, and other like household tasks.

With such cleaners to convert from suction cleaning to blowing or vice versa, it is usually necessary to detach the hose from the inlet and connect it to the outlet or vice versa. According to the present invention a single hose connection is provided with conduits leading to both the suction and exhaust ends of the unit and with valve mechanism whereby the single connection may be selectively placed in communication with either the suction or exhaust ports of the air moving unit.

It is desirable to use a light on a tank type suction cleaner in a position to illuminate the area to be cleaned by the nozzle which is attached to one end of a flexible hose, the other end of which may be attached to either the suction or exhaust ports of the air moving unit. During the cleaning operation the power unit of tank type suction cleaners is usually pulled about by means of the hose which connects the cleaning tool to either the suction or exhaust ports of the unit at opposite ends thereof and formed in the respective end caps of the unit.

With such units it is necessary to provide a light in each end thereof or to forego the use of the light for one type of operation, that is, either the suction or blowing operation.

In suction cleaners of the tank type it is usual practice to position the dust filter between the suction inlet and the motor-fan unit whereby the air is filtered before it passes through the motor-fan unit. That is, the filter is at the suction end of the unit and the motor of the unit at the exhaust end.

If a light is to be mounted in the suction end cap it is therefore necessary to provide electric conductors extending from the exhaust end of the unit where the motor is positioned to the suction end cap which is usually detachable for the purpose of cleaning the filter. This necessitates the use of detachable electrical connections between the main housing and the end cap of the unit.

According to the present invention, the above drawbacks are eliminated. According to the present invention the light is mounted in the exhaust end cap which is semi-permanently attached to the housing adjacent to the motor so that the light may be easily electrically connected in circuit with the motor. A conduit extends along the top of the cleaner from the exhaust end cap to the suction end cap. At the exhaust end cap the conduit is provided with a joint for detachably receiving one end of a flexible hose. Near the exhaust end the conduit is provided with a valve manually operable whereby the hose may be selectively connected to communicate with either the suction chamber or with the exhaust chamber.

According to another feature of this invention the conduit which extends between the exhaust and suction ends of the cleaner is raised upwardly above the walls of the cleaner housing for a portion of its length so as to form a carrying handle whereby it is unnecessary to provide the usual carrying handle. Additionally, the switch which controls the motor and light is conveniently positioned beneath the raised handle forming portion of the conduit so as to protect it against injury by being brought into contact with other objects.

The exhaust end of the conduit is connected to the body of the cleaner by an insulating duct member, the exhaust chamber of the unit being connected to the interior of the conduit by means of this duct. This duct member carries a valve which is used to place the hose in communication with either the suction or exhaust chambers. The duct also has an opening which serves as an exhaust opening when the cleaner is being used for suction cleaning and as an inlet opening when the cleaner is used for blowing.

According to another feature of this invention the exhaust chamber is so formed and the light for illuminating the surface to be cleaned is so mounted relative to the exhaust chamber that the flow of filtered air therethrough sweeps over the light and serves to keep it cool.

Other objects and advantages of this invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

Figure 1 is a perspective view of the suction cleaner of this invention showing a suction nozzle attached thereto by means of a flexible hose;
Figure 2 is a longitudinal view, partly in section, of the cleaner of Fig. 1;
Figure 3 is a transverse vertical sectional view through the exhaust chamber of the cleaner of Fig. 1; and
Figure 4 is a longitudinal sectional view of a modification of the invention showing a different manner of incorporating a light in the exhaust end cap.

Referring to the drawings the reference numeral 10 represents the casing of a motor-fan-filter unit which is supported in a longitudinal position for movement over a surface by runners 11 as is well known in the art. The opposite ends
of the casing or housing 10 are closed by an exhaust end cap 12 and a suction end cap 13. The exhaust end cap 12 is semi-permanently attached to the casing 10 in any suitable manner as is well known in the art while the suction end cap 13 is attached to the suction end of the casing for ready detachment so that the filter can be readily cleaned as is well known in the art.

The exhaust end cap 12 is of special formation and forms a portion of the suction chamber of the unit. It may be made of any suitable material but is preferably made of hard rubber or a phenol condensation product. The end cap 12 includes a hollow extension 14 communicating with one end of a conduit 15 which extends longitudinally along the top of the casing 10 and terminates near the exhaust end cap 12 in a coupling member 17 adapted to detachably receive one end of a flexible hose 16. The other end of the hose 16 may be attached to a suction nozzle as shown in Fig. 1 or to any other tool such as a blower nozzle, sprayer, or other special household tool.

