United States Patent

Nordeen

[15] **3,675,268**

[45] **July 11, 1972**

[54] VACUUM CLEANER

[72] Inventor: **Erwin E. Nordeen**, St. Paul, Minn.

[73] Assignee: **Whirlpool Corporation**

[22] Filed: **May 19, 1970**

[21] Appl. No.: **38,803**

[52] **U.S. Cl.** **15/350**, 15/412

[51] **Int. Cl.** **A47l 9/22**

[58] **Field of Search** 15/350, 412, 413, 351

[56] **References Cited**

UNITED STATES PATENTS

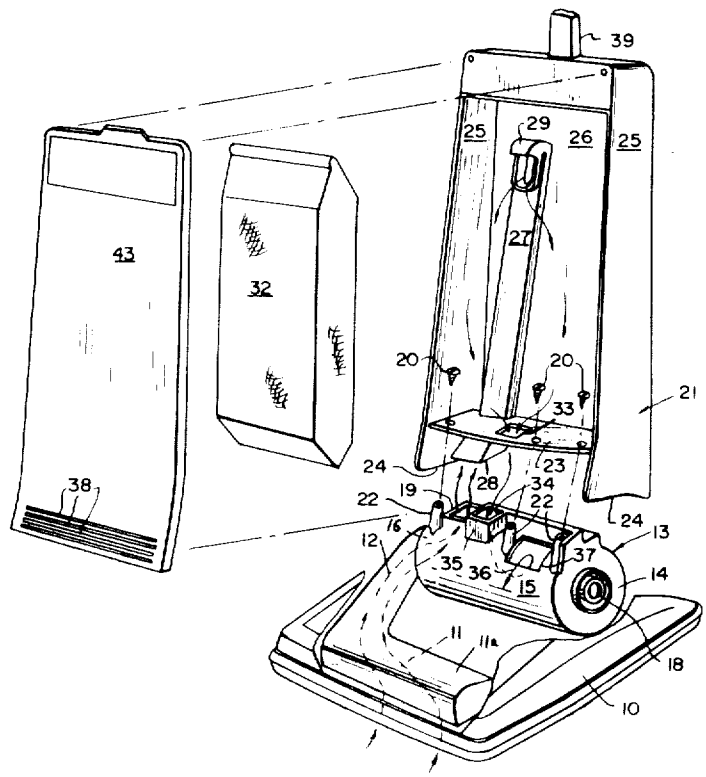
3,344,460	10/1967	Nordeen	15/351
2,633,596	4/1953	Turner et al.	15/350 X
3,273,194	9/1966	Jepson et al.	15/412 X
2,300,266	10/1942	Smellie	15/413 X

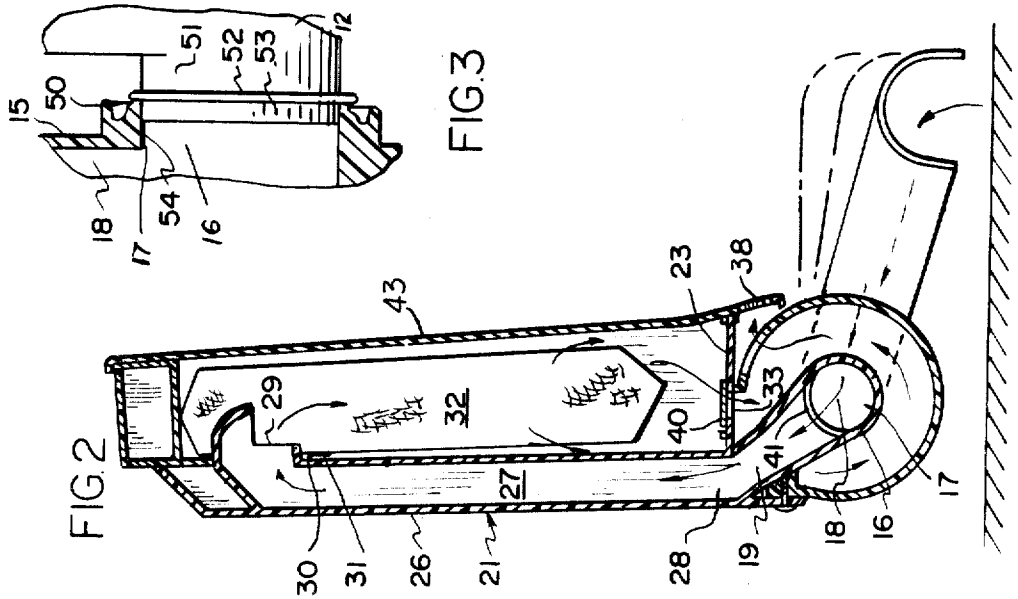
Primary Examiner—Walter A. Scheel
Assistant Examiner—C. K. Moore
Attorney—Hofgren, Wegner, Allen, Stellman & McCord, James S. Nettleton, Thomas E. Turcotte, Burton H. Baker, Gene A. Heth, Franklin C. Harter, Anthony Niewyk and Robert L. Judd

