

Feb. 4, 1936.

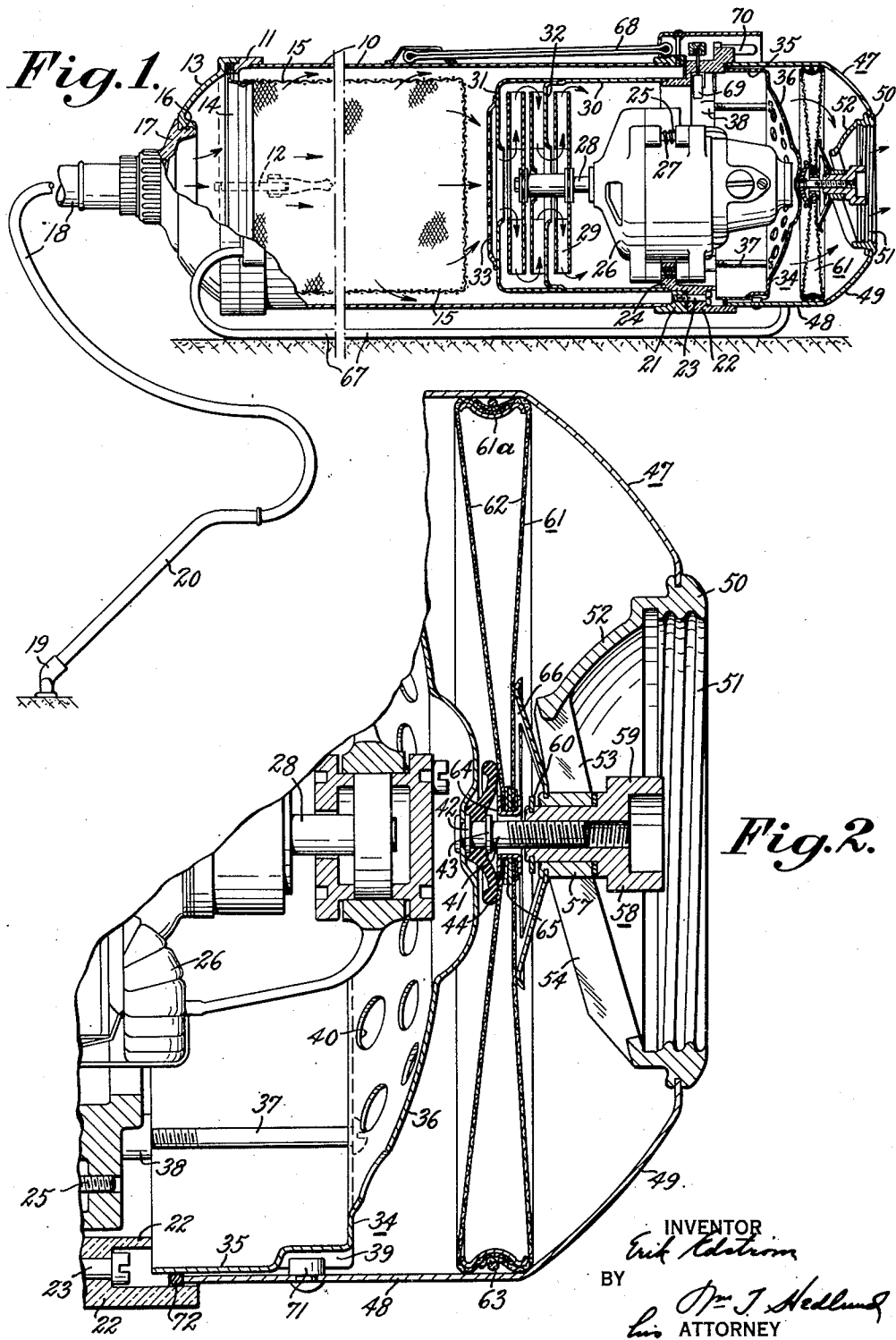
E. EDSTRÖM

2,029,613

VACUUM CLEANER

Filed June 14, 1933

2 Sheets-Sheet 1



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2,029,613

VACUUM CLEANER

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*Fig. 3.*

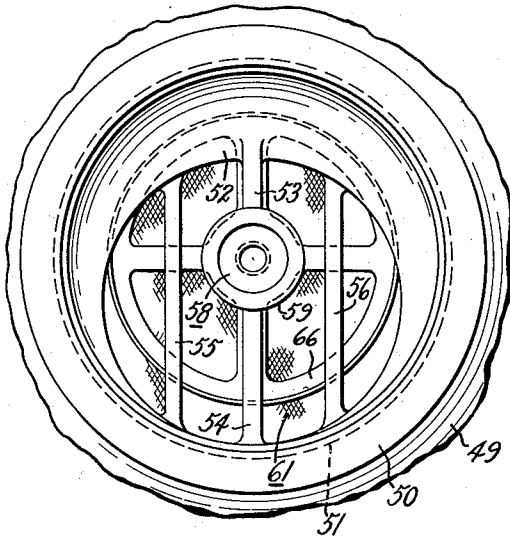


*Fig. 4.*

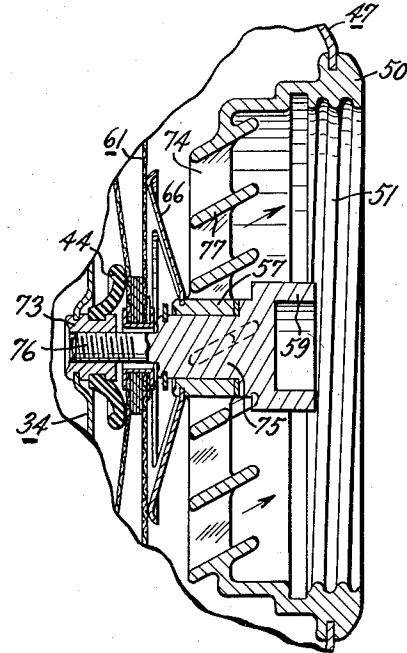


*Fig. 5.* *Fig. 6.*

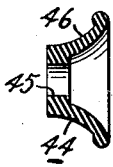
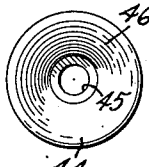


*Fig. 7.*

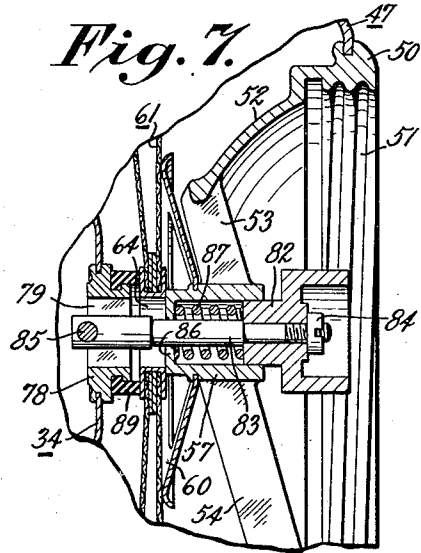


*Fig. 8.*

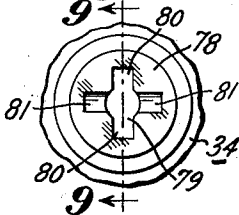


*Fig. 9.*

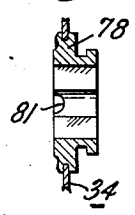
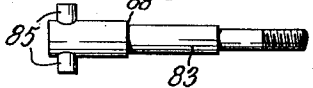


*Fig. 10.*



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## UNITED STATES PATENT OFFICE

2,029,613

## VACUUM CLEANER

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tion of Delaware

Application June 14, 1933, Serial No. 675,679  
In Germany December 7, 1932

23 Claims. (Cl. 183—35)

My invention relates to vacuum cleaners and more particularly to vacuum cleaners of the enclosed bag type.

