

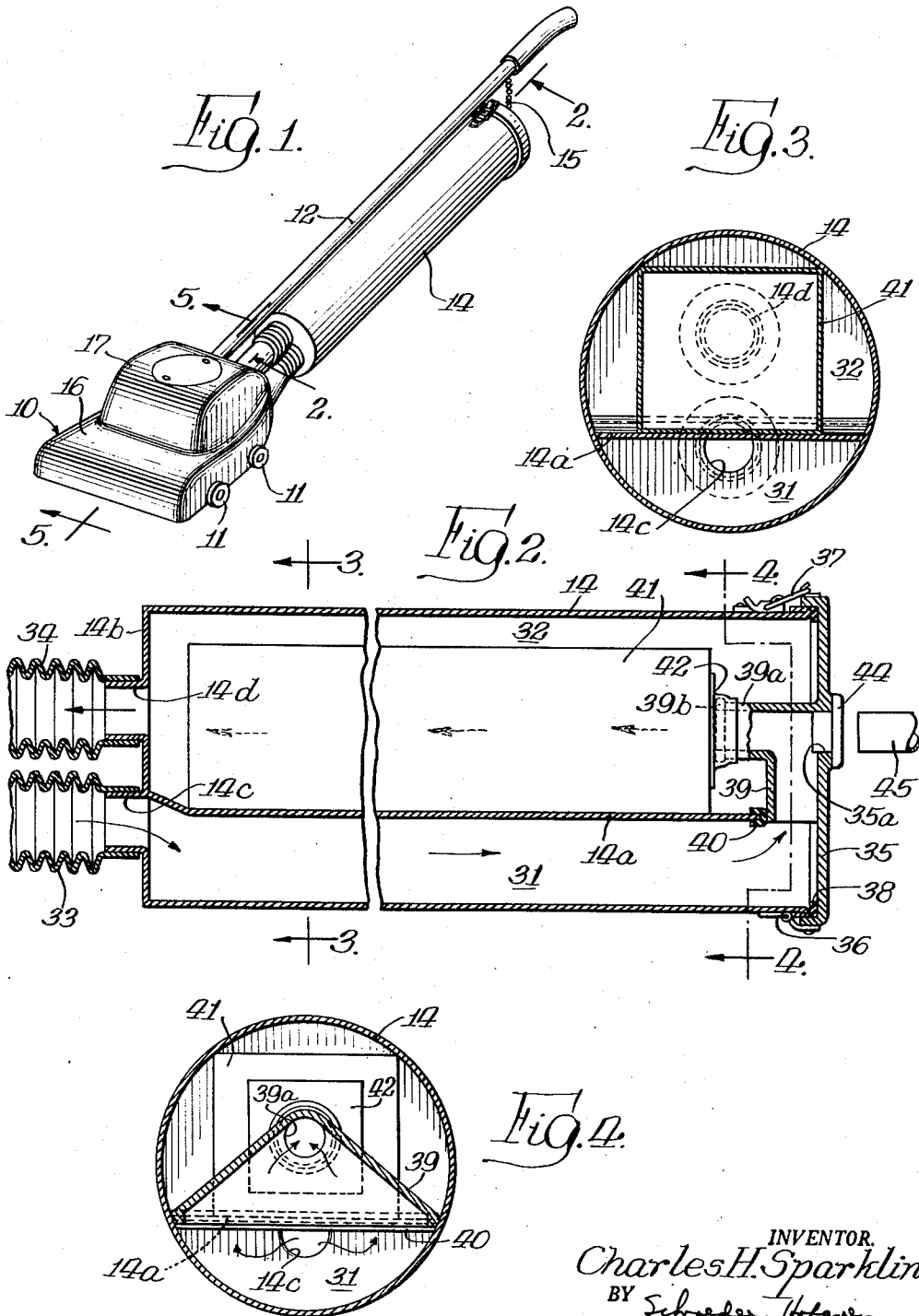
Sept 17, 1957

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VACUUM CLEANER

2,806,242

Filed Sept. 6, 1955

2 Sheets-Sheet 1



INVENTOR,
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Brady & Wagner Attys.

