

June 10, 1941.

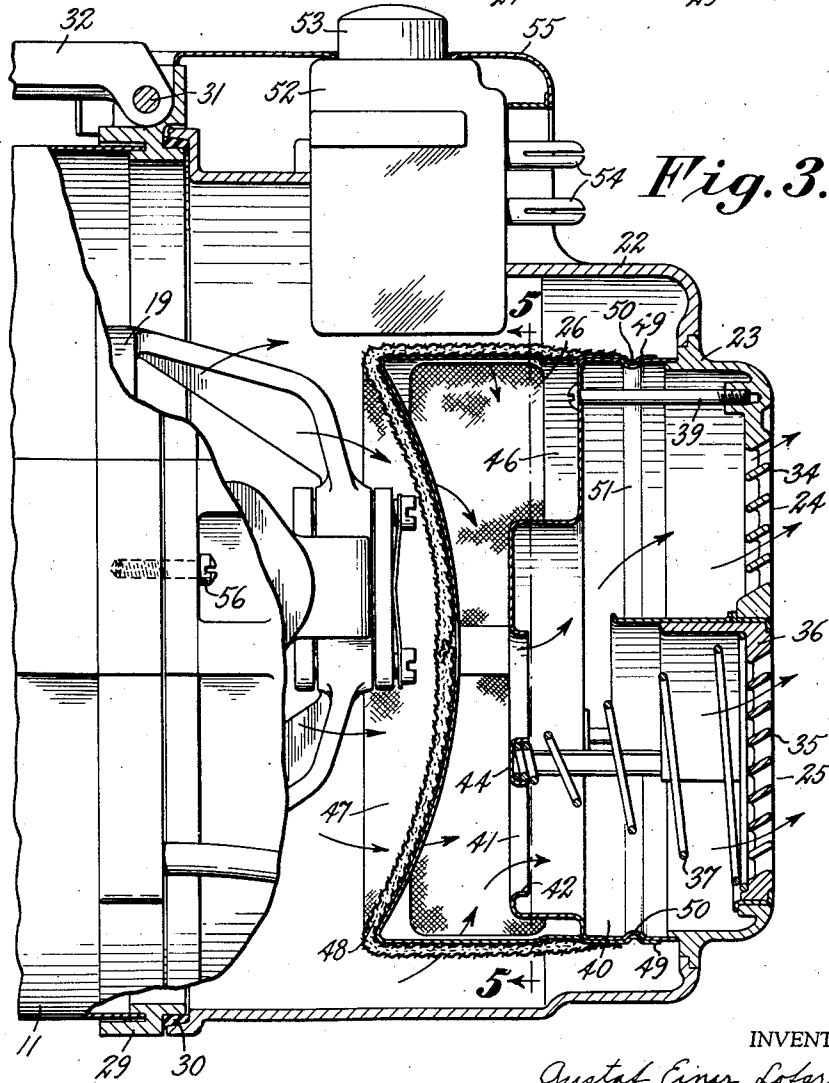
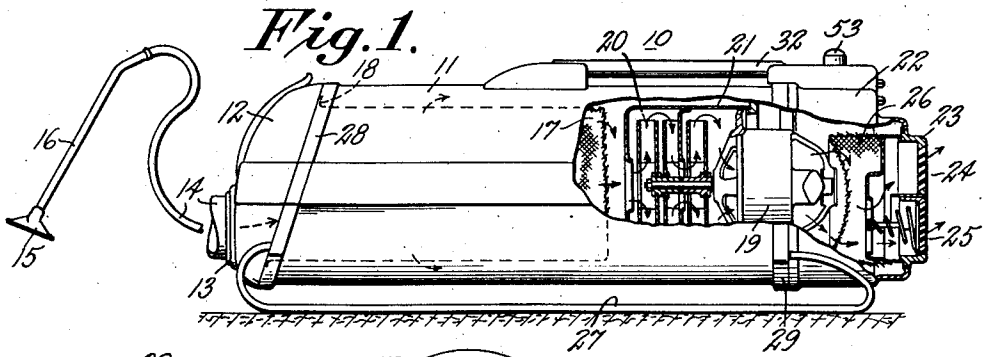
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2,244,843

VACUUM CLEANER

Filed Jan. 28, 1938

2 Sheets-Sheet 1



INVENTOR.

BY

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His ATTORNEY.

