

April 2, 1946.

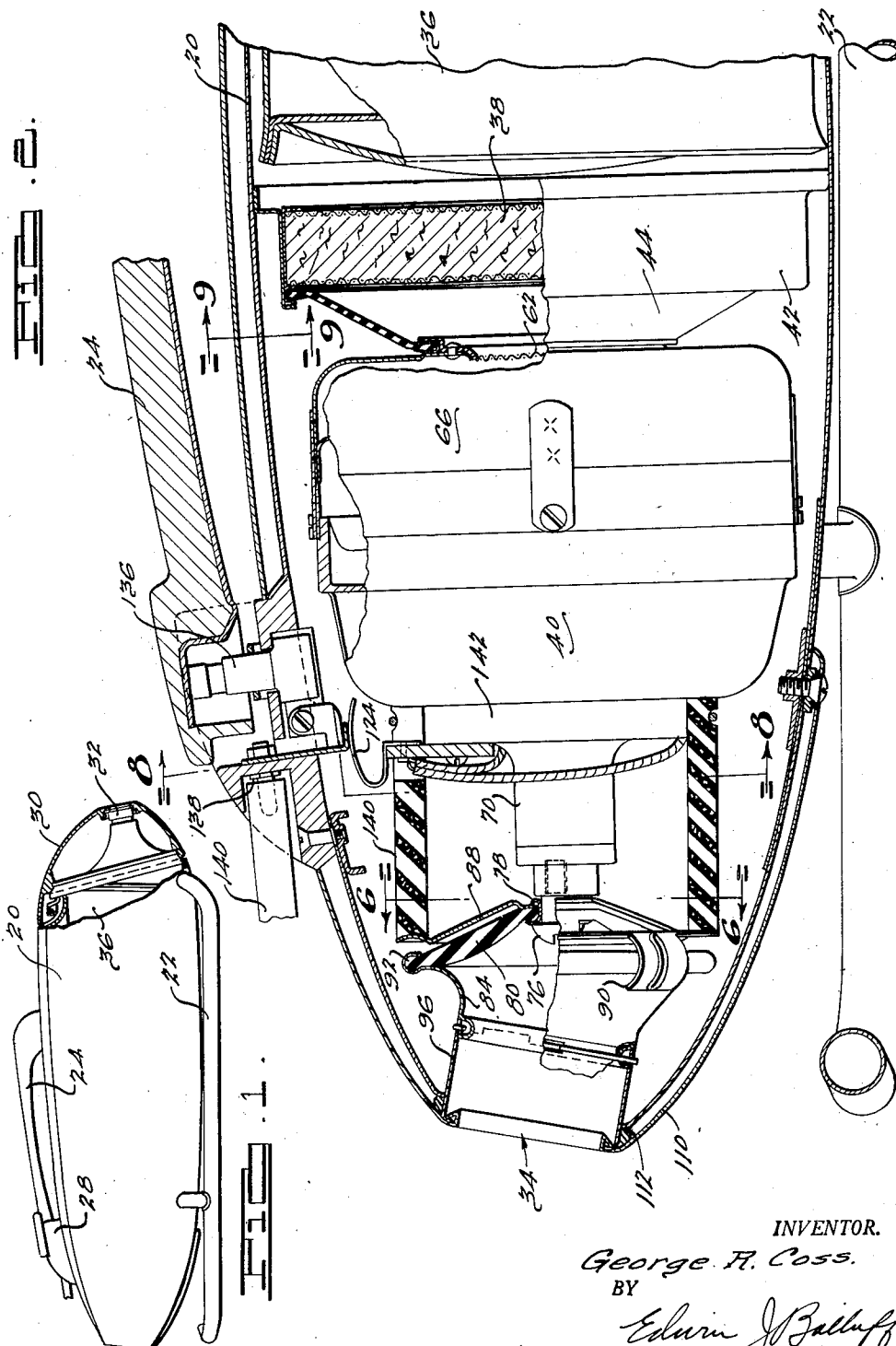
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2,397,536