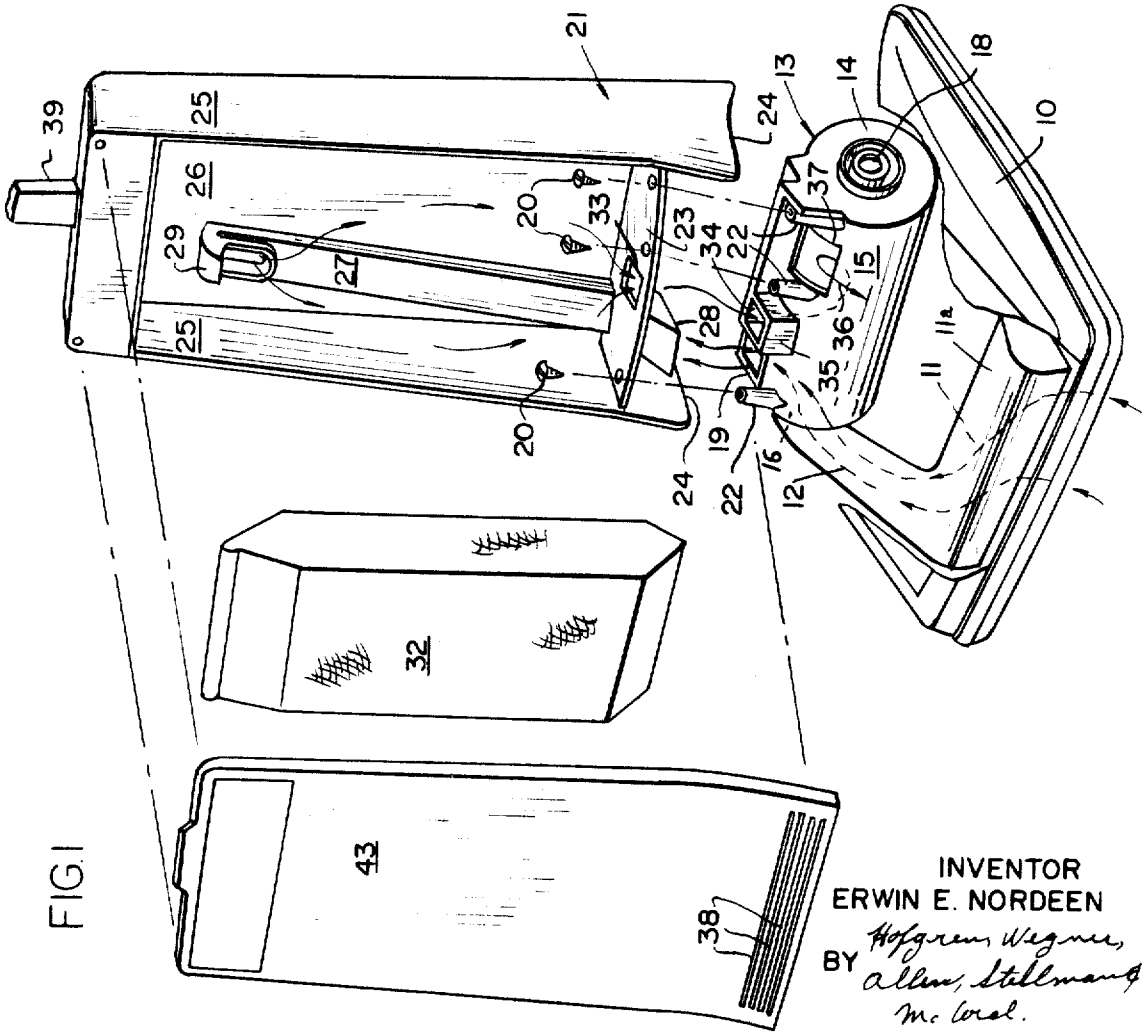
[57] **ABSTRACT**

A vacuum cleaner having a nozzle, a motor-fan suction unit pivotably mounted on the nozzle about a horizontal axis, a dust bag enclosing housing of rigid construction mounted on the suction unit to be pivoted therewith and a rigid air passage conduit in the housing extending to the upper portion thereof for suspending a filter bag in the housing together with air inlet passages into the conduit and air outlet passages from the housing both of which are enclosed by the attaching of the housing to the suction unit.

3 Claims, 3 Drawing Figures







INVENTOR
ERWIN E. NORDEEN
BY Hofgren, Wegner, Allen, Stellman & McCord.
ATTORNEYS.

VACUUM CLEANER

One of the features of this invention is to provide a vacuum cleaner of the above type in which the motor-fan suction unit and an attached rigid housing is pivotably mounted on the nozzle for pivotal movement about a generally horizontal axis and in which the dirt laden air passage into the housing and the filtered air passage from the housing extend through the unit and are enclosed by the lower end of the housing in combination with a dirt laden air conduit within the housing extending to adjacent the top thereof and having means at the top for suspending a replaceable filter bag.

Other features and advantages of the invention will be apparent from the following description of one embodiment thereof as shown in the accompanying drawings. Of the drawings:

FIG. 1 is a semi-diagrammatic exploded view of a vacuum cleaner embodying the invention.

FIG. 2 is a semi-diagrammatic vertical sectional view through the portions of the cleaner of FIG. 1 that include the various air flow passages.

FIG. 3 is a fragmentary sectional view of a portion of the air duct means at the juncture of the air inlet passage 12 and the end of the motor-fan section 15 containing the air flow chamber 16.