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2 Sheets-Sheet 2

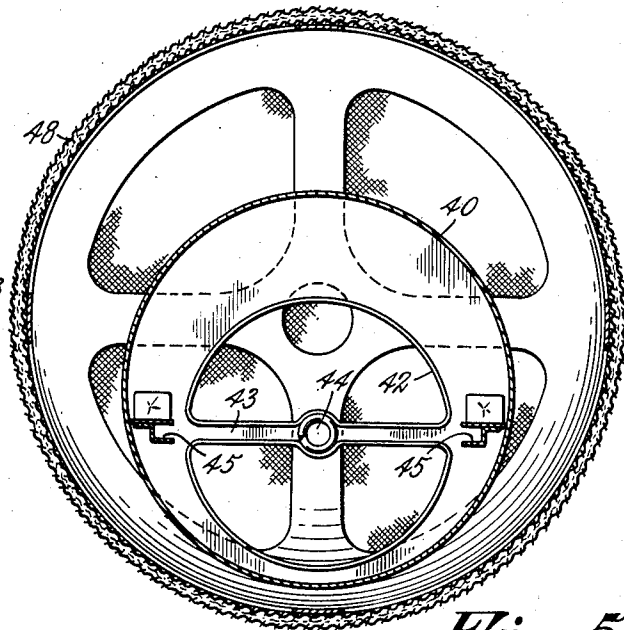
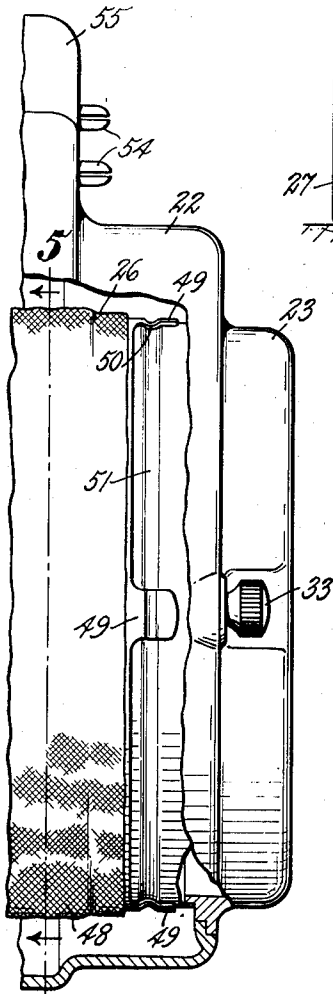
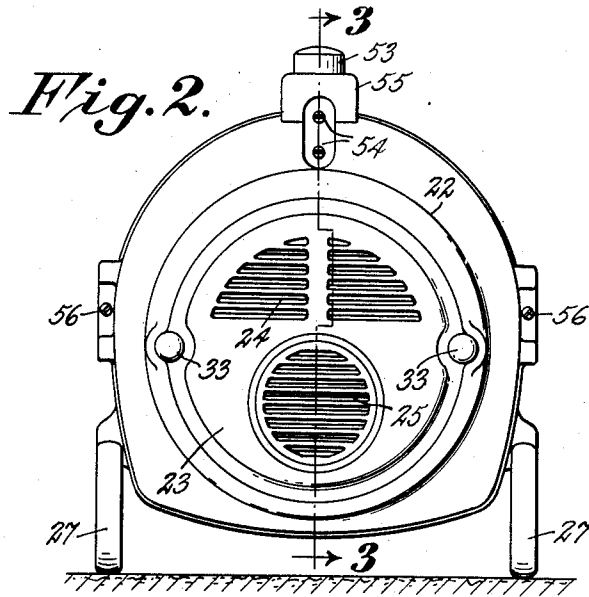


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

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VACUUM CLEANER

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4 Claims. (Cl. 183-73)

My invention relates to vacuum cleaners and more particularly to vacuum cleaners of the type having a unit supported on the floor and connected to a cleaning tool by a flexible hose or conduit.

In vacuum cleaners of this type the cleaning tool is normally connected by the flexible hose to the suction end of the vacuum cleaner unit. The cleaning tool may be connected to the flexible hose with or without substantially rigid tubular members. In the use of the cleaner as a suction cleaner dirt is picked up by air drawn in through the cleaning tool and passes through the conduit to the cleaner unit. As the air passes through the unit, entrained dust is collected in a dust-separating member and the air passes out an exhaust opening. For efficiently cooling the motor driving the fan the air may be passed wholly or partly through the motor before it passes out through the exhaust opening. Some carbon dust may be picked up by the air as it passes through the motor, also some very fine dust particles may pass through the dust-separating member. A filter element is provided adjacent the exhaust opening through which the air passes before it leaves the casing which serves to separate from it any carbon particles or fine dust which may have been entrained by the air.

