April 17, 1934. A. O. ENGBERG ET AL 1,954,924

VACUUM CLEANER

Filed Feb. 1, 1929

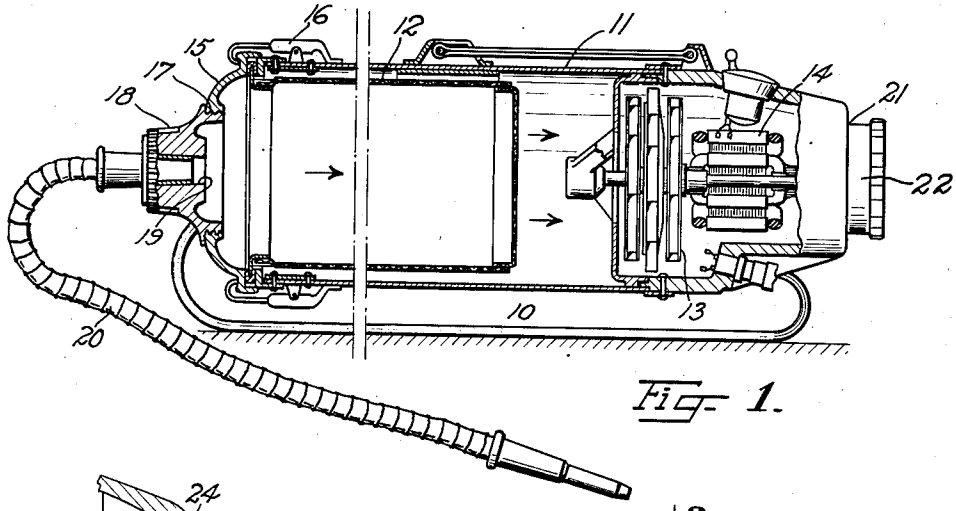


Fig. 1.

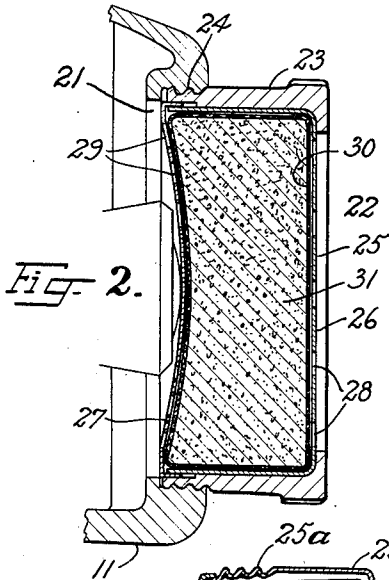


Fig. 2.

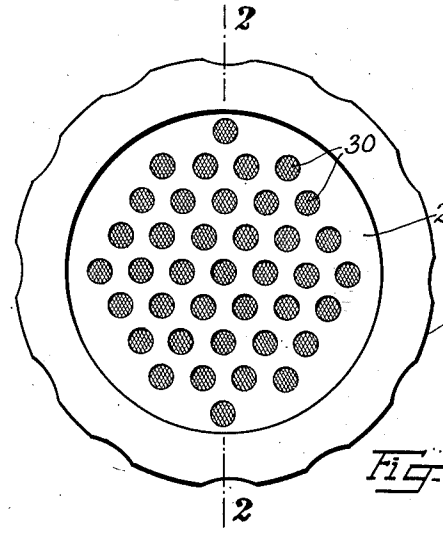


Fig. 3.

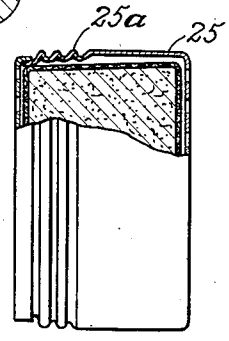


Fig. 4

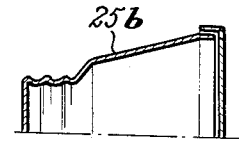


Fig. 5.

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1,954,924

VACUUM CLEANER

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Application February 1, 1929, Serial No. 336,796
In Sweden February 3, 1928

8 Claims. (Cl. 183—49)

Our invention relates to vacuum cleaners and more particularly to vacuum cleaners of the type having a casing enclosing a dust bag and a motor-driven fan and having suction and blowing openings adjacent the ends of the casing on each side of the fan. In one phase of our invention it relates more particularly to the conditioning or purifying of air passing through a cleaner of such type and the arrangement of an air purifying or air conditioning member in such cleaner, with respect to other parts of such cleaner. In another phase of our invention it relates to a specific and improved air conditioning member. In the more specific phases of the invention, the type of vacuum cleaner to which the invention applies is that disclosed in Pat. No. 1,757,239 granted May 6, 1930 to Axel Olof Engberg and Fredrik Carlstedt.

Amongst the objects of our invention are: To provide air purifying means between the fan and the blowing opening of the cleaner; to provide a cleaner with easily exchangeable air purifying means; to provide a cleaner with air purifying means comprising granulated solid material, such as animal-bone-coal, charcoal, coarse-grained sand of special kind, or the like; and to provide a cleaner with air purifying means capable of taking up also very fine dust and microbial organisms.

