May 15, 1956 R. C. OSBORN 2,745,512

VACUUM CLEANER

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Fig. 1

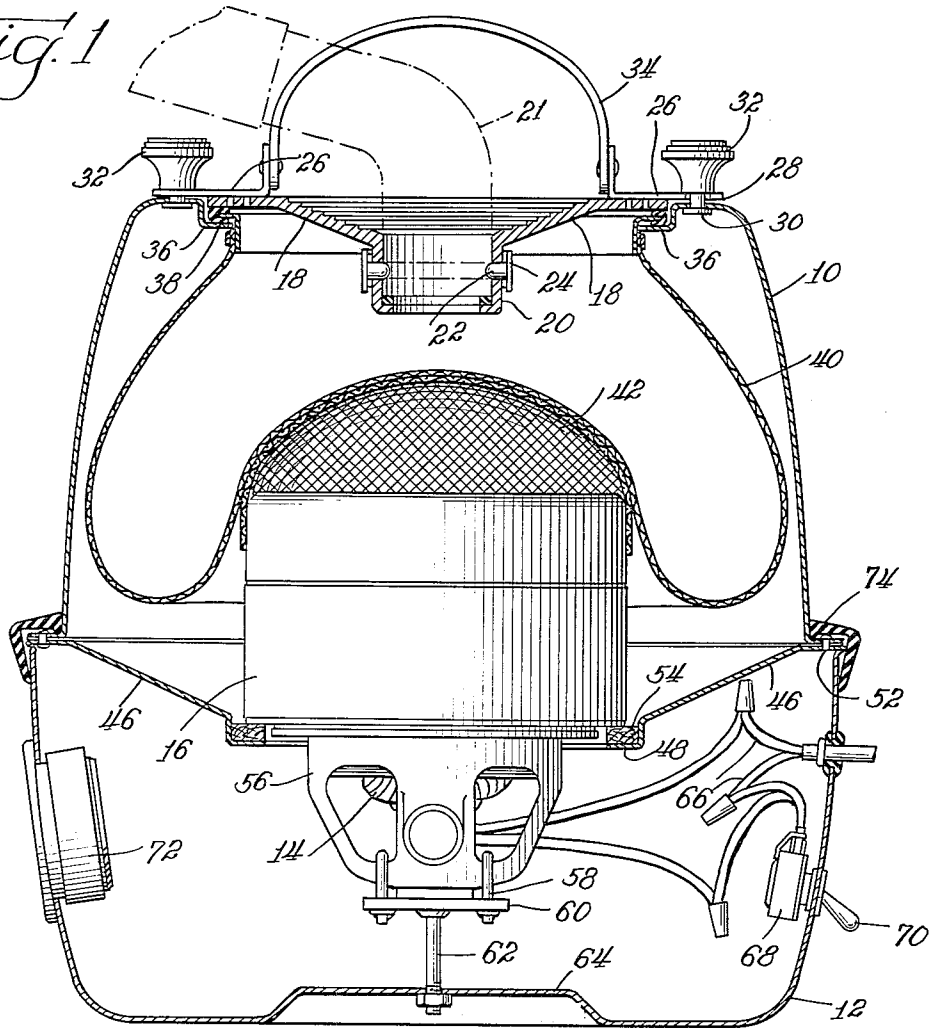
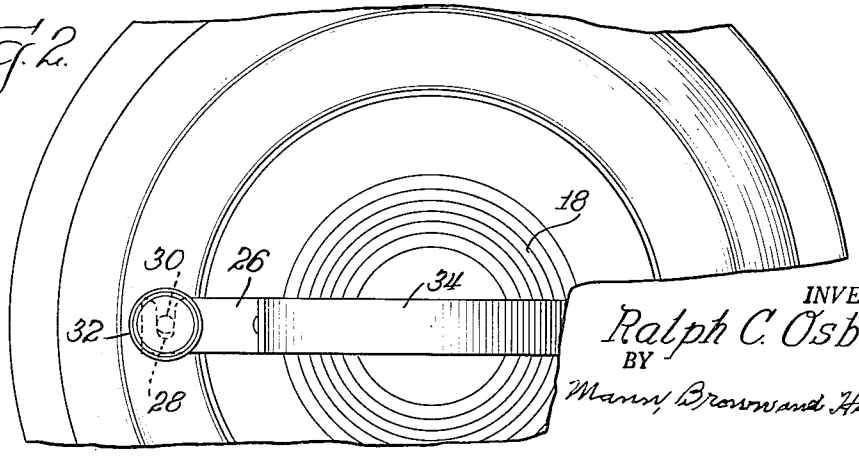