SUCTION CLEANER

Filed June 14, 1944

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

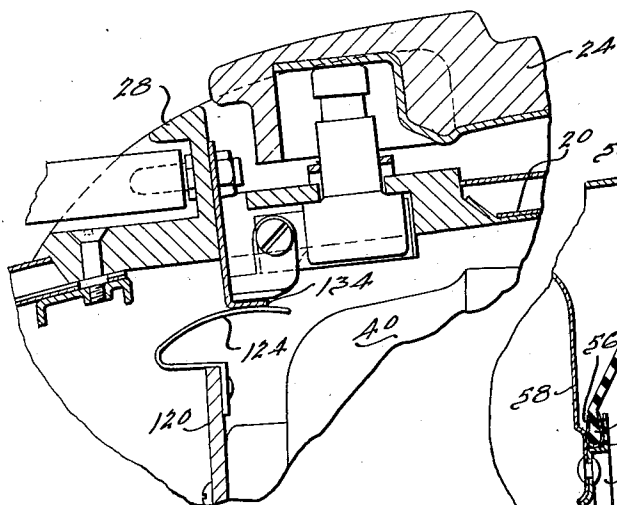


FIG. 3.

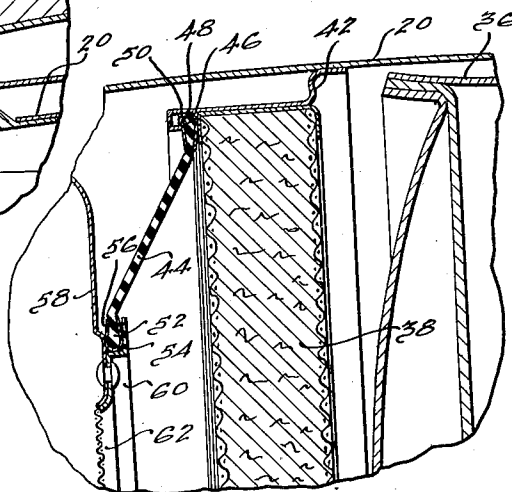


FIG. 4.

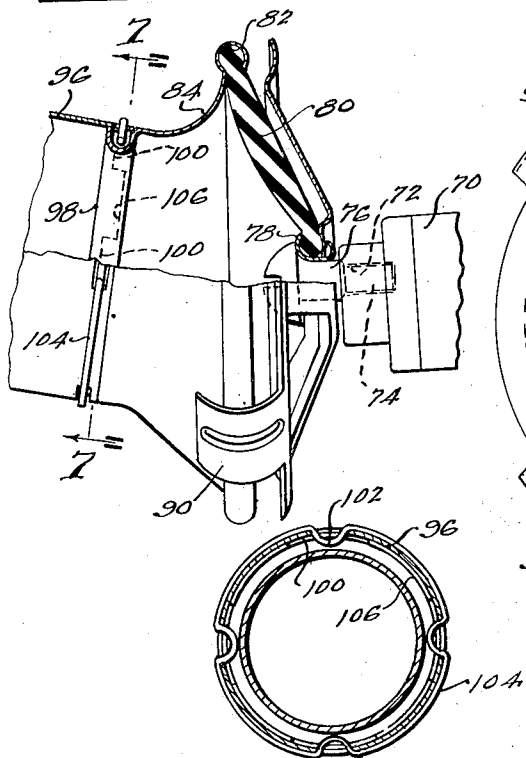


FIG. 5.

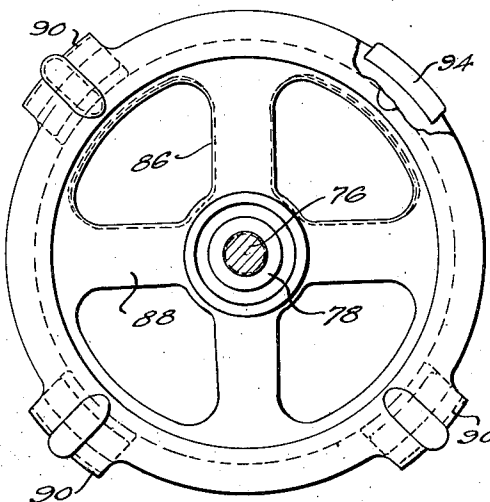


FIG. 6.