An air purifying or conditioning member according to the invention may be readily applied to vacuum cleaners of the kind above referred to in which a dust separator or dust bag and a motor driven fan are enclosed in a casing, and in which the blowing or air outlet opening is larger than the normal suction opening during suction operation, because, in such cleaners, the air purifying means may readily be attached in such manner that the resistance to flow of air through the cleaner is not increased to any appreciable extent. In suction cleaners of this kind it is known to use a connection piece or coupling member which contains a passage constituting the normal suction or blowing opening, and which may be connected to the suction cleaner and inserted either in its suction or its blowing end. If the air purifying means according to the invention is used in this type of cleaner, it is preferably provided with fastening means like that of said coupling member, and is so constructed that it may be connected to the cleaner casing in the operative position of and instead of said coupling member.

Further objects and the nature of our invention will be apparent as the description proceeds. The description is of three preferred forms, but it is to be understood that it is not intended that the invention be limited to the forms described.

With reference to the accompanying drawing:

Fig. 1 is in part an elevational side view and in part a cross-sectional view of a vacuum cleaner embodying the invention;

Fig. 2 is an enlarged sectional view of an air conditioning member forming part of the structure of Fig. 1 and showing the mode of connection to the main cleaner casing. Fig. 2 is in part taken on the line 2—2 of Fig. 3;

Fig. 3 is an end view of the air conditioning member;

Fig. 4 is in part a side and in part a cross-sectional view of a modified form of air conditioning member; and

Fig. 5 is a cross-sectional view of a modified form of part of the air conditioning means.

Reference character 10 designates generally a vacuum cleaner of the type shown in the patent above referred to, to which the invention is applied. The vacuum cleaner comprises a main casing 11 of generally cylindrical form which encloses a dust bag 12, a fan 13 and a motor 14. The fan 13 is driven by the motor 14 to produce flow of air through the casing. The fan and motor may be said to constitute a fan unit. At one end of casing 11 is a cap 15 held to the casing proper by spring clips 16. The dust bag is retained between cap 15 and the casing proper. In cap 15 is an air inlet or suction opening 17 which is screw-threaded to receive a coupling member 18. Coupling member 18 contains a central passageway 19 which constitutes the normal suction opening to the part of the cleaner containing the dust bag. A hose 20 is secured in coupling 18. It will be seen that the suction opening or air inlet opening 17 is larger than the passageway 19 which receives the hose. At the opposite end of the cylindrical casing is an opening 21 (see Fig. 2). Opening 21 may be termed the air outlet opening or blowing opening. Opening 21 is similarly threaded to opening 17 and is also adapted to receive the coupling 18. If the coupling 18 is inserted in opening 21, the hose may be inserted in the coupling 18 at the blowing end and the device used as a blower. This is fully described in the patent above referred to. It will be seen that the air inlet and air outlet openings are oppositely disposed with respect to and on opposite sides of the fan 13. The dust bag, which is of the ordinary cloth construction supported on a ring, is situated between the fan 13 and the inlet opening of the casing.

Reference character 22 designates generally an air conditioning member or air purifying member which is inserted into opening 21 in the ordinary use of the vacuum cleaner. Air conditioning member 22 comprises a frame 23, which is essentially a ring-shaped casing and which may be made of aluminum or any moulded material such as phenol condensation product or the like. Frame 23 is provided with screw-threads 24 which are similar to the screw-threads of coupling 18 and which consequently mate with the screw threads in opening 21. It will thus be seen that the coupling and the air conditioning member may be secured in the cleaner casing in similar manner and that the screw-threads constitute securing or fastening means of similar nature with respect to the cooperating parts.

Within and carried by the frame 23 is a receptacle 25. Receptacle 25 comprises a body portion 26 and a cover 27. The body portion has a perforated bottom, the perforations being shown at 28, and the cover 27 is also perforated, the perforations being shown at 29. Contained within the receptacle 25 is a cloth bag 30 which may be made of linen or other fabric material. This bag, as is shown, substantially fills the receptacle. Contained within the bag is a granulated solid mass such as the substance known as animal-bone-coal or animal-charcoal, charcoal, sand, or the like. This material is indicated at 31. The rim of frame 23 is provided with a hand grip surface as shown.

It will be seen that the air conditioning member is exchangeably fitted into the cleaner casing, is readily accessible, and can be readily removed for renewing the filter material or treating the filter material or otherwise. It will be seen that the receptacle can be readily taken apart to renew or treat the filter material. It will be further seen that the air conditioning member cooperates with the casing so that all the air passing through the casing is required to pass through the air conditioning member and in contact with the filtering medium therein.

Referring to Fig. 1, it will be seen that air passing through the vacuum cleaner casing must first pass through the cloth of the dust bag, then pass through the fan and before leaving the casing must all pass through the cloth of the air conditioning member and the granulated filter material contained therein. It will be seen that this air conditioning member provides two layers of cloth arranged transversely to the general line of flow of air through the cleaner casing.

