Feb. 13, 1940. J. E. V. EDSTROM 2,190,470

VACUUM CLEANER

Filed Oct. 22, 1938

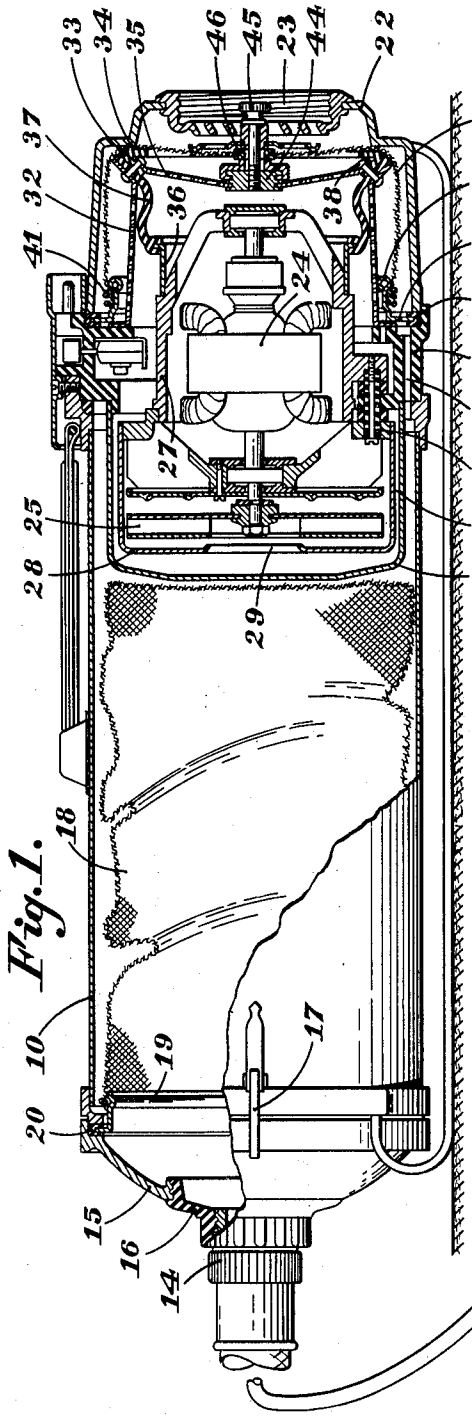


Fig. 1.

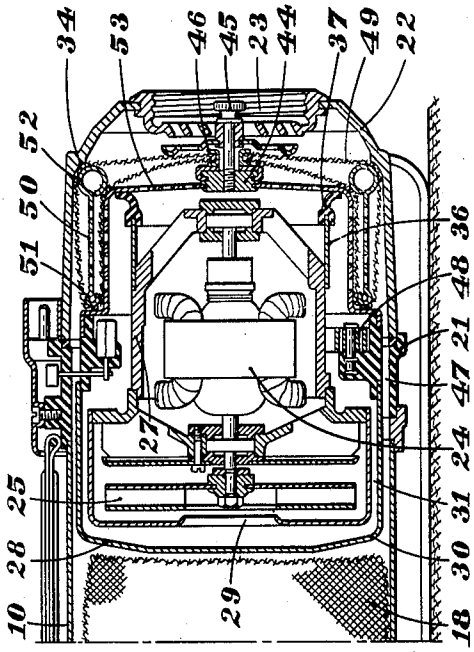


Fig. 2.

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Patented Feb. 13, 1940 2,190,470

UNITED STATES PATENT OFFICE

2,190,470

VACUUM CLEANER

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Application October 22, 1938, Serial No. 236,439
In Sweden October 27, 1937

5 Claims. (Cl. 183—37)

My invention relates to vacuum cleaners and more particularly to an improved air purifier for use in vacuum cleaners.

In vacuum cleaners of the inside bag type, dirt and dust collected by a vacuum cleaner is separated from the air by a dust bag and the air then continues through a fan inducing the air flow. While the dust bag is made of a material that is impervious to dirt and dust generally it is possible that some very fine dust may pass through the dust bag. The air in passing through the fan laden with this fine dust may deposit some of it in the fan. This fine dust may ultimately clog or partially close some of the passages to or from the fan. It has been a practice to direct a part or all of the air, passing through the cleaner, through the motor driving the fan for a more efficient cooling of the motor. This fine dust carried by the air after passing through the dust bag may interfere with the operation of the motor if deposited there. This fine dust may be separated from the air before it enters the fan by an air purifier or filter formed of fine mesh cloth or other material located in the path of air flow from the dust bag to the fan. The air in passing through the motor may collect carbon dust from the motor brushes. It is desirable to remove this carbon dust by an air purifier or filter located between the motor and the exhaust opening of the vacuum cleaner. An air purifier or filter which separates such fine dust particles from the air may become clogged in the course of time and interfere with the passage of air through the vacuum cleaner. It is highly desirable to arrange these air purifiers so that they are readily accessible for removal and may be cleaned or replaced by a new one. Experience has demonstrated that unless they are readily accessible they may not be removed until they have impaired the operation of the vacuum cleaner if they are removed at all.