One of the objects of my invention is to improve the appearance and ease of manipulation of vacuum cleaners. Another object is to provide a simple but sturdy means for securing an end member or cap to the main part of the cleaner casing so that it may be readily removed. Another object of my invention is to so construct the aforesaid securing means that it may hold a filter member in place within the end member at the same time that it secures the end member to the casing. A further object of my invention is to locate the securing means wholly within the casing but freely accessible from the outside thereof through an opening in the end member. A still further object of my invention is to so construct and arrange the means for securing the end member in place that it does not interfere with deflecting means in the opening for directing the flow of air upwardly and away from the surface on which the cleaner is supported.

Further objects and advantages of my invention will be apparent from the following description considered in connection with the accompanying drawings, of which:

Fig. 1 is a side view, chiefly in cross-section, of a vacuum cleaner showing one embodiment of my invention;

Fig. 2 is a cross sectional view on an enlarged scale of a portion of the device shown in Fig. 1;

Fig. 3 is an end view on a slightly reduced scale of a portion of the device shown in Fig. 2;

Fig. 4 is a cross sectional view of a portion of a cleaner showing another embodiment of my invention;

Fig. 5 is a cross sectional view of a sealing member employed in the devices illustrated in Figs. 1 to 4;

Fig. 6 is an end view of the member shown in Fig. 5;

Fig. 7 is a cross-sectional view of a portion of a vacuum cleaner showing still another embodiment of my invention;

Fig. 8 is an end view of a portion of the device shown in Fig. 7;

Fig. 9 is a cross sectional view taken on the line 9—9 of Fig. 8; and

Fig. 10 is a side view of a member shown in Fig. 7.

Referring more particularly to Figs. 1 through 3, reference character 10 designates the main member of the casing of the cleaner, which is preferably cylindrical and may be made of metal

or other suitable material. Secured to one end of main member 10 is a ring 11 to which an end member 13 may be clamped by suitable spring clips 12. A flanged ring 14 is adapted to be clamped between ring 11 and member 13. Secured to ring 14 is a dust bag 15 made of cloth or the like which is impervious to dust but permits the passage therethrough of air. End member 13 is provided with a central threaded opening or port 16, into which may be screwed a coupling member 17. Member 17 is adapted to receive one end of a flexible hose 18, the other end of which may be connected to any suitable suction cleaning nozzle, as is shown at 19. In the arrangement shown, a rigid hollow handle member 20 is interposed between hose 18 and nozzle 19.

A ring 21 is suitably secured to the other end of main casing member 10. A ring member 22, preferably made of electrical insulating material, such as bakelite, is secured to ring 21 by means of screws 23. Ring 22 is formed with lugs 24 having apertures therethrough, through which pass pins 25 for supporting an electric motor 26. Pins 25 may be provided with coil springs 27 or the like in order that the motor may be resiliently mounted. Mounted on the armature shaft 28 of the motor is a centrifugal fan 29 comprising two rotors. A fan housing 30 is carried by ring 22 and comprises a cylindrical portion and a pair of transverse walls. Transverse wall 31 is ahead of the first rotor while transverse wall 32 is located between the two rotors. Each wall is provided with a central aperture and the aperture in wall 31 is covered with a perforated plate 33.

A motor shield 34, comprising a cylindrical portion 35 and a transverse portion 36, is secured to the rear side of ring 22 by means of bolts 37 which have threaded engagement with lugs 38 formed on the ring 22. The cylindrical portion of the shield is formed with a groove 39 at the bottom while the transverse portion is formed with a plurality of openings 40 therethrough.

Secured to the center of the transverse portion 36 is a threaded bolt 41. Bolt 41 is formed with two spaced collars 42 and 43 between which is located a sealing member 44 made of suitably resilient material such as rubber. Sealing member 44 is shown by itself in Figs. 5 and 6. It comprises a hub portion 45 which engages bolt 41 between collars 42 and 43 and a radially extending portion 46.