On the interior of the casing is mounted a motor-fan unit, the motor 18 of which is shown in Fig. 2. The motor-fan unit is supported within a casing 10 by any suitable means including the bulkhead 19. Operation of the motor-fan unit draws air inwardly through the suction end cap 13, through the filter 20 and discharges the clean filtered air through openings 21 (Fig. 3) in the bulkhead 19 and into the pressure chamber 22.

The conduit 15 is suitably attached to the casing 10 at the suction end, and extends upwardly at 23 near the center of the casing to form a handle portion 24. Near the exhaust end cap 12 the handle portion 24 is attached to the casing 10 by a duct member 25 which places the interior of the exhaust chamber 22 in communication with the interior of the conduit 15.

Pivoted mounted on the interior of the duct 25 is a valve 26 which is positioned in a vertical position as shown in Fig. 2. Completely closes the interior of the conduit 15 and in cooperation with the walls of the duct 25 forms a passage 27 extending between the exhaust chamber 22 and the interior of the conduit 15 and a passage 28 extending between louvres 29 through the wall of the duct 25 and the interior of the duct 15.

When the valve 26 is in a horizontal position as shown in Fig. 4 the valve closes the passage 27 and forms a portion of the walls of the conduit 25 so that its end 11 is in open communication with the interior of the suction end cap 13 and the exhaust chamber 22 in open communication with the louvres 29. Attached to the shaft which pivotally mounts the valve 26 and positioned exteriorly of the duct 25 is the valve 26 by which the valve 26 may be manipulated. The handle 30 preferably extends parallel to the valve 26 so that when it is in horizontal position the valve will be turned for suction cleaning and when in vertical position the valve will be turned for blowing. Indicia may be placed on the exterior of the duct 25 to indicate the position of the valve 26.

The exhaust end cap 12 is also of special construction. As shown in Fig. 2 it is apertured to detachably receive a sealed beam combination light and reflector 31 of any suitable construction but of sufficient wattage to illuminate the entire area within the range of movement of the tool attached to the end of the hose 16. As shown in Fig. 2 the rear or reflector part of the light is adapted to be swept by the clean filtered air being exhausted through the ports 21 in the bulkhead 19.

The terminals of the light 31 are connected in circuit with the motor 18 in any suitable manner so as to be energized simultaneously there with when the switch 32 is turned to its on position. As shown, the switch 32 is mounted beneath the handle portion 24 of the conduit 15 so as to be protected against damage by being brought into contact with other objects.

In the modification of Fig. 4 the end cap 12 is especially made to receive any conventional light bulb 33. The rear of the cap 12 is in the form of a reflector 34, with a central sleeve 35 shaped to receive a conventional socket 36 for the bulb 33. The socket 36 is adapted to be connected in circuit with the motor 18 in any suitable manner. The front of the cap 12 is in the form of a lens 37 through which light rays from the bulb 33 are projected onto the surface to be cleaned. Near its bottom, in front of the ports 21 in the bulkhead 19, the reflector 34 is apertured at 38 and restricted openings 39 are provided in the top wall of the cap 12 to provide for circulation of a portion of the air from the exhaust chamber 22 over the bulb 33 so as to maintain it in a cool condition.

Operation

In operating the cleaner of this invention for cleaning floors the user usually pulls the cleaner about over the floor by pulling on the hose 16. Thus, whether a suction tool or a blowing tool is being used the light will always be facing in the right direction to illuminate the area which is to be cleaned.

When it is desired to clean drapes, furniture, or other off-the-floor cleaning the cleaner may be upended and supported on the suction end cap 13 which has a flat surface for that purpose. The cleaner of this invention is particularly adapted for such use since there is an exhaust port through the end cap on which the cleaner is to be supported as is the case with the usual tank cleaner.

When it is desired to use the cleaner as a suction cleaner the handle 30 is turned to a horizontal position so that the valve 26 will be positioned horizontally as shown in Fig. 4. The connection 17 and thus the suction tool being used will be in communication with the chamber formed interiorly of the suction end cap 13. The dirty air will pass through the filter 20 where it will be cleaned, pass over the motor-fan unit and be discharged through the ports 21 in the bulkhead 19 and into the exhaust chamber 22.

In the modification of Figs. 1 to 3 inclusive, all of the air exhausted through the ports 21 will pass over the rear of the light 31 and maintain it in a cool condition. From the chamber 22 the exhaust air will pass to the atmosphere through the duct 25 and the louvres 29.