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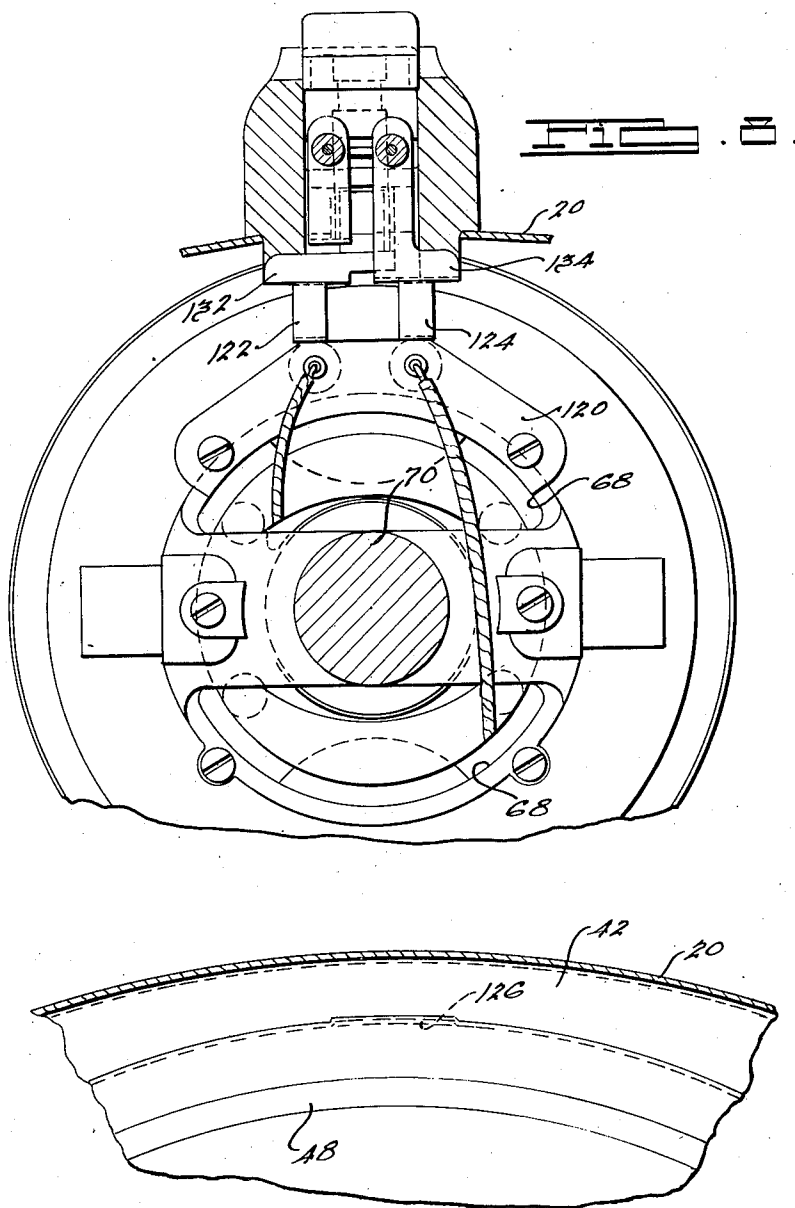


FIG. 3

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SUCTION CLEANER

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Application June 14, 1944, Serial No. 540,299

9 Claims. (Cl. 230—117)

This invention relates to suction cleaners and has particular reference to certain new and useful improvements in cleaners of the tank type.

Principal objects of the invention are to provide:

A new and improved construction for cleaners, particularly of the tank type; and

A new and improved mounting for motor fan units of cleaners of the tank type.

Other objects and advantages of the invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying drawings, of which there are three sheets and wherein:

Fig. 1 is a side elevational view of a tank cleaner embodying the invention;

Fig. 2 is an enlarged fragmentary longitudinal sectional view of the cleaner;

Fig. 3 is an enlarged fragmentary view of the connections between the motor and the switch for the circuit thereof;

Fig. 4 is an enlarged fragmentary view of a part of the motor mounting;

Fig. 5 is an enlarged fragmentary view of another part of the motor mounting at the other end of the motor;

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 2, certain parts being omitted;

Fig. 7 is a cross sectional view taken in a plane along the line 7—7 of Fig. 5; and

Figs. 8 and 9 are sectional views taken along the lines 8—8 and 9—9 respectively of Fig. 2, certain of the parts being omitted.

As illustrated in Fig. 1, a cleaner embodying the invention comprises a shell or casing 20 mounted on suitable skids 22 and having a handle 24, a switch and electric socket assembly 28, and a cap or cover 30. The cover 30 is provided with a socket 32 forming an air inlet, and the other end of the cleaner is provided with a socket 34 forming an air outlet from the cleaner.

The sockets 32 and 34 are adapted to detachably receive a coupling member carried on one end of a hose, the other end of which is provided with means by which various suction cleaning tools, etc., may be attached thereto. Removal or opening of the cover 30 will expose the interior of the shell or casing 20 which is adapted to receive a dirt collecting bag 36, the open end of which is presented toward the air inlet opening provided by the socket 32.

