

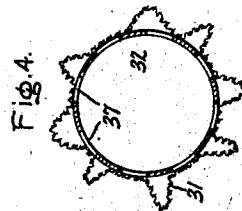
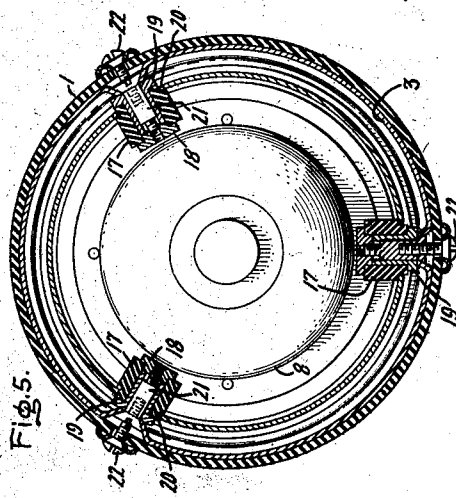
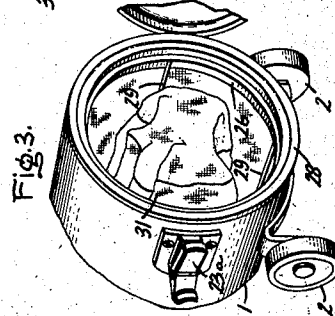
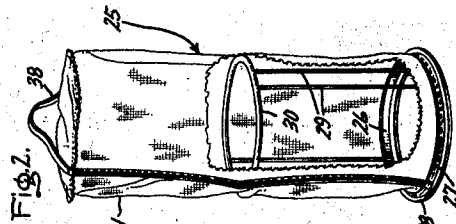
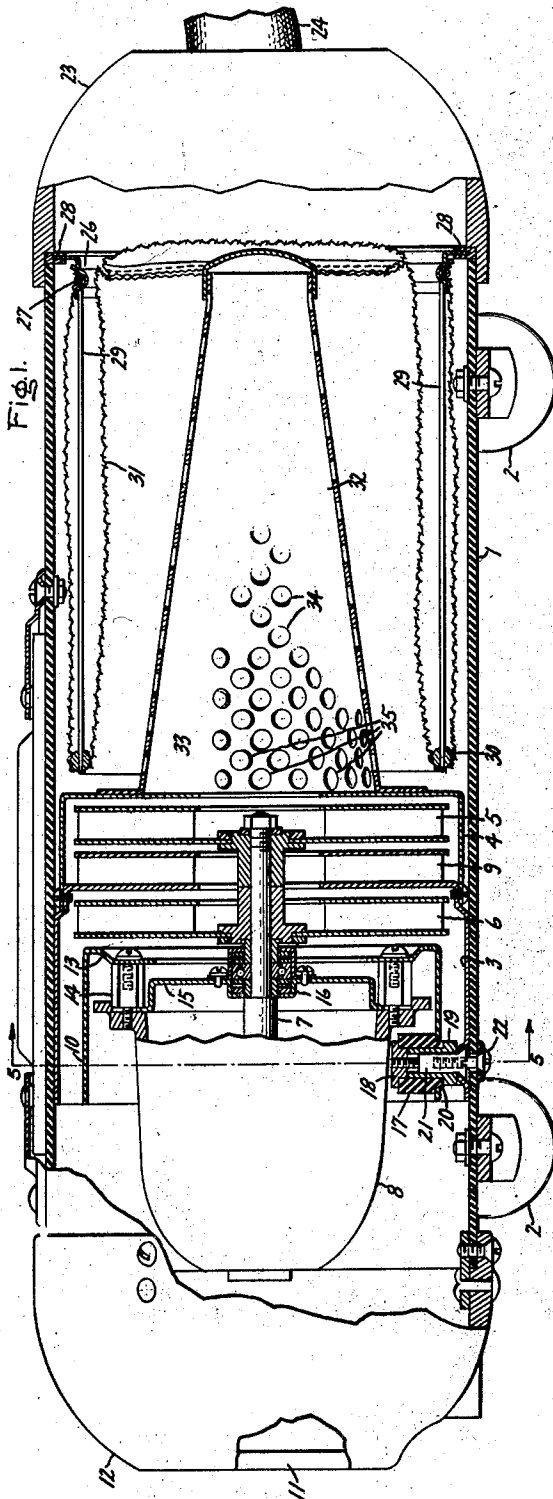
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H. T. LANG

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VACUUM CLEANER

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UNITED STATES PATENT OFFICE

2,099,566

VACUUM CLEANER

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Application September 18, 1936, Serial No. 101,461

5 Claims. (Cl. 230-117)

The present invention relates to vacuum cleaners of the type in which the suction producing means and the filter are contained within an enclosing casing.