Reference character 47 designates a cap, end piece, or end member which is adapted to be secured to and to form a closure for the motor end of main casing member 10. The casing as

a whole is made up of members 10, 13 and 47. Motor shield 34 is within this casing and hence may be termed an internal member. Member 47 comprises a cylindrical portion 48 which is integral with an end wall 49. Wall 49 is formed with a central aperture in which is fixed a ring 50 having threads 51 formed on the inner side thereof. Integral with ring 50 is a skirt 52 and laterally extending arms or transverse members 53 and 54. Arms 53 and 54 extend in a substantially vertical direction. Bars 55 and 56 are also integral with ring 50 and skirt 52 and serve to keep large articles out of end member 47 and protect the filter hereinafter referred to. The arms 53 and 54 meet to support a bushing 57. Rotatably mounted in bushing 57 is an internally threaded member 58 which is adapted to engage bolt 41 secured to internal member 34 to thereby secure the end member in place, and which is formed with a knurled knob or the like 59. A flange member 60 is secured to the inner end of member 58 in order to prevent axial movement of the member with respect to the bushing 57. A projection 71, which may be a rivet, is secured to the inside of cylindrical portion 48 and is adapted to cooperate with groove 39 to insure that end member 47 will be properly aligned with the rest of the casing so that skirt 52 will be at the top of the opening through ring 50. An annular packing 72 prevents leakage of air between ring 22 and end member 47.

A filter member 61 is adapted to be placed within end member 47 and comprises an annular frame 61a which serves to support a pair of layers of filter cloth 62. The layers 62 are folded over the outer side of member 61a and may be secured in place by means of tying a string 63 therearound. The center of layers 62 is formed with an aperture in which is placed an annular flanged member 64. The layers are secured between the flanges of member 64 and one or more washers 65 may be placed between the layers in order to separate them slightly at the center. A supporting member 66 is secured to bushing 57 and serves to support the rear layer of filter cloth 62.

The vacuum cleaner is provided with a pair of runners 67, one on each side of the casing, which serve to support it on a surface. A handle 68 is secured to the upper part of the casing for carrying purposes. Electric switch 69 and electric contacts 70 are carried by ring 22 and are suitably connected in the circuit for the motor 26.

The operation of the above described device is as follows:

Upon rotation of the fan rotors 29 by the motor 26, air is caused to pass in the direction of the arrows. This air picks up dust and passes through nozzle 19, handle 20 and hose 18 to within the dust bag 15. The air passes through the material of the dust bag while the dust is unable to do so and is separated from the air stream and collected in the dust bag. The air passes through the fan and is discharged over and through the motor, thereby cooling it, and passes through the apertures 40 in motor shield 34. The air then passes through the filter member 61, where very fine dust or bacteria or the like which may have passed through the dust bag is separated out. The air is finally discharged from the cleaner through the discharge opening or outlet port in ring 50. The skirt 52 serves to direct the air upwardly from the surface on which the cleaner is supported.

If it is desired to remove end member 47 in

order to change the filter 61, or for any other purpose, knurled knob 59 on member 58 is grasped and turned in the proper direction to unscrew it from bolt 41. When these two elements are disengaged the end member 47 is entirely free from the rest of the cleaner and may be removed therefrom by drawing it to the right as viewed in Figs. 1 and 2. The filter may then be withdrawn from within the end member 47 and cleaned or replaced by a new one. When the filter has been cleaned or replaced the end member can be again secured to the rest of the cleaner by sliding cylindrical portion 48 thereof over the cylindrical portion 35 of motor shield 34, with projection 71 aligned with groove 39. This assures that member 58 will be aligned with bolt 41 and may be engaged therewith by turning the knurled knob 59 in the proper direction. This draws the end member to the left as shown in Figs. 1 and 2, and seats it against the resilient packing member 72 located between motor shield 34 and ring 22. The provision of sealing member 44 hinders the passage of air through the opening in the flanged member 64. Inasmuch as the filter 61 fits closely within the member 47 substantially all the air discharged is forced to pass through the filter.