In accordance with my invention, a louver assembly is mounted at the rear end of the casing with an exhaust opening, carries the filter, and is arranged so that it may be easily removed from the casing for inspection of the filter. A rear end housing for the casing houses the filter element and may be removed for inspection of the motor. The filter element is removably secured to the louver assembly so it may be readily removed and replaced after the louver assembly has been removed from the rear end housing.

What I consider to be novel and my invention may be better understood by reference to the following specification and appended claims, when considered in connection with the accompanying drawings, in which

Fig. 1 is a side view partially in section of a vacuum cleaner unit embodying my invention;

Fig. 2 is a rear view of the devices shown in Fig. 1;

Fig. 3 is an enlarged cross-sectional view taken on the line 3-3 of Fig. 2;

Fig. 4 is a cross-sectional view of a portion of the cleaner unit;

Fig. 5 is a cross-sectional view taken on the lines 5-5 of Figs. 3 and 4.

Referring particularly to Fig. 1, numeral 10 designates generally a vacuum cleaner. Vacuum cleaner 10 includes a casing 11 of substantially cylindrical cross section which is adapted for mounting on a horizontal axis. One end of the casing 11 is closed by a removable cover 12 in which an aperture 13 is provided for connecting a hose 14. At the other end of hose 14 a cleaning tool 15 may be connected by means of a tubular handle member 16.

Within casing 11, a dust-separating member 17 is located with a flanged ring 18 which is secured to the end of casing 11 by means of front-end cover 12. The dust-separating member 17 is preferably made of a fine texture cloth which will permit the passage of air therethrough but will separate any dust particles entrained in the air. The dust collected in the separating member 17 is periodically emptied from the separating member 17 by removing it from the casing 11 which may be done by removing the front-end cover 12.

A motor fan unit including an electric motor 19 and a centrifugal fan 20 is mounted with the casing 11. The housing of fan 21 is sealed to the casing of motor 19 so that all of the air passing through the fan 19 must pass through the interior of the motor 19.

After the air has passed through the motor 19 it enters a rear end housing 22 carried by the end of casing 11. Rear end housing 22 has an exit fitting or louver assembly 23 in the form of a hollow body in which the exhaust openings 24 and 25 are provided. The air in passage through the separating member 17 may carry with it very fine dust particles which are fine enough to pass through the separating member 17. As the air passes through the motor 19 carbon dust particles from the motor brushes may be entrained by the air. It is not desirable to pass this air with the fine dust particles and the carbon particles out through the exhaust openings 24 and 25. For the purpose of separating out these fine dust particles and carbon particles a filtering member 26 is mounted in housing 22 and arranged so that all the air passes through it before passing through the exhaust openings 24 and 25.

Casing 11 is supported on a floor or other surface by means of two sleighs 27 which are secured at their front ends to a ring 28 and at their rear ends to a ring 29. Ring 28 is secured directly to the casing 11 at one end and the ring 29 is secured to the casing 11 at the other end. As it may be seen by reference to Fig. 3, the

rear end housing 22 is in the form of a casting and is secured to ring 29 with an interposed packing ring 30 which provides a fluid-tight seal between the casing 11 and the housing 22. Ring 29 carries a pivot pin 31 for a handle 32 for the vacuum cleaner unit 10.

Louver assembly 23 is which the exhaust openings 24 and 25 are located is secured to housing 22 by means of two screws 33 located at opposite sides. The exhaust openings 24 and 25 are provided with inclined vanes 34 and 35, respectively, for directing air upwardly as it leaves vacuum cleaner unit 10. The exhaust opening 24 is divided into two symmetrical halves, in each half the vanes 34 are provided.

In the operation of the vacuum cleaner unit 10, it is desirable at times to use a blower action instead of a suction action. To provide for the connecting of the hose 14, for blower action the exhaust opening 25 is provided with a cylindrical sliding louver 36 which carries vanes 35. The sliding louver 36 is held flush with the outer surface of louver assembly 23 by means of a spiral spring 37 which in its distended form is of substantially conical shape. The hose 14 is inserted in the opening 25 moving the sliding louver 36 to the left, as shown in Fig. 3, against the bias of spring 37.

Secured to the louver assembly 23 by means of screws 39 is an exhaust cover 40 in the form of a stamping. Cover 40 is provided with a port 41 with a curved lip 42. Extending transversely across port 41 is a cross-bar 43 with a central seat 44 for spring 37. Tracks 45 are secured to cover 40 serving to guide sliding louver 36 in its movement upon insertion of the hose 14 in opening 25.