Fig. 2




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Fig. 3.

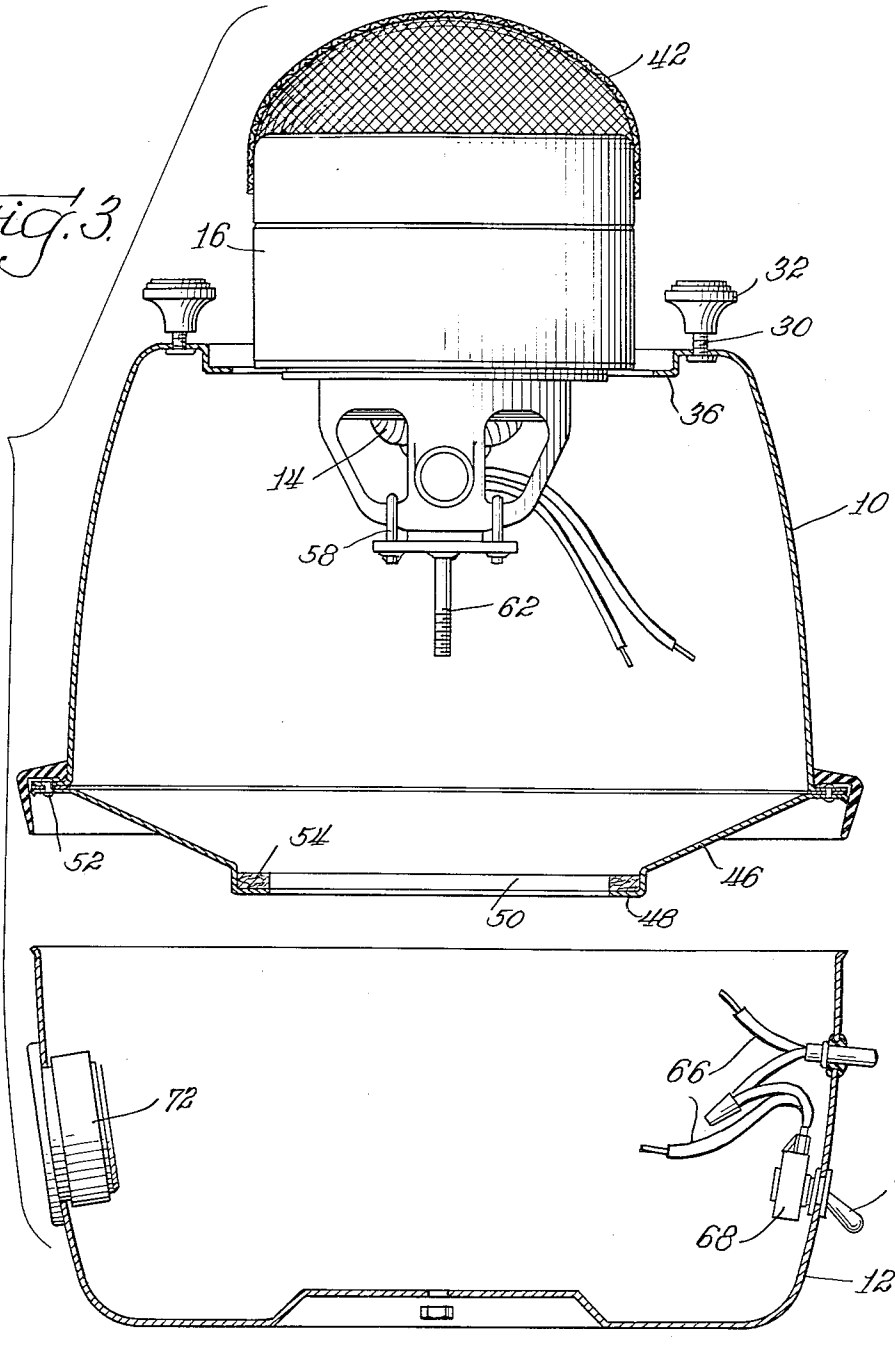
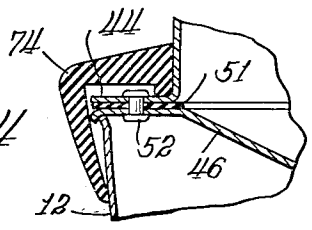