The bag 36 is removably arranged in the casing and so that all of the air which enters the cleaner through the air inlet provided by the

socket 32 will flow into the bag and thence through the walls thereof, thus depositing the dirt entrained in such air in the bag. Between the bag and the air outlet provided by the socket 34 there are arranged in the order named a filter 38 and a motor fan unit 40.

The shell or casing 20 may be formed of sheet metal of any desired shape or cross section and is made air pressure tight so that all the air must enter through the air inlet provided by the socket 32, and be discharged through the air outlet provided by the socket 34.

The filter 38, which may be of circular form, may be removably seated in an annular seat formed on a baffle or partition 42, the outer periphery of which conforms to the interior cross section of the casing 20 and is suitably secured thereto. A circular disk-shaped member 44 of resilient and flexible material, such as rubber, is provided on its outer periphery with a bead 46 which is fitted within a channel-shaped annular member 48 of metal or the like. The outer periphery of the bead 46 and member 48 is seated against an annular shoulder 50 formed on the inner periphery of the member 42. The bead 46 and member 48 have the same configuration as the shoulder 50. The disk-shaped member 44 at its center is provided with a circular opening defined by a bead 52 and a U-shaped member 54.

The bead 52 and U-shaped member 54 secured thereto are received within a channel or groove 56 formed by the end wall 58 of the fan and a ring 60 suitably secured thereto. The center of the end wall 58 of the fan and the ring 60 define an inlet opening 62 for the fan and this opening may be provided with a screen suitably secured to or between the inner edges of the wall 58 and ring 60 defining the opening 62. The disk-shaped member 44 may be made initially flat or in the shape of a cone frustum but of less height than that indicated in Figs. 2 and 4.

The motor blower unit 40 includes an electric motor and a centrifugal fan of one or more stages, the fan wheels or rotors thereof being mounted on the motor shaft, the fan being designated by the reference character 66. The axis of the motor and fan extends generally parallel to the longitudinal axis of the casing and lies approximately in the center of the circular air inlet opening 62.

The air which passes through the fan may be made to pass through the motor in order to cool the same, and thence be discharged through the openings 68 at the rear thereof.

The rear of the motor case is provided with a rearwardly extending axial boss 70 which is provided with a threaded hole 72 for receiving the threaded end 74 of a screw 76 which is carried in a collar 78 mounted in the central opening of a disk-shaped member 80. The outer periphery of the disk-shaped member is secured in an annular seat 82 formed on a sleeve 84. The disk-shaped member 80 is provided with a plurality of openings 86 therein for passing air. The disk-shaped member 80 is made of rubber or like material and may be made initially flat or in the shape of a cone frustum but of a lesser height than that indicated so that when the motor blower unit 40 is mounted as illustrated in Fig. 2, the material of the members 80 and 44 will be under tension. That is, the members 44 and 80 should be made so that the distance between the centers thereof, when said members 44 and 80 are not under tension, is greater than the length of the motor fan unit so that when the latter is mounted as illustrated in Fig. 2, parts 44 and 80 will be under tension and the motor fan unit will be floatingly mounted thereon. This mounting will permit a limited oscillation of the motor fan unit along its axis due for example to the operation of the motor and fan and variations in load thereon due to restrictions in the air intake or air discharge from the fan.

To limit the amplitude of such oscillations, a device comprising a metal plate 88 may be clamped to the inner bead of the member 80 by the collar 78. This plate has openings corresponding with those in the member 80, and is provided with a plurality of curved fingers 90 projecting laterally from the outer periphery of the plate 88 and disposed on both sides of the rim 92 forming the seat for the outer bead of the member 80 so as to limit the axial shifting of the motor fan unit. The rim 92 is cut away opposite the fingers 90 so as to accommodate projections or bumpers 94 on the outer bead of the member 80 (Fig. 6). These bumpers 94 project radially and laterally beyond the rim 92 so as to prevent contact between the fingers 90 and the rim 92.

The collar 84 has its other end shaped to fit within a sleeve 96. The end of the collar 84 fitted within the sleeve 96 may be formed in the shape of a relatively large annular bead, the outer marginal edge of which is formed to have a sliding fit in said sleeve 96. Such marginal edge of the bead 98 is provided with a plurality of notches 100 which are arranged so as to accommodate loops or projections 102 extending radially inwardly from a spring 104 which encircles the end of the sleeve 96. The loops or projections 102, of which four may be provided, extend through correspondingly spaced slots in the sleeve 96 and into the notches 100 so as to prevent axial separation of the collar 84 from the sleeve 96 when the parts are positioned as illustrated in Figs. 5 and 7. However, when the collar 84 is rotated relative to the sleeve 96, the tabs 106 formed on the sleeve 84 between the notches 100 will act on the loops or projections 102 and expand the spring 104, thereby permitting axial separation of the collar 84 from the sleeve 96.

