

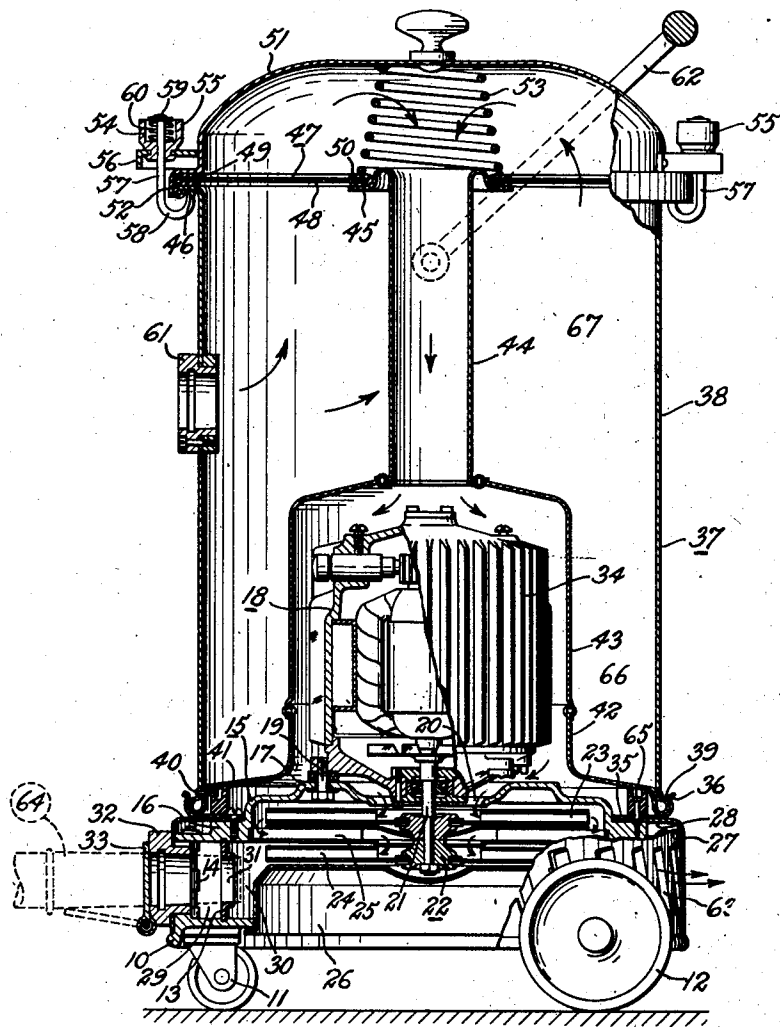
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VACUUM CLEANER

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TO ELECTROLUX CORPORATION, A CORPORATION OF DELAWARE

VACUUM CLEANER

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My invention relates to vacuum cleaners and particularly to portable vacuum cleaners driven by an electric motor.

One of the principal objects of my invention is the provision of a compact vacuum cleaner of the vertical type. This I accomplish by providing an annular dust receiving receptacle of impermeable material, the lower portion of which surrounds the electric motor. The dust drawn into the receptacle settles in this lower portion or pocket, while the upper larger portion of the receptacle causes the velocity of the dust laden air to decrease and hence much of the dust may be precipitated. This air is admitted near the lower part of the upper larger portion and travels upwardly and through a dust separating member which intercepts all dust which has not been precipitated during the travel of the air from the inlet to the separator. The air, after having passed through the separator, is led downwardly through the central passageway formed by the annular receptacle and passes around the electric motor, thus cooling the latter.

The fact that the dust separating member is at the top of the receptacle so that the air passes upwardly through it coupled with the fact that much of the dust is precipitated before it reaches the separator prevents the latter from becoming clogged with dust.

There is thus provided a highly efficient vacuum cleaner. The arrangement of the motor within the passageway formed by the annular receptacle results in a dust receiving receptacle of maximum size for a cleaner of given size, or, to express it another way, the cleaner is very compact.

Further objects and advantages will be apparent from the following description considered in connection with the accompanying drawing, which forms a part of this specification and which is a side view, chiefly in cross-section, of a vacuum cleaner constructed in accordance with my invention.

Referring to the drawing, reference character 10 designates an annular ring which serves as a base. Ring 10 is supported by a caster 11 and a pair of small wheels, one of which is shown at 12. Supported above an-

annular ring 10 by means of a cylindrical partition 13 and spindles 14 is a motor supporting member 15. Member 15 comprises an outer annular portion 16 which is secured to partition 13 and spindles 14 and an inner portion 17 to which is secured a vertically disposed electric motor 18 by means of bolts 19. The central portion of member 15 is provided with a circular aperture 20 through which extends the lower end of motor shaft 21. Secured to shaft 21 is a two stage centrifugal fan 22 comprising rotors 23 and 24. A partition 25 is provided between rotors 23 and 24 and is supported by member 15. A closure member 26 is located below fan 22 and is supported by member 10.