Ring 50 is provided with threads 51 so that coupling member 17 may be screwed thereinto if it is desired to use the cleaner as a blowing device. It is apparent that the coupling may be screwed into ring 50 without interference from member 58. It will be further apparent that member 58 is fully within the end member 47 and hence not visible from the outside, while it is still freely accessible through the opening in ring 50.

In the modification shown in Fig. 4, motor shield 34 is provided with an internally threaded member 73 which carries the sealing member 44. Ring 50 is provided with arms 74 which meet to support the bushing 57. Rotatably mounted in bushing 57 is a member 75 which is formed at one end as a threaded bolt 76 while at the other end is a knurled knob 59. Bolt 76 is adapted to engage the internally threaded member 73. A plurality of horizontally extending and upwardly and outwardly inclined louvers 77 are made integral with the vertically extending arms or transverse members 74. These louvers serve to direct the flow of air upwardly through the opening in ring 50 and hence away from the surface on which is supported the cleaner unit. The operation of this modification is the same as that shown in Figs. 1 to 3, and the end member 47 may be removed from the main casing member 10 by unscrewing member 75 from member 73.

The modification shown in Figs. 7 to 10 includes a bayonet joint arrangement for securing the end member 47 to the main casing member. Motor shield 34 is provided with a member 78, which has a passage-way 79 therethrough. Passage-way 79 has a circular center portion which merges into two lateral straight-sided portions 80. The face of member 78 within the motor shield is formed with a semi-circular groove 81 extending to both sides of the passage-way 79 and at right angles to the lateral portions 80 thereof. The bushing 57, carried by arms 53 and 54 supports a member 82 which is slidably and rotatably mounted therein. A spindle 83 is secured to member 82 by means of a nut 84. The other end of spindle 83 is provided with a pair of cylindrical projections 85 extending at right angles thereto. The left hand end of bushing 57, as viewed in Fig. 7, is provided with an in-

wardly extending flange 86. A spring 87 abuts against flange 86 and against member 82 and tends to move member 82 and spindle 83 to the right. A shoulder 88 formed on the spindle 83 limits movement thereof under the influence of spring 87. A sealing member 89 is carried by member 78. When the end member 47 is in place on the end of main casing member 10, projections 85 on spindle 83 are in groove 81, where they are held by the tendency of spindle 83 to move to the right under the influence of spring 87. In order to remove the end member 47 from the main casing member, member 82 is grasped and forced inwardly (to the left, as viewed in Fig. 7) until projections 85 are out of groove 81, whereupon member 82 is turned through 90 degrees until projections 85 are in alignment with portions 80 of the passage-way in member 78. When the projections are so aligned, the spring 87 will move the spindle 83 to the right, thus disengaging the spindle from member 78. End member 47 may then be removed from the main casing member 10. When it is desired to replace the end member, the projections 85 are aligned with portions 80 of the passage-way in member 78 and the spindle 83 is moved to the left until the projections lie beyond member 78, whereupon member 82 and spindle 83 are turned through ninety degrees until the projections 85 slip into groove 81.

Sealing member 89 forces the flanged member 64 against the end of bushing 57 and thus prevents the passage of air therebetween.

It will be seen that I have provided a simple means for securing the end member to the main casing member of the vacuum cleaner, which means is advantageously combined with means for directing the flow of air upwardly through the discharge opening. Also, the securing means is located within the end member and hence substantially out of sight, and yet freely accessible for manipulation in order to remove or replace the end member.

While I have shown three more or less specific embodiments of my invention, these are for purposes of illustration only and do not limit the scope of the invention, which is to be determined by the appended claims viewed in the light of the prior art.