Filtering member 26 is provided with a substantially cylindrical perforated frame 46 with a recess 47 at one end. A filtering material 48 is preferably in the form of a fabric or cloth with interspersed layers of felted fibers. The filtering member 26 is mounted on the louver assembly 23 by means of fingers 49 with inwardly extending projections 50 which are adapted to snap into an annular recess 51 provided in cover 40. The filtering material surrounds the frame 46 to a point where it overlies the cover 40 so all of the air that enters port 41 passes through filter material 48. The surface of filter material 48 is larger in area than the area of the opening of the rear end housing 22 in which louver assembly 23 is inserted.

Cleaning or replacement of the filtering member 26 or the covering of filtering material 48 may be accomplished by removing the louver assembly 23 from housing 22. The louver assembly 23 is removed simply by loosening the screws 33. While it will seldom be found necessary to replace the filtering member 26, it is desirable to remove the louver assembly 23 occasionally for examination of the filtering member 26 to determine whether or not it need be replaced.

Mounted in the top of housing 22 is a switch 52 for controlling the operation of the motor 19. Switch 52 has a button 53 for actuating the switch 52. Connected to the switch 52 are two terminals 54 which are provided for connection with a source of electrical supply. A plate 55 covers the switch 52 and has an opening through which the button 53 passes.

In the assembling of the rear end housing 22, the switch 52 and plate 55 are first secured to the housing. The housing may then be mount-

ed on the casing 11 by means of screws 56 which are threaded in engagement with the ring 29. Ordinarily it will be more convenient to assemble the louver assembly 23 with the cover 40 and filtering member 26 and secure it to the housing 22 after housing 22 has been mounted on the casing 11. However, whenever it is desirable to examine or replace the filtering material 26 it is not necessary to remove the housing 22 as only the louver assembly 23 need be removed. To obtain access to the motor, it is more convenient to remove the whole of the assembly of housing 22.

The operation of the vacuum cleaner 10 is as follows:

Air drawn in through the cleaning tool 16 picks up dirt or dust located on the surface being cleaned and passes through the tubular member 16, flexible hose 14, through the aperture 13 in front end cover 12 into the casing 11. As the air passes through the dust-separating member 17 the dust is collected by the dust-separating member 17. The air passes through the centrifugal fan 20 and is then directed through the motor 19. As the air passes through the motor 19 carbon particles from the motor brushes may be picked up. Also very fine dust may have passed through the dust-separating member 17. The air with carbon particles and fine dust particles which may have been entrained then passes through the filter element 26. As the air passes through the filter element 26 these carbon particles and very fine dust particles are removed from the air. The air enters a port in the exhaust cover 40. A portion of the air passes out the exhaust opening 24 of the louver assembly 23 and another portion passes out the exhaust opening 25. The air in passing through the exhaust openings 24 and 25 is directed upwardly by the vanes 34 and 35, respectively, away from the surface on which the cleaner unit is supported.

After the vacuum cleaner 10 has been used for a while it is desirable to remove the dust-separating member 17 and empty it which may be done by first removing the front end cover 12. At less frequent intervals it is advantageous to remove the filter element 26 for inspection to see whether or not it is desirable to clean or replace it. This may be done by unscrewing the two thumb screws 33 and removing the louver assembly 23 from the rear end housing 22. When the louver assembly 23 is removed the filter element 26 carried by it is also removed. After inspecting the filter element 26 it may be removed, if necessary, by removing the frame 46 from the louver assembly 23. The whole filter element 26 may then be replaced, or the filter material 48 on the frame 46 may be replaced. A new or clean filter element 26 or one with a cleaned or replaced filter material 48 is replaced on the louver assembly 23 by simply passing the fingers 49 over the cover 40 until the projections 50 snap into the annular recess 51. The filter element 26 and the louver assembly 23 may then be replaced in the rear end housing 22. The vacuum cleaner 10 is then ready for continued use as a suction cleaner or when desired its blower action may be utilized by connecting the flexible hose 14 in the exhaust opening 25.

What I claim is:

1. In a vacuum cleaner having a casing with a suction opening at one end and an exit opening at the other end, a removable exit fitting

for said last-mentioned opening, said exit fitting comprising a hollow body, means on said hollow body for attachment to said casing with the major portion of the hollow body within the casing, a filter for said major portion of the hollow body, said filter having a filtering surface spaced from the wall of the casing and of an area materially greater than the area of the exit opening in the end of the casing in which the hollow body is applied.

2. The structure defined in claim 1, wherein

said filter is readily detachable from said hollow body.

3. The structure defined in claim 1, that includes means supporting said filter in a manner such that the air passing through the casing passes through said filter.

4. The structure defined in claim 1 that includes means for securing said exit fitting in place in a manner to permit the same to be readily applied or removed.

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