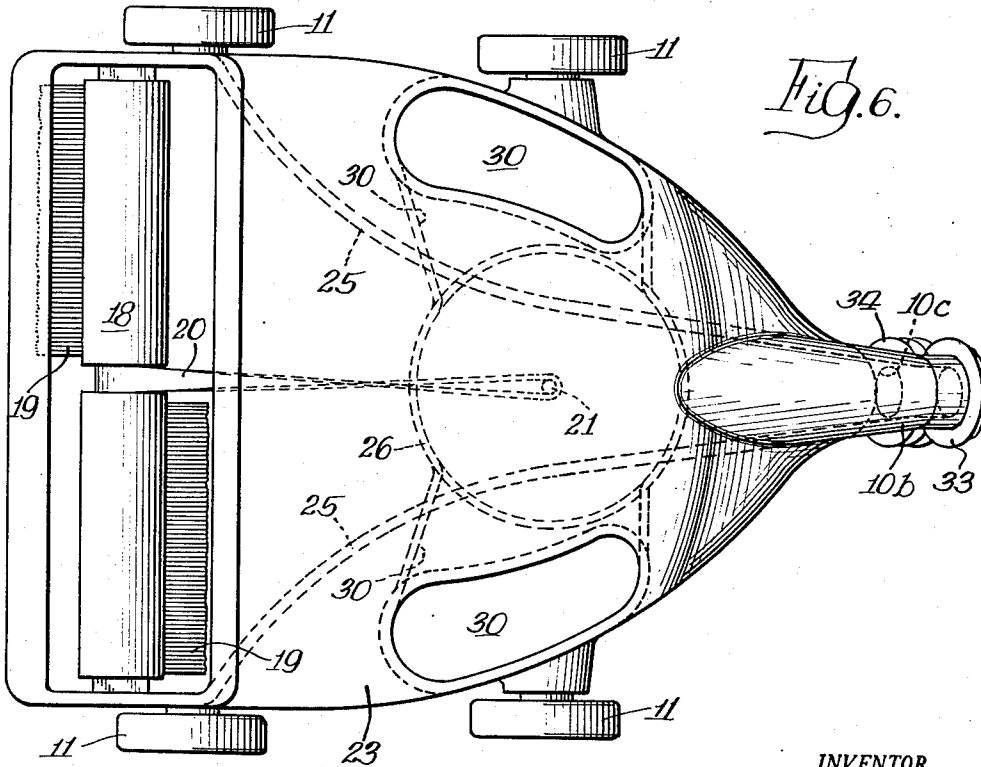
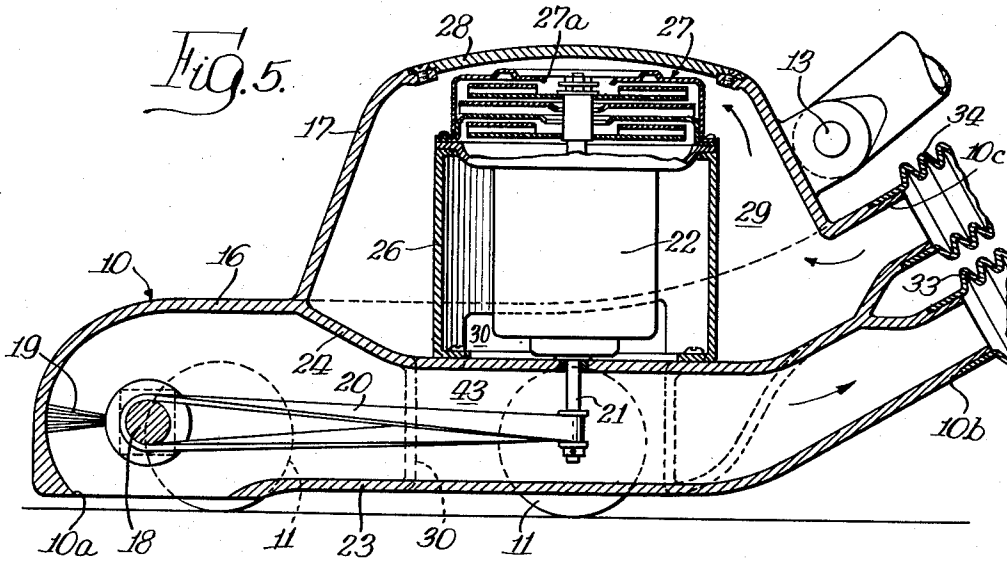
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VACUUM CLEANER

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Application September 6, 1955, Serial No. 532,606

5 Claims. (Cl. 15—351)

This invention relates to a vacuum cleaner of the type that is adapted to be propelled over a floor by means of a handle.