In accordance with my invention a single air purifier is provided which serves to filter out the fine dust particles as the air passes from the dust bag to the fan and also to remove the carbon dust after the air leaves the motor. This air purifier is located in a filter housing which may be removed for ready access to the air purifier.

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 drawing, in which

Fig. 1 is a longitudinal sectional view of a vacuum cleaner embodying the improved air purifier and;

Fig. 2 is a sectional view of a portion of a vacuum cleaner embodying a modified form of the invention.

Referring to the drawing, 10 indicates a vacuum cleaner casing. A cleaning tool 11 is connected to casing 10 by a flexible hose 12. A rigid tubular handle 13 may be interposed between the hose 12 and cleaning tool 11 if desired.

Hose 12 is connected to casing 10 by a coupling 14 in threaded engagement with a cover 15. A sleeve 16 of insulating material is interposed between coupling 14 and cover 15. Cover 15 is detachably secured to casing 10 by spring clips 17 only one of which is shown in Fig. 1. A dust bag 18 is located in casing 10 which is formed of cloth or other material impervious to dirt generally but pervious to air. A dust bag ring 19 is provided with a flange on which is mounted a flexible gasket 20. Ring 19 and gasket 20 are clamped between casing 10 and cover 15.

A ring 21 preferably of non-metallic material is secured to casing 10. A filter housing 22 is secured to ring 21 and is provided with a threaded exhaust opening 23. A motor 24 driving a fan 25 is secured to ring 21. A plurality of helical springs 26 are interposed between motor casing 27 and ring 21. A fan housing 28 having an inlet opening 29 is secured to motor casing 27.

An air tight cylindrical baffle or housing 30 forming an air passage 31 from the rear, shown at the right in Fig. 1, communicating with the inlet opening 29 of fan housing 28 is secured to ring 21.

A perforated cylindrical sleeve 32 is secured to ring 21 and spaced from motor casing 27. An annular rubber ring 33 is secured to the end of sleeve 32 and abuts a shoulder 34 in filter housing 22. A dished perforated disk 35 is secured to sleeve 32. A cylindrical shroud 36 is secured to motor casing 27. A rubber ring 37 extends from shroud 36 to sleeve 32. Ring 37 may be formed integrally with ring 33. Sleeve 32, disk 35, ring 33, and ring 37 may be secured together as by means of a plurality of rivets 38.

An air purifier or filter 39 extends between the perforated sleeve 32 and filter housing 22 and between perforated disk 35 and the exhaust opening 23 of filter housing 22. Filter 39 is preferably formed of a cloth material impervious to very fine dust and dirt. Filter 39 is of cup shape and its outer end is secured to a filter ring 40 as by means of a thread binding 41. Ring 40 has an outwardly extending flange 42 with a flexible gasket 43.

Flange 42 and gasket 43 are clamped between ring 21 and filter housing 22. Rings 33 and 37 separate filter housing 22 into two chambers, one a peripheral chamber in which the cylindrical portion of filter 39 is located and the other an exhaust chamber communicating with the exhaust opening 23 in which the disk shaped portion of filter 39 is located. Ring 33 also holds filter 39 in contact with shoulder 34 of filter housing 22.

A threaded nut 44 is secured centrally of disk 35. Filter housing 22 is secured to ring 21 by means of a bolt 45 in threaded engagement with nut 44. Bolt 45 passes through a ring 46 located in the center of filter 39. Filter 39 may be removed for inspection and replacement by unscrewing bolt 45 and removing the filter housing 22.

The operation of the above described device is as follows:

Operation of the fan 25 by motor 24 draws dirt laden air in through cleaning tool 11. The dirt laden air passes through hose 12, coupling 14, and cover 15 into the interior of dust bag 18. The dirt is separated from the air as it passes through the dust bag 18. The air passes between housing 30 and the casing 10 and thence through passages 47 provided in ring 21 into filter housing 22. The air then passes through the cylindrical portion of filter 39 which separates out any fine dust which may have passed through the dust bag 18. The air passes through perforated sleeve 32, around the spring 26, through passage 31 between the housings 28 and 30, and enters the inlet opening 29 to fan 25. The air continues through fan 25, motor 24, disk 35, and then passes through the disk portion of filter 39. In the passage of the air through the disk portion of filter 39 any carbon dust which may have been picked up in the passage of the air through motor 24 is separated from the air. The air then leaves the vacuum cleaner through the exhaust opening 23. Thus the single filter 39 by its cylindrical portion purifies the air before it enters the fan 25 and by its disk shaped portion purifies the air before it leaves the exhaust opening 23.