Fig. 4




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# VACUUM CLEANER

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4 Claims. (Cl. 183—37)

My invention relates to vacuum cleaners and particularly to vacuum cleaners of the canister type.

In vacuum cleaners generally in use much difficulty is encountered in repair and service of the various parts. Generally these cleaners are so constructed that a substantial amount of time and a great many hand operations are necessary to disassemble a machine requiring service and frequently special tools are required. Vacuum cleaners being household articles, it is desirable that such repairs as may be necessary should be made as quickly as possible and with a minimum of effort. It is also desirable from the manufacturers' consideration to be able to fabricate a vacuum cleaner with relatively few parts and from a minimum number of individual subassembly units, each of which may be constructed cheaply. It is also important that such subassemblies of parts be constructed in such a way that these assemblies may be incorporated into a finished vacuum cleaner inexpensively and with a minimum of effort.

One of the objects of my invention is to provide a vacuum cleaner which may readily be disassembled for inspection or repair.

Another object of my invention is to provide a vacuum cleaner in which the motor and blower unit may be quickly removed and replaced by a relatively few hand operations.

Another object of my invention is to provide a vacuum cleaner fabricated from a minimum number of subassembly parts which may be readily assembled into a completed vacuum cleaner.

Another object of my invention is to provide a novel suction means support designed in such a way as to cooperate with the suction means to hold the basic parts of the vacuum cleaner in assembled relation.

Another object of my invention is to provide a vacuum cleaner which may be fabricated of a relatively few number of parts and which may be made and assembled inexpensively.

These and other objects of my invention will become readily apparent from the following description and drawings in which I have illustrated a preferred embodiment of my invention.

In the drawings:

Fig. 1 is a sectional view of my improved canister type vacuum cleaner;

Fig. 2 is a partial top plan view showing the cover, a portion of the handle and one side of the locking means;

Fig. 3 is an exploded sectional view showing the parts in disassembled relation;

Fig. 4 is an enlarged sectional view of the assembly between the low pressure and high pressure chambers.

In its preferred form the vacuum cleaner comprises an upper or low pressure chamber generally circumscribed by a wall 10, a bottom or high pressure chamber pan or receptacle 12 and a motor 14 adapted to drive a suction fan within a fan housing 16. The chamber 10 has a top opening of a diameter larger than the fan housing so that the fan housing and motor may be withdrawn and inserted



therethrough. This opening is closed by a cover 18 having a generally cylindrical nozzle receiving collar 20 which carries a cleaner hose retaining means in the form of a coupling adapted to permit rotation of the hose connector 21. In the present instance I have illustrated a coupling in the form of a pair of studs 22 projecting through the collar 20 and adapted to cooperate with a circumferential recess adjacent the end of the hose connector 21. The studs 22 are yieldingly held in place by means of a rubber or other elastic band 24 extending around the collar 20 and the flat portion of the studs 22.

Secured to opposite sides of the upper part of the cover 18 are a pair of brackets 26 terminating at their ends in oppositely disposed hook portions 28 adapted to engage threaded thuds 30 secured to the top inturned flange of the wall 10. Ornamental cap screws 32 are threaded on the studs 30 to removably hold the cover in closed position. Pivotally attached to the other ends of brackets 26 is a handle 34 which may be pivoted downwardly to permit complete rotation of the hose connector 21 within the coupling means.