A cylindrical member 27 provided at the top with an annular flange 28 is supported by the annular portion 16 of member 15. Cylindrical member 27 forms, with cylindrical partition 13, an annular chamber 29. Partition 13 in conjunction with closure member 26 forms an annular chamber 30. Chambers 29 and 30 communicate with each other through an opening 31 formed in the partition 13. A series of slotted openings 63 are provided in the cylindrical portion of member 27 and serve as outlets. An outlet coupling 32 is provided in cylindrical member 27 in alignment with opening 31. A closure member 33 comprising a spring actuated flap is secured to outlet coupling 32 and serves to normally close this outlet.

Motor 18 is preferably of the enclosed type and is provided with a series of axially extending fins 34 in order to increase the heat radiating surface of the motor housing.

Secured to the annular ring portion 28 of member 27 is an annular member 35 provided at its outer circumference with an upturned lip 36. Member 35 is adapted to receive the lower part of an annular dust receiving receptacle 37. Receptacle 37 comprises a cylindrical outer wall 38 of impermeable material, the lower part of which terminates in a ring 39 formed by bending the material of the wall back on itself and retaining it in this position by means of rivets 40. The material is so shaped as to provide a bottom portion 41 for the receptacle and a

portion 42 of a central passageway through the annular receptacle in which is located motor 18. A dome shaped member 43 is secured to the upper edge of portion 42 and completes the motor chamber. A conduit 44 is secured to the upper part of member 43 and extends vertically through the dust receiver, it being provided with a flanged upper end 45. The upper end of cylindrical wall 38 is likewise flanged at 46. An annular packing 65 secured to member 35 bears against bottom portion 41 when receptacle 37 is in place and prevents the passage therebetween of air.

A dust separator 47 comprises a piece of suitable cloth 48 of circular form with an opening in the center thereof. A packing 49 is secured around the outer periphery of cloth 48 while a packing 50 is secured to the edge of the circular opening in the center of the cloth. A cover member 51 provided with a flange 52 is adapted to be placed on receptacle 37 and to clamp the packing 49 between flange 46 of the receptacle and flange 52 of the cover member. A spring 53 is secured to cover member 51 and bears against packing 50 and forces this packing in contact with flange 45 on conduit 44. Cover 51 is retained in place by means of catches 54. Catch 54 comprises a cylindrical member 55 secured to an arm 56 which is attached to the cover member. Extending through member 54 is a rod 57 provided with a hook-shaped lower end 58 and a head 59. A spring 60 is retained between head 59 and member 54 and serves to raise rod 57 and cause hook-shaped portion 58 to engage flange 46, thus holding the cover in position on the receptacle. A handle 62 is secured to the cylindrical member.

It will be seen that dust receiving receptacle 37 comprises two portions, a lower narrow portion or pocket 66 and an upper wide portion 67. An air and dust inlet coupling 61 is placed in wall 38 at such an elevation as to be in the lower part of the upper wide portion 67 and a substantial distance below dust separator 47.

In operation motor 18 rotates centrifugal fan 22 and causes a current of air to pass through inlet 61 into dust receiver 37 from whence the air passes through dust separator 47 into the space within cover member 51. From here the air passes through conduit 44 into the chamber surrounding motor 18 and passes in contact with fins 34 on the motor. After passing in contact with the motor, the air passes through opening 20 in member 15 to the fan 22. The air discharged from rotor 24 of the fan passes into annular chamber 30 and through opening 31 into annular chamber 29 from whence it is discharged through the opening 63 in member 27.

When the device is used as a vacuum cleaner a suitable hose is secured in inlet open-

ing 61, the other end of the hose being provided with a suitable suction nozzle. The air passing into the nozzle carries with it dirt from the object being cleaned and this dirt is carried into dust receiver 37. When the air passes through inlet 61 into the wide portion 67 of receptacle 37 its velocity is greatly reduced and a portion of the dust carried by the air is precipitated and collects in pocket 66. The air passes in a generally upwardly direction towards dust separator 47, which allows still more dust to be precipitated. As the air passes through separator 47 the remaining dust is separated from the air. Due to the fact that the separator is in a horizontal position, only a thin film of dust will be held thereon during operation of the cleaner and that will fall to the bottom of the receptacle when the fan is stopped. Hence, the separator can never get clogged with dust.