Vacuum cleaners are in general of two main types. One type is that which is adapted to be propelled by means of a handle over the carpet or other surface that is being cleaned. This type customarily employs a motor and fan unit in a wheeled housing which also contains the suction inlet and dirt laden air passage and which also usually contains a rotatable brush that is rotated against the surface being cleaned. In this type of vacuum cleaner, the dirt laden air stream customarily is drawn rearwardly and directed into a collapsible dirt separating member in the form of a bag that is suspended from the handle.

The other type of vacuum cleaner is the self-contained tank or canister type wherein the motor and fan are enclosed within a casing and the dirt separating member itself is also enclosed within this casing so that everything is hidden from view. In this type the cleaning is done by means of a cleaning tool held on the end of a pipe-like wand which is connected by means of a flexible hose to an inlet on the vacuum cleaner.

The cleaner of this invention combines the features of both types of vacuum cleaners in that it includes a wheeled housing that is adapted to be propelled over the surface being cleaned by means of a handle and it also includes a dirt separating member hidden from view within a relatively rigid container. The vacuum cleaner of this invention has a number of advantages over prior types of cleaners. Thus, it is more attractive as the dirt separating member or bag is kept entirely out of sight in a container. In a preferred construction, this container is relatively rigid and the dirt separating member is a disposable bag, such as a paper bag, that may be easily inserted therein and removed therefrom. Other advantages will be discussed in the description of the embodiment of the invention as shown in the drawings. Further advantages will be apparent from the description of this embodiment as shown in the drawings, of which:

Figure 1 is a perspective view of a vacuum cleaner embodying the invention.

Figure 2 is a sectional elevational view taken substantially along line 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken substantially along line 3—3 of Figure 2.

Figure 4 is a transverse sectional view taken substantially along line 4—4 of Figure 3.

Figure 5 is a transverse sectional view taken substantially along line 5—5 of Figure 1.

Figure 6 is a bottom view of the wheeled housing of the vacuum cleaner.

The vacuum cleaner shown in the accompanying drawings includes a wheeled housing 10 supported on spaced wheels 11 for propelling over the surface being cleaned by means of a handle 12. This handle is movably attached to the housing 10 as by means of a hinge 13. Suspended from the handle 12 adjacent to the top thereof is an elongated essentially cylindrical and relatively rigid

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container 14 that may be suspended from the handle adjacent to the top thereof as by a chain 15. The container 14 may be made of a thin metal, phenol-aldehyde resin or similar synthetic or of any similar material desired.

The wheeled housing 10 has a relatively low front portion 16 and a domed portion 17 adjacent to the rear of the housing. The front portion 16 is provided with a transverse bottom opening 10a adapted to be arranged adjacent to and above the surface being cleaned. Immediately above this opening 10a, there is positioned a transverse elongated brush 18 provided with oppositely located brush elements 19. The brush 18 is rotatably mounted and it is rotated by means of an endless belt 20 which engages the brush 18 adjacent to the center thereof and which extends rearwardly and around the drive shaft 21 of a motor 22. The dirt laden air inlet opening 10a, brush 18, driving belt 20, motor shaft 21, and motor 22 are purely conventional and are of the ordinary type usually used in vacuum cleaners adapted to be propelled over a surface by means of a handle.

The wheeled housing 10 of the vacuum cleaner is provided with walls including the bottom wall 23, top wall 24, and side walls 25 forming an air passage leading from the air inlet 10a toward the rear of the bottom of the cleaner so that the air will exhaust out a generally cylindrical tubular portion 10b.

The motor 22 in the embodiment shown is vertically arranged within the domed portion 17 with the motor being mounted within an enclosing cylinder 26 within the portion 17. Associated with the upper end of the motor 22 in the customary manner is a multistage fan unit 27 of usual construction having an air inlet 27a adjacent to the top thereof so that the air is drawn down through the fan and through the motor for cooling the motor. The motor and fan unit is of ordinary construction and is so arranged that the fan stages are rotated by the end of the motor shaft that is opposite to the end used for rotating the belt 20. In the embodiment shown, the top of the domed portion 17 is closed by means of a removable cover 28.

The intermediate wall 24 and the wall forming the domed portion 17 in conjunction with the enclosing cylinder 26 form an air passage 29 leading from the second tubular portion 10c. In the embodiment shown, the tubular portions 10b and 10c are arranged one above the other. However, if desired, they can be arranged side by side.