In the modification of Fig. 4 a portion of the air discharged through the ports 21 will pass through the aperture 36 in the reflector 34, pass over the bulb 33 and exit through the restricted openings 39. The remainder of the air will pass to the atmosphere through the duct 25 and the louvres 29. The proportion which passes over the bulbs 33 is of course determined by the size of the restricted openings 39.

If the cleaner is to be used for blowing the handle 30 is turned to vertical position whereby the valve 26 will also be turned vertically as shown in Fig. 2. Air will be drawn into the duct
which said light is positioned to be cooled by air flowing from said pressure chamber whether the cleaner is used for suction cleaning or blowing.

3. A suction cleaner according to claim 1 in which said light is positioned in a chamber separate from said pressure chamber and vent forming means for diverting a portion of the air flowing from said pressure chamber through said separate chamber whether the cleaner is used for suction cleaning or blowing.

4. A suction cleaner according to claim 1 in which said suction end closure is constructed to support said casing in a vertical position with said light directed upwardly whereby vertical surfaces to be cleaned will be illuminated whether the cleaner is being used for suction cleaning or blowing.

5. A suction cleaner comprising, a casing, means for supporting said casing in a horizontal position on a surface to be cleaned, a motor-fan-filter unit within said casing, said motor-fan-filter unit being arranged to provide suction and pressure chambers at opposite ends of said casing with the filter and said unit being positioned at the suction chamber end and the motor of said unit at the pressure end, a suction end closure detachably secured to the suction end of said casing, a pressure end closure supported at one end of said casing, duct forming means connecting said fitting to said suction and pressure chambers and said suction and pressure chambers to atmosphere, valve means for selectively controlling the ducts of said duct forming means to connect said fitting to said suction chamber and said pressure chamber to atmosphere or said suction chamber to atmosphere and said fitting to said pressure chamber and a light supported on the end closure at the same end of said casing on which said fitting is supported in a position to project light onto the surface being cleaned whereby said surface will be illuminated whether the cleaner is being used for suction cleaning or blowing as the cleaner is propelled by pulling on a suction hose attached to said fitting.

6. A suction cleaner according to claim 5 in which the end closure at the end of said casing opposite that upon which said fitting is supported is formed to support said casing in a vertical position with said light directed upwardly whereby vertical surfaces to be cleaned will be illuminated whether the cleaner is being used for suction cleaning or blowing.

Dale C. Gerber.

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From the foregoing it can be seen that this invention provides a suction cleaner in which a conduit has communication with both the suction and exhaust ports of a motor-fan-filter unit whereby by manipulation of the valve any cleaning tool which is desired to use may be selectively connected to either the suction or pressure side of the unit depending upon which is desired. Further, the conduit which connects the suction and exhaust ports of the unit is positioned lengthwise of the motor-fan-filter unit and forms a carrying handle for the unit. Additionally, the structure is such that the hose is connected at the exhaust end of the motor-fan-filter unit whereby a light may be mounted in the exhaust end cap in a position for easy electrical connection to the electric circuit of the motor.

While I have shown but two modifications of my invention it is to be understood that these modifications are to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the particular structure shown and described but to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. A suction cleaner comprising, a casing, means for supporting said casing in a horizontal position on a surface to be cleaned, a motor-fan-filter unit within said casing, said motor-fan-filter unit being arranged to provide suction and pressure chambers at opposite ends of said casing with the filter and said unit being positioned at the suction chamber end and the motor of said unit at the pressure end, a suction end closure detachably secured to the suction end of said casing, a pressure end closure secured to the pressure end of said casing, a coupling fitting for the attachment of a flexible hose supported at the pressure end of said casing, duct forming means connecting said fitting to said suction and pressure chambers and said suction and pressure chambers to atmosphere, valve means for selectively controlling the ducts of said duct forming means to connect said fitting to said suction chamber and said pressure chamber to atmosphere or said suction chamber to atmosphere and said fitting to said pressure chamber and a light supported on the end closure at the same end of said casing on which said fitting is supported in a position to project light onto the surface being cleaned whereby said surface will be illuminated whether the cleaner is being used for suction cleaning or blowing as the cleaner is propelled by pulling on a hose attached to said fitting.

2. A suction cleaner according to claim 1 in which said light is positioned to be cooled by air flowing from said pressure chamber whether the cleaner is used for suction cleaning or blowing.