5 The object of my invention is to provide an improved construction and arrangement in cleaners of this type, and, for a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and the claims appended thereto.

10 In the accompanying drawing, Fig. 1 is a side elevation partly in section and partly broken away of a vacuum cleaner embodying my invention; Fig. 2 is an elevation partly broken away of the bag; Fig. 3 is a fragmentary view of the inlet end of the cleaner casing; Fig. 4 is a sectional view showing the configuration the bag assumes around the inlet to the fan during the use of the cleaner; and Fig. 5 is a fragmentary sectional view taken on line 5-5 of Fig. 1.

20 Referring to the drawing, I have shown my invention applied to a vacuum cleaner having a cylindrical casing 1 provided with supporting wheels 2 for supporting the cleaner on the floor. Within the left end of the casing is a fan housing which comprises a cup-shaped member 3 at the right end of which is fixed a cup-shaped member 4. Within the fan housing are fans 5 and 6 which are fixed to the shaft 7 of an electric motor 8. The fan 5 discharges peripherally into the cup-shaped member 4, and the air flows to the inlet of fan 6 through a deflector 9 attached to the cup-shaped member 3. The fan 6 discharges peripherally to the cup-shaped member 3, and the air flows axially between the cup-shaped member 3 and an annular shroud ring 10, and is discharged through an opening 11 in a cap 12 secured to the end of the casing. The shroud ring 10 extends a substantial distance along the periphery of the electric motor 8 and provides a relatively unobstructed passage for the air. This decreases the friction loss, and results in improved efficiency. The electric motor is secured to an inwardly extending flange 13 on the shroud ring 10 by screws threaded into studs 14 which secure the end frame 15 of the motor in place. The end frame 15 is provided with a bearing housing 16 for the motor shaft 7.

50 The shroud ring 10 is resiliently supported on the cup-shaped member 3 by means of resilient supports each of which comprises a rubber bushing 17 clamped between a nut 18 and a sleeve 19 by a bolt 21 extending from the outside of the member 3 through the sleeve 19. The rubber bushing is provided with a reduced portion 20

which extends through an opening in the shroud ring and prevents any metal-to-metal contact. Three or four resilient supports of this nature are used equally spaced around the periphery of the motor. The cup-shaped member 3 is secured to the outer casing by means of screws 22 which are threaded into the screws 21.

With this arrangement the electric motor and fan are resiliently supported by the resilient supports for shroud ring 10 and the shroud ring provides an annular passage for the discharge of air from the fan 6. Since the motor and the rubber bushings 17 are arranged within the shroud ring the rapidly whirling air currents discharged from the fan 6 do not strike the rubber bushings and do not strike the motor except at the streamlined rear portion thus decreasing the friction losses. The air currents which strike the rear of the motor are used to cool the motor.

Due to the nature of this construction the motor, fan, and fan housing can all be assembled outside the cleaner casing and inserted as a unit.

At the right end of the casing 1 is hinged a cap 23 which is provided with a suitable coupling (not shown) to which a suction hose 24 may be attached. The cap is secured to the casing by a trunk latch 23a. The other end of the hose 24 may be attached to a suitably shaped suction nozzle. Between the cap 23 and the fan housing is arranged a cylindrical bag 25, the open end of which is secured to a supporting ring 26 by means of a clamping band 27. The supporting ring 26 is provided with a flange 28 which abuts the end of the casing 1 and is faced with suitable gasket material which provides an air-tight joint between the end of the casing and the cap 23. From the supporting ring 26 extend supporting arms 29 which are secured at their inner ends to a ring 30 which holds the outer walls of the bag in spaced relation to the inner walls of the casing 1. The bag has a re-entrant portion 31 which fits around a tubular projection 32 projecting from the inlet 33 of the fan housing. The projecting portion 32 is provided with closely spaced perforations 34 through which the air flows.