How often the filtering material is to be changed depends, of course, on the circumstances of use. When the bag 30 with the filter mass 31 has been removed from the receptacle 25, any suitable bacteria-killing medium is poured thereon, or it may be immersed in such medium, after which it is dried to be again ready for use.

In the form of air conditioning member shown in Fig. 4, the receptacle 25 is itself formed with threads 25*a* which are of the same kind as those of the coupling member 18, and thus the member 23 is eliminated and the receptacle itself becomes the frame of the air conditioning member.

In Fig. 5 I have shown a receptacle 25*b*, which constitutes the frame of the air conditioning member as in Fig. 4. In this arrangement the cover 27*a* is arranged on the outside of the air conditioning member with respect to its position in the casing and, in such case, it is not necessary to remove the receptacle from the vacuum cleaner casing in order to change or treat the filter.

What we claim is:

1. A vacuum cleaner comprising a casing of generally cylindrical formation having air inlet and air outlet openings disposed at opposite ends thereof, means to produce flow of air through said casing, a dust bag in said casing, said openings being threaded with similar screw-threads, a hose coupling having threads mating with the threads of the openings and adapted to fit into either opening and having a relatively small tube connection, said openings being appreciably wider than said tube connection, and an air conditioning member comprising a relatively wide frame and air conditioning material carried by said frame, said frame having threads similar to the threads of the coupling and adapted to fit into either of said openings.

2. A vacuum cleaner comprising a casing of generally cylindrical formation having air inlet and air outlet openings disposed at opposite ends thereof, means for producing flow of air through said casing, said openings being threaded with similar screw threads, a hose coupling having threads mating with the threads of the openings and adapted to fit into either opening and having a relatively small tube connection, said openings being appreciably wider than said tube connection and an air conditioning member comprising a relatively wide frame, said frame having threads similar to the threads of the coupling, a receptacle in said frame constructed to permit access of air thereto and animal charcoal in said receptacle, said air conditioning member being formed to replace said coupling in the casing.

3. A vacuum cleaner comprising a casing of generally cylindrical formation having air inlet and air outlet openings disposed at opposite ends thereof, a dust bag in said casing adjacent the inlet opening, an air conditioning member in said casing adjacent the outlet opening and comprising a plurality of layers of cloth arranged transverse to the axis of the casing, animal charcoal between said layers of cloth, and a fan unit in said casing between the dust bag and the air conditioning member.

4. A vacuum cleaner comprising a casing containing means for producing flow of air and having relatively wide air inlet and air outlet openings disposed on opposite sides of said means, a dust bag in said casing, hose coupling means having a relatively small tube connection, said hose coupling means and the parts of the casing forming the air inlet and air outlet having cooperating parts constituting securing means, and an air conditioning member comprising a relatively wide frame, said frame having a part thereof cooperating with an opening of the casing in like manner as said hose coupling means.

5. A vacuum cleaner comprising a casing of generally cylindrical formation having air inlet and air outlet openings disposed at opposite ends thereof, a dust bag in said casing, means for producing flow of air through said casing, said openings being threaded with similar screw threads, a screw threaded coupling fitting into either opening and having a central passageway of appreciably smaller diameter than the inlet or outlet for receiving an air hose, and an air conditioning member comprising a frame and air conditioning material carried by said frame, said frame having threads engageable with the threads in said openings.

6. A vacuum cleaner comprising a casing of generally cylindrical formation having air inlet and air outlet openings disposed at opposite ends thereof, a dust bag in said casing, means for producing flow of air through said casing, said openings being threaded with similar screw threads, a screw threaded coupling fitting into either opening and having a central passageway of appreciably smaller diameter than the inlet or outlet for receiving an air hose, and an air conditioning member comprising a frame, said frame having threads similar to the threads of said coupling, a receptacle in said frame having a cross-sectional area substantially as great as that of said openings and constructed to permit access of air thereto and divided filter material in said receptacle.

7. A vacuum cleaner comprising a casing of generally cylindrical formation having air inlet and air outlet openings disposed at opposite ends thereof, a dust bag in said casing adjacent the inlet opening, said openings being threaded with similar screw threads, a hose coupling having threads mating with the threads of the openings and adapted to fit into either opening and having a relatively small tube connection, said openings being appreciably wider than said tube connection, an air conditioning member comprising a relatively wide frame, said frame having threads similar to the threads of the coupling and being adapted to screw into said outlet opening, a plurality of layers of cloth carried by said frame transverse to the axis of the casing, and a fan unit in said casing between the dust bag and the air conditioning member.

8. A vacuum cleaner comprising a casing containing means for producing flow of air and having relatively wide air inlet and air outlet openings disposed on opposite sides of said means, a dust bag in said casing, hose coupling means having a relatively small tube connection, said hose coupling means and the parts of the casing forming the air inlet and air outlet having cooperating parts constituting securing means, and an air conditioning member comprising a receptacle adapted to contain air conditioning material, said receptacle having a part thereof cooperating with an opening of the casing in like manner as said hose coupling means.

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