In the modification shown in Fig. 2 similar parts are designated by the same numerals used in the description of Fig. 1. A spiral spring 48 for resiliently mounting the motor casing 27 in the ring 21 is substituted for the helical spring 26 of Fig. 1.

A filter 49 is provided with two layers of filtering material instead of the single layer of the filter 39 of Fig. 1 for more efficiently removing very fine dust and to lengthen the life of the filter as it will be able to accumulate more dirt and dust before it will become clogged or before it will impair the operation of the vacuum cleaner. A perforated ring 50 is located between the two layers of the filter. Ring 50 is provided with a bulbous enlargement 51 at one end holding filter 49 in contact with ring 21 and a bulbous enlargement 52 at the other end holding filter 49 in contact with shoulder 34 of filter housing 22. The sleeve 32 and disk 35 of Fig. 1 are combined in a single perforated cup shaped member 53 secured to ring 21. Member 53 carries the threaded nut 44 by which filter housing 22 is secured to ring 21. The peripheral portion of filter housing 22 is separated from the portion adjacent the exhaust opening by the ring 37 and the bulbous enlargement 52 which contact opposite sides of member 22. The operation of the devices shown in Fig. 2 is exactly the same as the operation of the devices of Fig. 1 as described above.

What I claim is:

1. A vacuum cleaner including a casing having an inlet opening at one end, a closure member secured to said casing at the other end having an outlet opening, a dust separating member in said casing adjacent said inlet opening, a motor-fan unit mounted in said casing, a fine dirt filter located in said closure member, means guiding air passing from said dust separating member to said fan through a portion of said filter, and means guiding air passing from said fan to said exhaust opening through a portion of said filter.

2. A vacuum cleaner including a casing having an inlet opening at one end, a filter housing secured to said casing at the other end having an exhaust opening, a dust separating member in said casing adjacent the inlet opening, a motor-fan unit mounted in said casing, a ring separating a peripheral chamber from an exhaust chamber in said filter housing, a filter in said filter housing having one portion extending into the peripheral chamber and another portion extending into the exhaust chamber of said filter housing, means guiding air passing from said dust separating member to said fan through the portion of said filter located in the peripheral chamber, and means guiding air passing from said fan to the exhaust opening through the portion of said filter located in the exhaust chamber.

3. A vacuum cleaner including a casing having an inlet opening at one end, a closure member secured to said casing at the other end having an exhaust opening, a dust separating member in said casing adjacent the inlet opening, a motor-fan unit mounted in said casing, a cup shaped filter located in said closure member, a flanged ring secured to said filter and clamped between said closure member and said casing, means guiding the air passing from the dust separating member to the fan through a portion of said filter, and means directing the air passing from said fan to the exhaust opening through another portion of said filter.

4. A vacuum cleaner including a casing having an inlet opening at one end, a closure member secured to said casing at the other end having an exhaust opening, a dust separating member located in said casing adjacent to the inlet opening, a motor-fan unit mounted in said casing, a filter located in said closure member having a plurality of layers of filtering material, a perforated ring having bulbous enlargements at each end located between adjacent layers of filtering material and clamped between said casing and said closure member, means guiding the air passing from the dust separating member to the fan through a portion of said filter, and means guiding the air passing from the fan to the exhaust opening through another portion of said filter.

5. A vacuum cleaner including a casing having an inlet opening at one end, a closure member secured to said casing at the other end having an exhaust opening, a dust separating member located in said casing adjacent to the inlet opening, a motor-fan unit mounted in said casing, a perforated cup shaped member secured to said casing, means removably securing said closure member to said cup shaped member, a filter located in said closure member, means clamping said filter between said casing and a shoulder of said closure member, means guiding air passing from the dust separating member to the fan through a portion of said filter and means guiding air passing from the fan to the exhaust opening through another portion of said filter.

JOHAN ERIC VALDEMAR EDSTROM.

CERTIFICATE OF CORRECTION.

Patent No. 2,190,470. February 13, 1940.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the grant, line 1, name of inventor, for "JOHN ERIC VALDEMAR EDSTROM" read --JOHAN ERIC VALDEMAR EDSTROM--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of May, A. D. 1940.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.