The cleaner illustrated in the embodiment of the drawings comprises a nozzle structure 10 having an inlet passage means 11 for dirt laden air comprising a transverse front passage 11*a* and a rearwardly extending side passage 12 on one side of the nozzle 10. The parts 11 and 12 are integral and may be made of a rigid molded plastic.

On the rear of the nozzle structure there is provided a motor-fan suction unit 13 which is pivotable relative to the nozzle structure and is independent thereof. The unit 13 includes a generally cylindrical casing 14 having a motor-fan section 15 on one end thereof and a smaller air flow chamber 16 adjacent the other end. The smaller air flow chamber 16 is integral with the casing 14 so as to be movable therewith. This chamber 16 has an entrance 17 that is concentric with the horizontal axis of the motor-fan suction unit 13 and an exit 19 from the chamber 16 (FIG. 2).

As shown in the detail fragmentary sectional view of FIG. 3, the air inlet side passage 12 is provided with a short horizontal cylindrical extension 51 which extends into an annular part of the motor-fan section 15 and has an annular flange 52 bearing against a flange 50 on the section 15. The tubular end 53 beyond the flange or collar 52 is rotatably received within the annular bore 54 on the entrance 17 to the chamber 16.

Attached to the top of the suction unit casing 14 as by the attaching screws 20 is a rigid upright housing 21 preferably made of a molded plastic. The housing 21 is rigidly attached by the screws 20 being held in mounting bosses 22 on the casing 14. As shown in FIG. 1 these screws 20 extend through a rigid transverse bottom wall 23 that is spaced upwardly a short distance from the bottom ends 24 of the side walls 25 of the housing 21.