In the use of the cleaner the dust laden air flows through the hose 24 into the bag 25. The air flowing through the re-entrant portion 31 of the bag causes this portion of the bag to be drawn around the member 32, as shown in Figs. 3 and 4. The irregular configuration of the bag is caused by the fact that the re-entrant portion 31 is of greater diameter than the projecting portion 32. Due to the close spacing of the perforations 34

the bag is not drawn tightly against each perforation, so that a number of the perforations, such as those indicated at 37 in Fig. 4, receive air from an area of the bag which is greater than the area of the perforations. This means that the effective filtering area of the re-entrant portion 31 is in excess of the combined area of the perforations 34 but is of course somewhat less than the total area of the re-entrant portion. Some of the air flows through outer walls of the bag, along the space between the walls of the bag and the cleaner casing, and to the inlet of the fan housing through perforations 35 which are not covered by the re-entrant portion 31. This arrangement provides an extended surface through which the air is filtered so that the bag will hold a large amount of dirt for a given pressure drop.

When the bag is to be emptied the cap 23 is swung to the open position shown in Fig. 3 and the bag is removed. The bag may then be inverted over a suitable receptacle and the re-entrant portion 31 of the bag extended to the position shown in Fig. 2. A handle 38 is provided for the convenience of the operator. When in this position the operator may stand on the flange 28 of the bag, take hold of the handle 38, and shake the bag to loosen the dirt. The dirt which is loosened by shaking will remain within the bag. When the bag is to be re-inserted the portion 31 is pushed slightly below the ring 30 and the bag is then grasped by the supporting ring 26 and inserted into the cleaner. During this insertion the projecting member 32 pulls the re-entrant portion 31 into its proper position. The construction and arrangement of the bag described above form no part of my invention, but are the invention of Jesse F. Carson and are being claimed in his application Serial No. 101,445, filed September 18, 1936.

What I claim is new and desire to secure by Letters Patent of the United States:

1. In a vacuum cleaner of the type having the suction producing and dust separating means located within an enclosing casing, a cylindrical casing, a fan discharging peripherally to the casing, a shroud ring within the casing and spaced therefrom to provide an annular passage therebetween for the axial discharge of air from the fan, an electric motor for driving the fan extending axially within said shroud ring, and means for resiliently supporting the motor from the casing including a resilient means arranged between the motor and the shroud ring whereby said resilient means is out of the path of the air discharged from the fan.

2. In a vacuum cleaner of the type having the suction producing and dust separating means located within an enclosing casing, a cylindrical casing, motor-fan assembly arranged axially in said casing and comprising a cylindrical fan housing secured to said casing, a motor arranged axially within said fan housing, a fan on the motor shaft discharging peripherally to

said housing, a shroud ring arranged between the motor and the fan housing and spaced from the fan housing to provide an annular passage therebetween for the axial discharge of air from the fan, means for securing the motor to the shroud ring, and means for resiliently supporting the shroud ring from the casing including resilient means arranged between the motor and the shroud ring whereby said resilient means is out of the path of the air discharged from the fan.

3. In a vacuum cleaner of the type having the suction producing and dust separating means located within an enclosing casing, a cylindrical casing, a fan discharging peripherally to the casing, a shroud ring within the casing and spaced therefrom to provide an annular passage therebetween for the axial discharge of air from the fan, an electric motor for driving the fan, said motor being arranged axially in said casing and extending within the shroud ring, means for securing the motor to the shroud ring, and means for resiliently supporting the shroud ring from the casing including resilient means arranged between the motor and the shroud ring whereby said resilient means is out of the path of the air discharged from the fan.

4. In a vacuum cleaner of the type having the suction producing and dust separating means located within an enclosing casing, a cylindrical casing, a motor-fan assembly insertable into the casing as a unit comprising a cylindrical fan housing, a motor extending axially within said housing, a fan on the motor shaft discharging peripherally to said housing, a shroud ring extending axially between the motor and the housing and spaced from the housing to provide an annular passage therebetween for the axial discharge of air from the fan, and means for resiliently supporting the shroud ring from the fan housing including resilient means arranged between the motor and the shroud ring whereby said resilient means is out of the path of the air discharged from the fan.

5. In a vacuum cleaner of the type having the suction producing and dust separating means located within an enclosing casing, a cylindrical casing, a motor arranged axially within said casing and spaced therefrom, a fan on the motor shaft discharging peripherally to the casing, a shroud ring extending axially between the motor and the casing and spaced from the casing to provide an annular passage therebetween for the axial discharge of air from the fan, an inwardly extending flange on said shroud ring adjacent the fan, means for securing the motor to said flange whereby the motor and the fan are supported by the shroud ring, and means for resiliently supporting the shroud ring from the casing including a resilient means arranged between the motor and the shroud ring whereby said resilient means is out of the path of the air discharged from the fan.

HENRY T. LANG.