The upper part of the chamber wall 10 defines a cover receiving opening and has an annular shoulder 36 adapted to receive a gasketed neck portion 38 of a cleaner bag 40 which partially rests upon a dome shaped screen 42 secured to the fan housing 16.

The chamber wall 10 is generally of cylindrical shape and terminates at its lower end in an outwardly turned flange 44 (see Fig. 4) to which is secured a diaphragm 46 having a lower shoulder portion 48 and an opening 50. As shown more particularly in Fig. 4, the outer end of diaphragm 46 is bent downwardly to encompass the upper peripheral portion of the bottom pan wall 12. The diaphragm 46 separates the high and low pressure chambers of the cleaner and it is therefor desirable to insure against air leakage. This may be done by means of an annular gasket 51 positioned between the flange 44 and diaphragm 46. This assembly of the flange 44, diaphragm 46 and gasket 51 may be maintained in secure relationship by fastening means such as a plurality of rivets 52.

The annular shoulder 48 defining the opening 50 is of such a size as to receive a ring gasket or seal 54 against which the lower peripheral edge of the fan housing 16 bears. The diaphragm 46 may be constructed of sheet metal of such gauge as to adequately support the suction means, as will be more fully described hereinafter.

A bracket 56 supports the motor and fan housing and secured to the bracket by means of U bolts 58 is a bar 60 having a threaded bolt 62 welded thereto. The bolt is of a length sufficient to extend through an opening in a recessed portion 64 of the bottom pan 12, when the fan housing 16 is in place on the gasket 54.

A source of electrical power may be provided in the lower chamber by means of wires 66 connected to the motor 14 through a switch 68, the arm 70 of which extends through the pan wall 12. The high pressure chamber also has an outlet in the form of a hose coupling 72 which in the normal cleaning operation is open to atmosphere. When the cleaner is to be used as a blower, this coupling mechanism is adapted to receive a hose connection in the same manner as is done in connection with the coupling means of the cover.

Since the assembly of the flange 44 and the diaphragm 46 may present a sharp edge likely to mar furniture when the cleaner is shifted from place to place, I have provided an annular bumper guard 74 of rubber, plastic or other material not likely to scratch or mar furniture. As shown particularly in Fig. 4, this bumper guard is of a size to snugly fit the upper chamber wall and has a depending skirt portion enveloping the flange 44, the peripheral edge of the diaphragm 46 and the upper peripheral

edge of the pan wall **12**. This bumper guard also provides a streamlined or symmetrical appearance to the cleaner.

From the foregoing description of the parts, it is apparent that the bottom pan section may be fabricated as a unitary piece with appropriate holes formed therein. As shown in the bottom of Fig. 3, the hose coupling **72**, the leads **66** and the switch **68** may be assembled on the chamber wall **12**. The upper chamber **10** may also be readily fabricated as a subassembly unit including a chamber wall **10**, the diaphragm **46** with the gasket **54** and the cover holding mechanism. The suction means including the motor, fan and fan housing together with the screen may also be fabricated as a subassembly unit to which the bracket **56** and the bolt **62** may be secured.

The completion of the assembly of the cleaner is then simple. The upper chamber is placed so as to slightly overlap the upper peripheral edge of the pan **12**. The electrical circuit is completed by connecting the appropriate wires and the motor, fan and fan housing unit is inserted through the top opening and placed in position such that the fan housing **16** contacts the gasket **54** in the shoulder **48** of the diaphragm **46**, thus substantially closing the opening between the high pressure and low pressure chambers. In this position the bolt **62** will extend through the opening in the recessed portion **64** of the chamber wall **12**. When a nut is applied to the bolt and tightened, the fan housing will be drawn tight against the gasket **48** and the lower chamber wall **12** will be drawn tightly into peripheral engagement with the underside of diaphragm **46** and will be encompassed by the turned down portion of the diaphragm. The bag **40** may then be inserted in its proper position and locked in place.