When it is desired to empty the dust from receptacle 37, cover 51 is removed by releasing catches 54. Dust separator 47 may then be removed. Receptacle 37 may be lifted off the base portion by exerting a vertical force, preferably on handle 62, as the receptacle is releasably held in position by the engagement of ring 39 with lip 36. The receptacle, now freed of the weight of the motor and base, may be easily turned over and the dirt contained therein dumped out.

If it is desired to use the device as a blower, cover 51 is preferably removed in order that air may be drawn directly into the upper end of conduit 44 without having to pass through dust separator 47. Closure member 33 is opened and a hose nozzle, shown in dotted lines at 64, is placed in coupling member 32. Nozzle 64 extends through annular chamber 29 and engages opening 31 in partition 13. All the air discharged from fan 22 into chamber 30 must therefore pass through nozzle 64 and none of this air can enter annular chamber 29.

It will thus be seen that I have provided a very compact vacuum cleaner. The space surrounding the motor is utilized as a dust collecting chamber. All of the air passing through the cleaner is caused to pass in contact with the electric motor in order to cool the latter. The arrangement of the dust separator in a horizontal position at the top of the dust collecting chamber assures that this separator will not become seriously clogged with dirt during the operation of the vacuum cleaner. If the dust separator were to become clogged it not only would reduce the suction produced by the vacuum cleaner but it would cause the electric motor to become overheated due to the fact that less air for cooling the motor would be passed in contact therewith.

While I have shown and described a preferred embodiment of my invention, it is to

be understood that I am not to be limited thereby but that the scope of my invention is to be determined by the appended claims viewed in the light of the prior art.

5 What I claim is:—

1. In a vacuum cleaner, a base, a fan unit comprising an electric motor and a fan having an air outlet mounted on said base, a dust receiving member having an air inlet supported on said base, said member comprising an annular receptacle formed by an outer impermeable wall and an inner impermeable wall, said walls being joined together to form the bottom of said receptacle, said inner wall forming a central passageway through said receptacle of varying cross-sectional area, being larger at the bottom than at the top, the lower portion of said inner wall forming a motor chamber for housing said motor, a dust separator comprising the top of said receptacle and a cover member forming together with said dust separator a chamber, said passageway being in communication with said chamber so that rotation of said fan induces a current of air through said inlet into said receptacle and through said dust separating member into said chamber and through said passageway in contact with said motor to said fan from whence it is discharged through said outlet.

2. In a vacuum cleaner, a base, a fan unit comprising an electric motor and a fan having an air outlet mounted on said base, a dust receiving member having an air inlet supported on said base, said member comprising an annular receptacle formed by an outer impermeable wall and an inner impermeable wall, said walls being joined together to form the bottom of said receptacle, said inner wall forming a central passageway through said receptacle of varying cross-sectional area, said receptacle having a wide upper portion and a narrow lower portion, said inlet being positioned near the bottom of said wide upper portion, the lower portion of said inner wall forming a motor chamber for housing said motor, a dust separator comprising the top of said receptacle, and a cover member forming together with said dust separator a chamber, said passageway being in communication with said chamber so that rotation of said fan induces a current of dust laden air through said inlet into the wide upper portion of said receptacle where its velocity is reduced and dust is precipitated to said narrow lower portion, the air thence passing through said dust separator, said chamber and said passageway and in contact with said motor to said fan from whence it is discharged through said outlet.

3. In a vacuum cleaner, an annular dust receiving receptacle formed with a central passageway therethrough, said passageway being larger at the bottom than at the top whereby said receptacle comprises a wide

upper portion and a narrow lower portion, means for admitting dust laden air to said receptacle at a point near the bottom of said wide upper portion, a dust separator comprising the top of said receptacle, means for conducting air from said dust separator to the upper end of said passageway, an electric motor in the lower part of said passageway and a fan operatively connected to said motor for inducing a current of dust laden air into the wide upper portion of said receptacle where its velocity is reduced and dust is precipitated to said narrow lower portion, the air thence passing through said dust separator to said passageway and in contact with said motor to said fan.

4. In a vacuum cleaner, a base, a motor supported on said base, a fan member below said motor and connected thereto to be driven thereby, a dust receiving receptacle comprising impermeable inner and outer walls and closed at the bottom and open at the top and fitting around and over said motor and adapted to rest on said base, said receptacle having a central passageway, said passageway being of relatively reduced cross-sectional area above said motor and relatively large cross-sectional area around said motor, the receptacle having a wide dust receiving space above the motor and a relatively narrow space around the motor, a dust separator at the top of said receptacle, and an air inlet in said receptacle below said dust separator, whereby, on rotation of said fan, air enters the receptacle and dust is precipitated downwardly to the space around the motor while the air passes upwardly through the dust separator, downwardly through said central passageway, over the motor and through the fan.