Air that is drawn within the tubular portion 10c is drawn into the fan 27 and down through the motor 22 into the interior of the enclosing cylinder 26. From here the air is exhausted through oppositely located lateral passages 30 to be exhausted through the bottom wall 23 of the vacuum cleaner.

The container 14 is of generally cylindrical construction and is provided adjacent to the bottom surface thereof with a longitudinal transverse partition 14a. This partition divides the interior of the container into a pair of compartments 31 and 32. The bottom compartment 31 is of considerably smaller cross-sectional area than is the top compartment 32. The bottom end 14b of the container is provided with a pair of cylindrical extensions 14c and 14d. The bottom extension 14c is connected to the first tubular portion 10b on the housing 10 by means of an accordion-pleated flexible conduit 33, which is preferably made of a synthetic material, such as flexible polyethylene. The upper extension 14d is connected to the second tubular portion 10c by a similar flexible conduit 34. As the conduits are flexible and accordion-pleated, the handle 12 may be moved throughout its entire range of movement without disrupting the tubular connections. As is customary in a cleaner of this type,

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the handle may be moved from an erect storage position to a lowered position, where it is substantially parallel to the floor in order that the housing 10 may be moved under pieces of furniture and the like during the cleaning operation.

The upper end of the container 14 is provided with a removable cap member 35 mounted at one edge on the adjacent portion of the container 14 as by means of a hinge 36. The side of the cap member 35 opposite to the hinge 36 is removably latched in position by means of a toggle latch 37 or the like. The cap member 35 is sealed to the upper edge of the container 14 as by means of a gasket 38. The upper edge of the partition 14a is spaced from the plane defining the upper edge of the container 14 so as to provide space for a conduit member 39 that is formed integrally with the cap member 35. As is shown most clearly in Figures 2 and 4, the conduit member 39 has sloped side walls converging toward the center of the compartment 32 and merging to form a downwardly extending cylindrical extension portion 39a. The walls forming the cylindrical extension portion 39a are essentially parallel to the walls of the container 14.

The conduit member 39 is substantially sealed with respect to the upper edge of the partition 14a by means of a gasket 40 mounted on this upper end of the partition. The inner end of the cylindrical extension portion 39a is adapted to receive the upper end of an elongated disposable dirt separating member 41, which preferably is a paper bag of the ordinary type which is adapted to filter out the dirt and other foreign matter from an air stream conducted into the interior of the bag. One end of the bag is provided with a thin rubber diaphragm 42 that is flexible and that contains a center hole so that the diaphragm may be stretched over the extension portion 39a in the manner illustrated in Figure 2 to make sealing contact therewith. The inner end of this extension portion is provided with an outwardly directed flange 39b to aid in holding the paper bag 41 in place.

When the vacuum cleaner is in operation, a dirt laden air stream is directed by means of the motor and fan unit 22 and 27 through the opening 10a, passage 43 formed by the walls 23, 24, and 25, and out the first tubular portion 10b into the flexible conduit 33. From the conduit 33, the dirt laden air is drawn through the compartment 31 and through the conduit member 39 into the interior of the bag 41 that is located within the compartment 32. As the bag 41 is porous, preferably of porous paper, substantially all of the dirt and foreign matter is filtered from the air stream and remains within the bag. The filtered air then flows from the compartment 32 through the flexible conduit 34, through the air passage 29, through the fan 27 and motor 22 and through the side passages 30 where it is exhausted out the bottom of the vacuum cleaner.

When the bag 41 is completely contaminated with dirt, it may easily be removed and replaced with a clean bag. In order to do so, it is only necessary to unlatch the cap member 35 and rotate it in a clockwise direction as shown in Figure 2. As the conduit member 39 forms a part of the cap member, this upward and rearward rotation of the cap member draws the top of the bag from within the compartment 32 and it is then a simple matter to remove the bag from the extension portion 39a and replace it with a clean bag. The end of the clean bag will be inserted in the compartment 32 and the cap member 35 rotated back to the position shown in Figure 2 and latched in position.

In order to convert the cleaner from on-the-floor to off-the-floor cleaning, the cap member 35 is provided with an opening 35a aligned with the inwardly extending extension portion 39a of the conduit 39. When the vacuum cleaner is used for normal on-the-floor cleaning, this opening is closed by a removable plug 44. However, when the cleaner is used for off-the-floor cleaning, this plug 44 may be removed and the cylindrical rigid end

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45 of a flexible hose may be inserted through the opening 35a so that the inner end of the member 45 is held within the extension portion 39a of the conduit 39. This places the interior of the rigid end 45, and thus of the hose, in direct communication with the interior of the dirt separating member 41 for off-the-floor cleaning. This function of the flexible hose including the rigid end portion 45 is purely conventional and the hose operates in its ordinary manner.