It will be readily apparent that in order to dissasemble the cleaner it is necessary merely to remove the cover and bag and unscrew the nut from bolt **62**. The suction unit may then be removed through the opening in the top. If the electrical connections are to be checked, it is merely necessary to remove the nut from the bolt **62** and the whole upper chamber and suction means may be lifted from the lower chamber.

From the foregoing it is obvious that I have devised a vacuum cleaner of relatively simple construction and one in which the low pressure chamber is partitioned from the high pressure chamber by means of a diaphragm which is also utilized as a support for the suction unit. It is also apparent that I have devised a vacuum cleaner in which a relatively few parts are used and which parts may be readily fabricated into individual subassembly units. These subassembly units may be quickly assembled by unskilled labor to form a completed vacuum cleaner. This structure is also particularly beneficial in that ready access is permitted to the various portions of the cleaner for inspection or repair purposes and that such access is achieved by a minimum of simple hand operations.

I claim:

1. A device of the type described comprising a first chamber defined by an encompassing side wall, a diaphragm fixed to the lower portion of the side wall, and a cover carried by the upper portion of the side wall, said diaphragm being formed with an opening, suction means carried by said diaphragm and disposed in said opening, said cover being formed with an inlet, a cleaner bag within said first chamber adjacent said suction means, said inlet leading to said cleaner bag, a receptacle including an encompassing side wall merging into a bottom wall, said first chamber being supported by said receptacle side wall, said diaphragm and said receptacle



defining a second chamber, said receptacle being formed with an outlet, and means securing said suction means to said receptacle, said means also detachably securing said chambers in assembled relation.

2. A device of the type described comprising an upper low pressure chamber having an inlet formed therein, a diaphragm defining the lower portion of said chamber, said diaphragm being formed with a central opening, suction means carried by said diaphragm and disposed in said opening, a cleaner bag within said low pressure chamber adjacent said suction means, said inlet leading to said cleaner bag, a lower high pressure chamber having an outlet formed therein, said lower chamber including an encompassing side wall, said upper chamber resting on the upper periphery of said side wall, said diaphragm defining the upper portion of said second chamber, and means securing said suction means to said lower chamber, said means also detachably securing said chambers in assembled relation.

3. A device of the type described comprising a first chamber defined by an encompassing side wall, a diaphragm fixed to the lower portion of said side wall, and a cover carried by the upper portion of said side wall, said diaphragm being formed with an opening, gasket means carried by said diaphragm adjacent said opening, suction means disposed in said opening and resting on said gasket means, said cover being formed with an inlet, gasket means separating the lower portion of said side wall and said diaphragm, a cleaner bag within said first chamber adjacent said suction means, said inlet leading to said cleaner bag, a receptacle including an encompassing side wall merging into a bottom wall, said first chamber being supported on the upper periphery of said receptacle side wall, said diaphragm and said receptacle defining a second chamber, said receptacle being formed with an outlet, and means securing said suction means to said receptacle, said means detachably securing the said chambers in assembled relation.

4. A device of the type described comprising a first chamber defined by an encompassing side wall, a diaphragm fixed to the lower portion of said side wall, and a cover carried by the upper portion of said side wall, a pair of brackets secured to the opposite sides of the upper surface of said cover, said brackets comprising oppositely extending generally horizontal portions, and generally vertical portions, a handle pivotally attached to said vertical portions, a pair of generally vertical studs carried by the upper portion of said side wall, said horizontal portions of said brackets being formed to receive said studs, caps carried by said studs, said diaphragm being formed with an opening, gasket means carried by said diaphragm adjacent said opening, suction means disposed in said opening and resting on said gasket means, said cover being formed with an inlet, gasket means separating the lower portion of said side wall and said diaphragm, a cleaner bag within said first chamber adjacent said suction means, said inlet leading to said cleaner bag, a receptacle including an encompassing side wall merging into a bottom wall, said first chamber being supported on the upper periphery of said receptacle side wall, said diaphragm and said receptacle defining a second chamber, said receptacle being formed with an outlet, and means securing said suction means to said receptacle, said means detachably securing said chambers in assembled relation.

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