When the collar 84 is initially assembled to the sleeve 96, the bead 98 will cam the projections 102 outwardly until the notches 100 are aligned with the projections 102, whereupon the same will snap into their position as illustrated in Fig. 7 and secure the collar 84 in the sleeve 96.

The sleeve 96 forms the socket 34 which provides the air discharge from the cleaner and is suitably secured to that part of the casing 20 which defines the opening for the socket 34. In this case a trim band 110 provided with an opening has the marginal edges which define the opening flanged inwardly and bent to cooperate with the end of the sleeve 96 for positioning the same as illustrated in Fig. 2. The gasket 112 may be arranged around the sleeve 96 so as to prevent the escape of air from the casing through the joint between the sleeve 96 and the casing wall.

The motor has suitably affixed thereto an insulating panel 120 to which spring contacts 122 and 124 are secured. The contacts are suitably connected by leads to the motor windings.

In the manufacturing process the collar 84 with the disk 80 and the plate 88 thereon may be assembled to the sleeve 96 after the latter has been assembled to the casing. The screw 76 is rotatably held in the collar 78. The motor fan unit 40 has the member 44 assembled thereto. After the baffle or partition 42 is arranged and secured in the casing, the motor fan unit 40 and the mounting member 44 are inserted into the casing through the opening exposed when the cover 30, filter 38 and bag 36 are removed. The outer periphery of the member 44 is seated on the shoulder 50.

To obtain proper alignment of the contacts 122 and 124 with the switch contacts 132 and 134, the baffle 42 is provided with a notch or joggle 126 (Fig. 9) which is shaped to receive a corresponding guide and locating surface on the outer periphery of the member 48. After the outer rim of the member 44 is properly seated against the shoulder 50, and the members 44 and 80 are stretched, the threaded hole 72 in the boss 70 of the motor may be aligned with the threaded part 74 of the screw 76 and then by inserting a screw driver through the socket 34, the screw 76 may be threaded into the hole 72 and tightened therein.

The socket and switch assembly 28 which is suitably mounted on the casing 20 is partially exposed to the interior of the casing and provided with contacts 132 and 134 with which the spring contacts 122 and 124 engage when the motor is positioned as illustrated in Fig. 2. The socket and switch assembly further includes a push type of switch 136 arranged in a recess in one end of the handle 24 and a socket 138 having electrical terminals adapted to receive a plug 140 on the end of a current conducting cord. The switch 136 is housed within a recess in the handle 24 which has a limited movement so that by stepping on the end of the handle 24 over the switch 136, the same may be actuated to open or close the circuit of the motor.

A muffler 140 comprising a ring of sponge rubber or other acoustic material may be arranged between the outer margin of the plate 88 and the annular shoulder 142 on the end of the motor, this ring being suitably supported on the motor. A part of the ring may be notched out to accommodate the motor leads. In lieu of using sponge rubber, an air pervious material might be employed, or suitable perforations in the sponge rubber might be provided. The air which passes through the cleaner would pass through the ring forming the muffler 140 after being discharged from the rear end of the motor and would thence flow through the openings 86 and socket 34 to atmosphere.

While the invention has been described with

some detail, it is to be understood that the description is for the purpose of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

I claim:

1. In a suction cleaner having a casing with a motor blower unit therein, a pair of spaced disc-shaped mounting members formed of resilient material, said casing being provided at one end with a relatively large opening through which said motor blower unit and said mounting members are inserted in and may be removed from said casing, the interior of said casing being provided with a seat facing said opening and against which the outer periphery of one of said members is removably seated, a collar secured to the outer periphery of the other of said members, a sleeve forming an air exhaust from said cleaner, said casing having at its other end a relatively small opening within which said sleeve is secured, means providing a detachable connection between said collar and said sleeve, central portions of said members being connected to the ends of said unit, at least one of said members of resilient material being under tension, one of said members being connected to one end of said unit by a threaded means, the head of which is accessible through said sleeve and collar.