The structure of this invention has a number of new and unobvious advantages. Thus, the dirt separating member or bag 41 is kept entirely hidden by the container 14. This results in a much more pleasing appearance as there is no collapsible bag in view, which often is dirty and unsightly. The container 14, which contains the bag 41, may be made quite long because the handle itself is long. This results in a relatively small cross-section of the container yet provides sufficient area for the bag 41 so that the bag may be used for a relatively long period of time without requiring replacement.

Although disposable paper bags have been proposed for use in handle type vacuum cleaners, these have ordinarily been employed within a flexible cloth bag. Not only is the invention much more pleasing in appearance, but it is also much easier to install and remove the disposable bag as the container 14 is rigid and the bag 41 is at least partially removed therefrom when the cap member 35 is rotated to an open position. In addition, the bag 41 is easy to remove without requiring undue stooping as the cap member 35 is adjacent to the top of the handle 12 and is thus a considerable distance from the floor.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. A vacuum cleaner, comprising: a wheeled housing having a suction air inlet; a motor and fan in said housing; walls in said housing defining an air passage including said suction air inlet and an air outlet; a handle attached to said wheeled housing for moving the same over a surface; a relatively rigid container adjacent to and supported by said handle adapted to contain a removable dirt separating member and having one end adjacent to said housing air outlet; a flexible conduit member connecting said air outlet with the interior of said container; walls in said housing defining a second suction air passage including said fan and a casing air inlet adjacent to said air outlet; a longitudinal partition dividing the interior of said container into a pair of air passages, one of which communicates with said conduit member and the other of which contains said dirt separating member, said air passages communicating with each other at the upper end of the container by means of a conduit to which said separating member is adapted to be releasably attached; and a second flexible conduit member connecting said casing air inlet and the housing end of said other air passage.

2. The vacuum cleaner of claim 1 wherein said upper end of the container is closed by a removable cap member of which said conduit is a part, the cap member having a normally closed opening aligned with the separating member end of said conduit for receiving a suction conduit for use in off-the-floor cleaning.

3. A vacuum cleaner, comprising: a wheeled housing having a suction air inlet; a motor and fan in said housing; a handle attached to said wheeled housing for moving the same over a surface; a relatively rigid container adjacent to said housing adapted to contain a removable dirt separating member; and means including said fan for directing dirt laden air in a passage from said housing air inlet into and through said dirt separating member for

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separating dirt from said air, said container being provided with a partition therein dividing the same into a pair of air flow conduits, one of which is adapted to contain said dirt separating member, said conduits being connected at one end by a cylindrical conduit to one end of which said separating member is adapted to be releasably attached.

4. A vacuum cleaner, comprising: a wheeled housing having a suction air inlet; a motor and fan in said housing; walls in said housing defining an air passage including said suction air inlet and an air outlet; a handle attached to said wheeled housing for moving the same over a surface; a relatively rigid container adjacent to and supported by said handle adapted to contain a removable dirt separating member and having one end adjacent to said housing air outlet; a flexible conduit member connecting said air outlet with the interior of said container; and means associated with said container for directing air from said outlet into said separating member, said container being provided with a longitudinal partition dividing the interior into a pair of air passages, one of which communicates with said conduit member and the other of which contains said dirt separating member, said air passages communicating with each other at the upper end of the container by means of a conduit to which said separating member is adapted to be releasably attached.

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5. A vacuum cleaner, comprising: a wheeled housing having a suction air inlet; a motor and fan in said housing; walls in said housing defining an air passage including said suction air inlet and an air outlet; a handle attached to said wheeled housing for moving the same over a surface; a relatively rigid container adjacent to and supported by said handle adapted to contain a removable dirt separating member and having one end adjacent to said housing air outlet; a flexible conduit member connecting said air outlet with the interior of said container; and means associated with said container for directing air from said outlet into said separating member, said container being provided with a longitudinal partition dividing the interior into a pair of air passages, one of which communicates with said conduit member and the other of which contains said dirt separating member, said air passages communicating with each other at the upper end of the container by means of a conduit to which said separating member is adapted to be releasably attached, said upper end of the container being closed by a removable cap member of which said conduit is a part.

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