What I claim is:

1. In a vacuum cleaner, a casing including a main member and a cap, an internal member secured to said main member, said cap having an air port, a filter within said casing between said internal member and said air port, and means internally of said casing and passing through said filter and accessible through said port for securing said cap to said internal member.

2. In a vacuum cleaner, a casing including a main member and a cap, said cap having an air port therein, air deflecting means for guiding flow of air through said port, a filter in said casing, and means internally of said casing and passing through said filter and said air deflecting means for securing said cap to said main member.

3. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing for producing flow of air therethrough, a dust separating member in said casing for removing dust from air flowing therethrough, an end member for closing one end of said main casing member, said end member being formed with an opening for the passage of air therethrough, and

means within said casing for removably securing said end member to said main casing member, said means being freely accessible through said opening.

4. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing for producing flow of air therethrough, a dust separating member in said casing for removing dust from air flowing therethrough, an internal member secured to said casing adjacent to one end thereof, an end member for closing said one end of said main casing member, said end member being formed with a central opening for the passage of air therethrough, and means for removably securing said end member to said internal member whereby said end member is removably secured to said main casing member, said means being freely accessible through said opening.

5. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing adjacent to one end thereof for producing flow of air therethrough, a dust separating member in said casing adjacent to the other end thereof for removing dust from air flowing therethrough, a motor shield member secured to said main casing member adjacent to said one end thereof, an end member for closing said one end of said main casing member, said end member being formed with a central opening for the passage of air therethrough, and means for removably securing said end member to said shield member whereby said end member is removably secured to said main casing member, said means being freely accessible through said opening.

6. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing adjacent to one end thereof for producing flow of air therethrough, a dust separating member in said casing adjacent to the other end thereof for removing dust from air flowing therethrough, a motor shield member secured to said main casing member adjacent to said one end thereof, an end member for closing said one end of said main casing member, said end member being formed with a central opening for the passage of air therethrough, and threaded means for removably securing said end member to said shield member whereby said end member is removably secured to said main casing member, said threaded means being freely accessible through said opening.

7. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing adjacent to one end thereof for producing flow of air therethrough, a dust separating member in said casing adjacent to the other end thereof for removing dust from air flowing therethrough, a motor shield member secured to said main casing member adjacent to said one end thereof, an end member for closing said one end of said main casing member, said end member being formed with a central opening for the passage of air therethrough, a transverse member within said end member, and means comprising a bayonet joint for removably securing said transverse member to said shield member whereby said end member is removably secured to said main casing member, said means being freely accessible through said opening.

8. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing ad-

5 adjacent to one end thereof for producing flow of  
air therethrough, a dust separating member in  
said casing adjacent to the other end thereof for  
removing dust from air flowing therethrough, a  
motor shield member secured to said main casing  
member adjacent to said one end thereof, an  
end member for closing said one end of said  
main casing member, said end member being  
formed with a central opening for the passage  
10 of air therethrough, a transverse member within  
said end member, a threaded bolt secured to said  
shield member, and an internally threaded member  
journalled in said transverse member and  
adapted to engage said bolt to removably secure  
15 said end member to said main casing member,  
said internally threaded member being freely ac-  
cessible through said opening.

9. In a vacuum cleaner having a casing including a cylindrical main casing member open at  
20 each end, a motor-fan unit in said casing adjacent to one end thereof for producing flow of  
air therethrough, a dust separating member in  
said casing adjacent to the other end thereof for  
removing dust from air flowing therethrough, a  
25 motor shield member secured to said main casing  
member adjacent to said one end thereof, an end  
member for closing said one end of said main casing  
member, said end member being formed with a  
central opening for the passage of air there-  
30 through, a transverse member within said end  
member, an internally threaded member secured  
to said shield member, and a threaded bolt journalled  
in said transverse member and adapted to  
engage said threaded member to removably  
35 secure said end member to said main casing  
member, said bolt being freely accessible through  
said opening.