5. In a vacuum cleaner, a base, a motor supported on said base, a fan member below said motor and connected thereto to be driven thereby, a dust receiving receptacle comprising impermeable inner and outer walls and closed at the bottom and open at the top and fitting around and over said motor, means for releasably holding said receptacle on said base, said receptacle having a central passageway, said passageway being of relatively reduced cross-sectional area above said motor and relatively large cross-sectional area around said motor, the receptacle having a wide dust receiving space above the motor and a relatively narrow space around the motor, a dust separator at the top of said receptacle, and an air inlet in said receptacle below said dust separator, whereby, on rotation of said fan, air enters the receptacle and dust is precipitated downwardly to the space around the motor while the air passes upwardly through the dust separator, downwardly through said central passageway, over the motor and through the fan.

6. In a vacuum cleaner, a base, a motor

supported on said base, a fan member below said motor and connected thereto to be driven thereby, said base having an outlet chamber therein, a dust receiving receptacle comprising impermeable inner and outer walls and closed at the bottom and open at the top and fitting around and over said motor, means for releasably holding said receptacle on said base, said receptacle having a central passageway, said passageway being of relatively reduced cross-sectional area above said motor and relatively large cross-sectional area around said motor, the receptacle having a wide dust receiving space above the motor and a relatively narrow space around the motor, a dust separator at the top of said receptacle, an air inlet in said receptacle below said dust separator, and packing between said base and said receptacle, whereby, on rotation of said fan, air enters the receptacle and dust is precipitated downwardly to the space around the motor while the air passes upwardly through the dust separator, downwardly through said central passageway, over the motor, through said fan and into said outlet chamber.

7. In a vacuum cleaner, a base, a motor supported on said base, a fan member below said motor and connected thereto to be driven thereby, a dust receiving receptacle comprising impermeable inner and outer walls and closed at the bottom and open at the top and fitting around and over said motor and adapted to rest on said base, said receptacle having a central passageway, said passageway being of relatively reduced cross-sectional area above said motor and relatively large cross-sectional area around said motor, the receptacle having a wide dust receiving space above the motor and a relatively narrow space around the motor, a dust separator at the top of said receptacle, resilient means for holding said dust separator in place, and an air inlet in said receptacle below said dust separator, whereby, on rotation of said fan, air enters the receptacle and dust is precipitated downwardly to the space around the motor while the air passes upwardly through the dust separator, downwardly through said central passageway, over the motor and through the fan.

8. A vacuum cleaner comprising a base, a motor supported on said base, a fan member below said motor and connected thereto to be driven thereby, an enclosure comprising impermeable inner and outer walls and forming a dust receiving receptacle and a central passageway, said receptacle being closed at the bottom and open at the top, said motor being disposed in said passageway whereby said receptacle surrounds said motor, a dust separator at the top of said receptacle, and an air inlet in said receptacle below said dust separator, whereby, on rotation of said fan, air enters the receptacle and dust is precipi-

tated downwardly to the space around the motor while the air passes upwardly through the dust separator, downwardly through said central passageway, over the motor and through the fan.

9. A vacuum cleaner comprising a dust collecting receptacle having impermeable walls and having a passageway extending through the same, a motor within a part of said passageway, a fan connected to be driven by said motor to draw air through said passageway, said motor being disposed on the suction side of said fan, means to admit dust-laden air to said receptacle, means for directing air from within said receptacle to said passageway, and a dust separator in the path of air leaving said receptacle, the portion of said receptacle surrounding said motor serving for collection of dust.

10. A vacuum cleaner comprising a dust collecting receptacle having impermeable walls and having a conduit extending through the same, a motor within a part of said conduit, a fan connected to be driven by said motor to draw air through said conduit, means to admit air to said receptacle, a cover removably secured to said receptacle and serving to direct air from within said receptacle to said conduit, a dust separator between said receptacle and said cover, and resilient means for holding said dust separator against said conduit.

11. A vacuum cleaner comprising a dust collecting receptacle having impermeable walls and having a passageway extending through the same, a motor within a part of said passageway, a fan connected to be driven by said motor to produce flow of air through said passageway, means to admit dust-laden air to said receptacle, means for directing air from within said receptacle to said passageway, and a dust separator in the path of air leaving said receptacle, the portion of said receptacle surrounding said motor serving for collection of dust.

In testimony whereof I hereunto affix my signature.

ANDERS ERIKSSON-JONS.