Positioned within the rigid housing 21 at the back wall 26 thereof is a rigid air passage conduit 27 having its lower end 28 beneath the bottom wall 23 and between the side walls 25 and communicating directly with the exit 19 from the air flow chamber 16. The conduit 27 has a forwardly projecting upper end 29 that is provided with a mounting flange 30 for releasably securing the rubber diaphragm portion 31 of a replaceable paper filter bag 32 that normally extends vertically within the housing 21 as illustrated. Thus the bag 32 is actually suspended freely from the top of the vertical conduit 27 for dirt laden air.

The housing 21 is open at the front but is normally closed by a removable cover 43 in order that used filter bags may be removed and replaced by clean ones.

The housing 21 is provided with exit means 33 in the form of an opening in the bottom wall 23 of the housing externally of the bag 32 for passage of filtered air from the housing. As can be seen in the drawings the lower end of the housing 21 also encloses this exit means 33 as well as the entrance means to the housing embodied in the lower end 28 of the conduit 27.

The exit means 33 from the housing 21 coincides with a filtered air entrance 34 to the interior of the suction unit casing 14. This entrance 34 which is located in a short duct 35 directs the filtered air through the suction unit motor as indicated by the arrows 36 and from the casing 14 to the ambient atmosphere by way of a casing opening 37 and lower vent openings 38 in the bottom of the front cover 43.

The top of the housing 21 is provided with a customary propelling handle 39 that is attached to the housing.

As shown in FIG. 2 only for clarity of illustration the exit means opening 33 in the bottom wall 23 is provided with a safety filter 40 which may be made of felt or the like and which operates to prevent dirt entering the motor in the event of failure of the filter bag 32.

As stated earlier, the rigid assembly of suction unit 13, rigid housing 21 and air passage conduit 27 therein is pivotably mounted about a horizontal axis 18. This is accomplished in the illustrated embodiment by having the arcuate lower end of the conduit entrance 17 pivotably mounted on the circular upper end 41 of the side passage 12 of the nozzle structure. The other end of the casing 14 may be pivoted to the nozzle in any manner desired.

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 appended claims.

I claim:

1. A vacuum cleaner comprising: a nozzle having an inlet passage means, for dirt laden air; a motor-fan suction unit having a cylindrical casing pivotably mounted on said nozzle about a horizontal axis of said unit and defining a fan chamber having an entrance means in communication with said inlet passage means and an exit means, whereby dirt laden air is conducted successively through said inlet passage means of the nozzle and said fan chamber by way of its said entrance and exit means; a rigid upright housing having a lower end removably attached to said casing to be pivotal directly therewith; an air passage conduit in said housing having a lower end in direct communication with said exit means to receive dirt laden air therefrom and an upper end in an upper portion of said housing; means at said upper end of said conduit for releasably securing a filter bag in position to receive said dirt laden air and filter the dirt therefrom in passing the air outwardly through the bag into said housing; housing exit means for conducting the filtered air from said housing, said lower end of the housing enclosing each of said casing fan chamber exit means and housing exit means; and an outlet opening in said casing for discharging the filtered air from the vacuum cleaner forwardly through said casing, said housing lower end and casing cooperatively defining means for guiding the discharged air forwardly from said outlet.

2. The vacuum cleaner of claim 1 wherein said means for discharging the filtered air comprises a first air passage means through the casing of said motor-fan suction unit in communication with said housing exit means for conveying said filtered air into said casing and a second air passage means through the casing for discharging the filtered air from the interior of the casing, said second air passage means being movable with said casing relative to said nozzle, said guiding means including a discharge vent opening in said lower end of the housing forwardly of the casing second air passage means.

3. The vacuum cleaner of claim 1 wherein said cylindrical casing for said suction unit is horizontally disposed and supports at a top portion thereof said fan chamber exit means and a filtered air inlet from said housing exit means to the interior of said casing, and means for attaching said lower end of the housing to said top portion of said casing to enclose both said exit means.

* * * * *