10. In a vacuum cleaner having a casing including a cylindrical main casing member open  
40 at each end, a motor-fan unit in said casing for  
producing flow of air therethrough, a dust separating  
member in said casing for removing dust  
from air flowing therethrough, an internal member  
secured to said main casing member adjacent  
45 to one end thereof, an end member for closing  
said one end of said main casing member, said  
end member being formed with a central opening  
for the passage of air therethrough, louver members  
within said end member adjacent to said  
50 opening for directing air flow upwardly and outwardly  
therethrough, and means for removably  
securing said end member to said internal member  
whereby said end member is removably secured  
to said main casing member, said means  
55 extending beyond said louvers and being freely  
accessible through said opening.

11. In a vacuum cleaner having a casing including a cylindrical main casing member open  
60 at each end, a motor-fan unit in said casing  
for producing flow of air therethrough, a dust  
separating member in said casing for removing  
dust from air flowing therethrough, an internal  
member secured to said casing adjacent to one  
65 end thereof, an end member for closing said one  
end of said main casing member, said end member  
being formed with a central opening for the  
passage of air therethrough, a transverse member  
within said end member, louver members  
70 within said end member adjacent to said opening  
for directing air flow upwardly and outwardly  
therethrough, and threaded means for removably  
securing said transverse member to said internal  
member whereby said end member is re-  
75 movably secured to said main casing member,

said means extending beyond said louvers and  
being freely accessible through said opening.

12. In a vacuum cleaner having a casing including a cylindrical main casing member open  
at each end, a motor-fan unit in said casing for  
5 producing flow of air therethrough, a dust separating  
member in said casing for removing dust  
from air flowing therethrough, an internal member  
secured to said casing adjacent to one end  
thereof, an end member for closing said one end  
10 of said main casing member, said end member  
being formed with a central opening for the passage  
of air therethrough, a transverse member within  
said end member adjacent to said opening,  
louver members secured to the last mentioned  
15 transverse member for directing air flow upwardly  
and outwardly through said opening, and means  
for removably securing said transverse member  
to said internal member whereby said end member  
is removably secured to said main casing member,  
20 said means extending beyond said louvers and  
being freely accessible through said opening.

13. In a vacuum cleaner having a casing including a cylindrical main casing member open  
25 at each end, a motor-fan unit in said casing adjacent  
to one end thereof for producing flow of  
air therethrough, a dust separating member in  
said casing adjacent to the other end thereof  
for removing dust from air flowing through said  
casing, a motor shield member secured to said  
30 main casing member adjacent to said one end  
thereof, an end member for closing said one end  
of said main casing member, said end member  
being formed with a central opening for the  
passage of air therethrough, a transverse member  
35 within said end member adjacent to said opening,  
louver members secured to said transverse member  
for directing air flow upwardly and outwardly  
through said opening, and means for removably  
securing said transverse member to said shield  
40 member whereby said end member is removably  
secured to said main casing member, said means  
extending beyond said louvers and being freely  
accessible through said opening.

14. In a vacuum cleaner having a casing including a cylindrical main casing member open  
45 at each end, a motor-fan unit in said casing for  
producing flow of air therethrough, a dust separating  
member in said casing for removing dust  
from air flowing therethrough, an internal member  
secured to said casing adjacent to one end  
50 thereof, an end member for closing said one end  
of said main casing member, said end member  
being formed with a central opening for the  
passage of air therethrough, a transverse member  
within said end member, a filter member in  
55 said casing between said transverse member and  
said internal member, said filter member formed  
with an opening therethrough, and means for  
removably securing said transverse member to  
said internal member whereby said end member  
60 is removably secured to said main casing member,  
said means being freely accessible through the  
opening in said end member and extending  
through the opening in said filter member.