2. In a suction cleaner having a casing with a motor blower unit therein, a pair of spaced disc-shaped mounting members formed of resilient material, said casing being provided at one end with a relatively large opening through which said motor blower unit and said mounting members are inserted in and may be removed from said casing, the interior of said casing being provided with a seat facing said opening and against which the outer periphery of one of said members is removably seated, a collar secured to the outer periphery of the other of said members, said casing having at its other end an exhaust port to which said collar is connected, central portions of said members being connected to the ends of said unit, at least one of said members of resilient material being under tension, one of said members being connected to one end of said unit by a threaded means which is accessible through said collar, and means secured to said unit and cooperable with the periphery of said one of said members which is secured to said collar for limiting the deflection of said unit axially and transversely.

3. In a suction cleaner having a casing with a motor blower unit therein, inlet and outlet parts for said casing, means for floatingly supporting said unit in said casing comprising spring means arranged under tension between one end of said unit and said casing, said motor blower unit having an opening at one end thereof for the intake of air and an opening at the other end thereof for the discharge of air, and sound attenuating means comprising a tubular member of sound absorbing material carried by said unit and surrounding the discharge opening thereof and forming a path within said casing for the flow of air between the discharge opening of said unit and said casing outlet port.

4. In a suction cleaner a casing, a switch mounted thereon and having an actuating element accessible from the exterior thereof and

contacts exposed to the interior of said casing, a motor blower unit removably and resiliently mounted in said casing independently of said switch, and contacts carried by said motor unit engageable with said switch contacts upon arranging said unit in said casing.

5. In a suction cleaner having a casing with a motor blower unit therein, a mounting member for supporting each end of said unit, said casing being provided at one end with a relatively large opening through which said motor blower unit and said mounting members are inserted in and may be removed from said casing, the interior of said casing being provided with a seat facing said opening and against which the outer periphery of one of said mounting members is removably seated, said seat defining an opening through which at least part of said motor blower unit and the other of said mounting members may pass, said casing having at its other end a relatively small opening forming an air outlet for said casing, means providing a connection between said other mounting member and said casing, at least one of said mounting members being of resilient material, said other of said mounting members being connected to said unit by detachable threaded means which is accessible through said relatively small opening.

6. In a suction cleaner having a casing with a motor blower unit therein, a pair of spaced disc-shaped mounting members, said casing being provided at one end with a relatively large opening through which said motor blower unit and said mounting members are inserted in and may be removed from said casing, the interior of said casing being provided with an annular seat facing said opening and against which the outer periphery of one of said members is removably seated, said seat defining an opening through which said motor blower unit and the other of said mounting members may pass, a collar secured to the outer periphery of the other of said mounting members, a sleeve forming an air exhaust from said cleaner, said casing having at its other end a relatively small opening forming an air outlet and within which said sleeve is secured, means providing a detachable connection between said collar and said sleeve, said members being connected to the ends of said unit, at least one of said mounting members being of resilient material, said other of said members being connected to one end of said unit by a threaded means which is accessible through said sleeve and collar.

7. In a suction cleaner having a casing with a motor blower unit therein, a pair of mounting members for said unit, at least one of which is formed of resilient material, said casing being provided at one end with a relatively large opening through which said motor blower unit and said mounting members are inserted in and may be removed from said casing, said casing being provided with an internal shoulder forming a seat facing said opening and against which the outer periphery of one of said members is removably seated, said seat defining an opening through which said motor blower unit and the other of said mounting members may pass, means providing a detachable connection between the other end of said casing and said other mounting member which functions to hold said one of said mountings on its seat and to thereby suspend said unit in said casing and secure it relative thereto, said other of said members being connected to one end of said unit by a threaded means which is

accessible through a relatively small opening in said other end of said casing.

8. In a suction cleaner having a casing with a motor blower unit therein, a mounting member formed of resilient material arranged to support one end of said unit, said casing being provided at one end with a relatively large opening through which said motor blower unit and said mounting member are inserted in and may be removed from said casing, the interior of said casing being provided with an internal seat facing said opening and on which seat the outer periphery of said mounting member is seated for locating said mounting member, said casing having at its other end a relatively small opening forming an air outlet from said cleaner, and threaded means which is accessible through said small opening for securing the other end of said unit relative to said casing thereby to bias said unit against said

resilient member and said resilient member toward said seat and to suspend said unit in said casing.

9. In a suction cleaner having a casing with a motor blower unit therein, a mounting member formed at least in part of resilient material and supported within said casing and engageable with said unit so as to form at least a part of a support for said unit within said casing, said casing being provided at one end with a relatively large opening through which said unit and mounting member are inserted in and may be removed from said casing, a single threaded means within said casing and between said casing and unit for securing said unit in and relative to said casing and said casing being provided at its other end with another opening through which access may be had to said threaded means.

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