15. In a vacuum cleaner having a casing including a cylindrical main casing member open  
65 at each end, a motor-fan unit in said casing for  
producing flow of air therethrough, a dust separating  
member in said casing for removing dust  
from air flowing therethrough, an internal member  
secured to said casing adjacent to one end  
70 thereof, an end member for closing said one end  
of said main casing member, said end member  
being formed with a central opening for the

passage of air therethrough, a transverse member within said end member, a filter member in said casing between said transverse member and said internal member, said filter member being  
 5 formed with an opening therethrough, means for removably securing said transverse member to said internal member whereby said end member is removably secured to said main casing member, said means being freely accessible  
 10 through the opening in said end member and extending through the opening in said filter member, and sealing means for preventing the passage of air through the opening in said filter member.

15 16. In a vacuum cleaner having a casing including a cylindrical main casing member open at each end, a motor-fan unit in said casing adjacent to one end thereof for producing flow of air therethrough, a dust separating member in  
 20 said casing adjacent to the other end thereof for removing dust from air flowing therethrough, a motor shield member secured to said main casing member adjacent to said one end thereof, an end member for closing said one end of said  
 25 main casing member, said end member being formed with a central opening for the passage of air therethrough, a transverse member within said end member adjacent to said opening, louver members secured to said transverse member for  
 30 directing air flow upwardly and outwardly through said opening, a filter member in said casing between said transverse member and said motor shield, said filter member formed with an opening therethrough, and means for removably  
 35 securing said transverse member to said motor shield whereby said end member is removably secured to said main casing member, said means extending through the opening in said filter member and beyond said louver members and  
 40 being freely accessible through the opening in said end member.

17. In a vacuum cleaner, a casing including a main member and a cap, means in said casing for producing flow of air, a shield within said  
 45 casing secured to said main member, said cap having an air port for discharge of air from said casing, a filter within said casing between said shield and said port, and means internally of  
 50 said casing and passing through said filter and accessible through said port for securing said cap to said shield.

18. In a vacuum cleaner, a casing including a main member and a cap, means in said casing  
 55 for producing flow of air, said cap having an air port therein for discharge of air from said casing, vanes for guiding flow of air through said

port, and means passing through said vanes for securing said cap to said main member.

19. In a vacuum cleaner, a casing including a main member and a cap, means in said casing for producing flow of air, said cap having an air  
 5 port therein for discharge of air from said casing, air deflecting means for guiding flow of air through said port, a filter in said casing, and means internally of said casing and passing through said filter and said air deflecting means  
 10 and accessible through said port for securing said cap to said main member.

20. In a vacuum cleaner having a casing including a main member and a cap, said cap forming part of the exterior of said casing, means to  
 15 produce flow of air through said casing, said cap having an air port therein for discharge of air from said casing, and means internally of said casing and accessible through said port for securing said cap to said main member.

21. In a vacuum cleaner having a casing including a main member and a cap, means to produce flow of air through said casing, said cap forming part of the exterior of said casing, a  
 25 member internally of and secured to said casing, said cap having a port therein for flow of air therethrough, and means internally of said casing and accessible through said port for securing said cap to said internal member.

22. In a vacuum cleaner having an elongated  
 30 casing including a main member and an end piece for closing one end of said main member, said end piece forming part of the exterior of said casing, said end piece having an air port therein, a dust separating member in said casing, 35  
 means to produce flow of air through said casing, said dust separating member and said port, and means engaging said end piece and said main member within said casing and operable to removably secure said end piece to said main member, said last mentioned means being freely accessible for operation from the outside of said casing.

23. In a vacuum cleaner having an elongated casing including a main member and an end  
 45 piece for closing one end of said main member, said end piece forming part of the exterior of said casing, said end piece having an air port therein, a dust separating member in said casing, means to produce flow of air through said casing, 50  
 said dust separating member and said port, and means located entirely within the space defined by the general outline of said casing for removably securing said end piece to said main member, said last mentioned means being freely accessible 55  
 from the outside of said casing.

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