

Dec. 26, 1939.

E. L. SNYDER

2,184,446

SUCTION CLEANER

Filed March 9, 1938

2 Sheets-Sheet 1

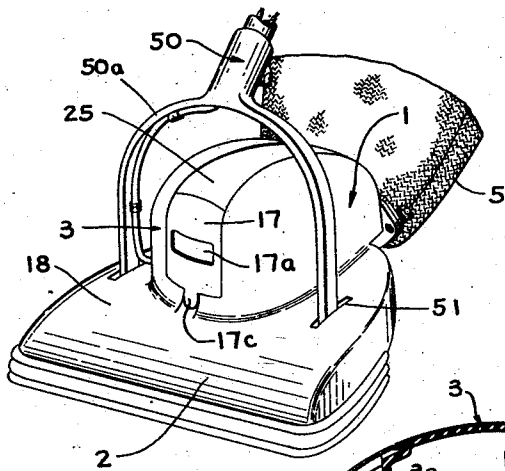


Fig. 1

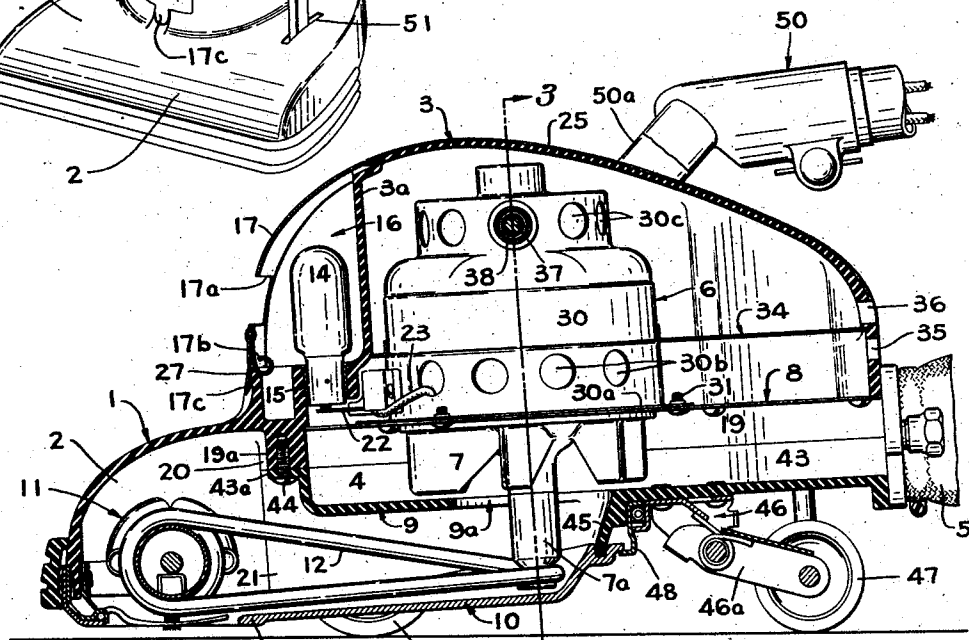


Fig. 2

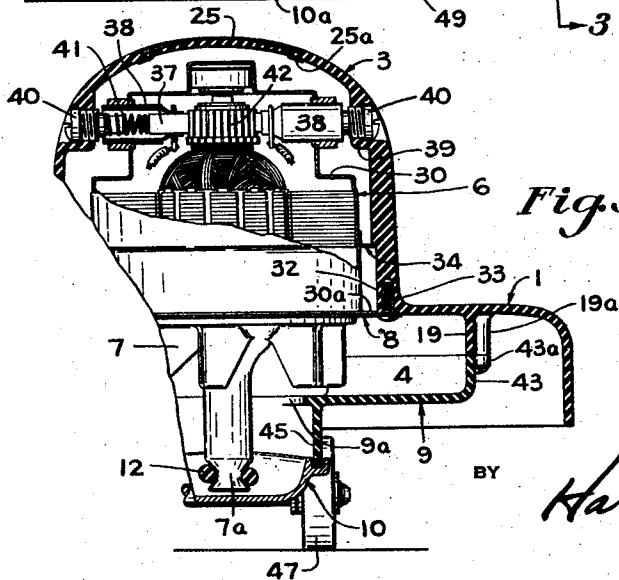


Fig. 3

INVENTOR

Eugene L. Snyder

BY

Harry S. Brumser

ATTORNEY

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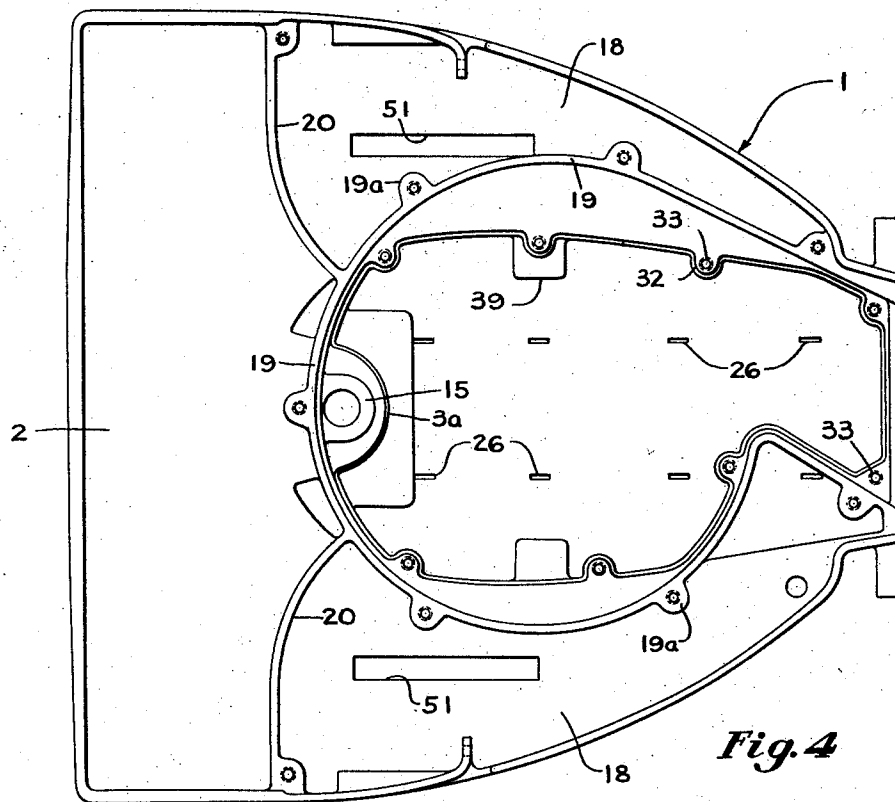


Fig. 4

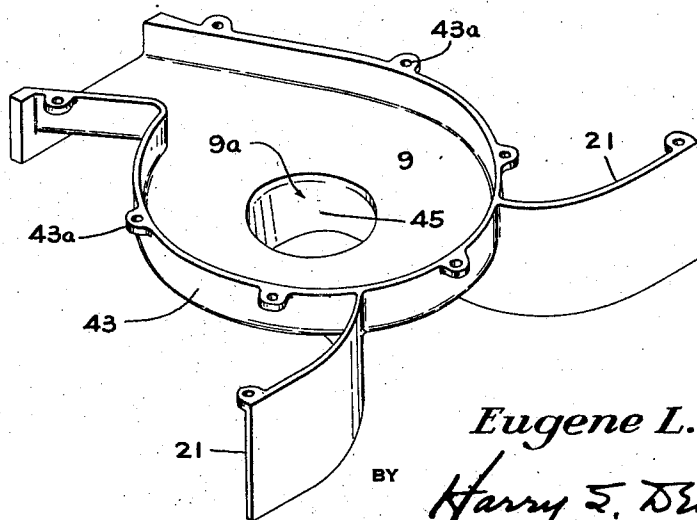


Fig. 5

INVENTOR

Eugene L. Snyder

BY

Harry S. Drumm

ATTORNEY

UNITED STATES PATENT OFFICE

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SUCTION CLEANER

Eugene L. Snyder, Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio, a corporation of Ohio

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5 Claims. (Cl. 15-16)

This invention relates to improvements in suction cleaners and more particularly to a novel structural design for a suction cleaner wherein the main casting of the cleaner body and the motor housing are formed as one integral member.

It has been the common practice heretofore in suction cleaner design to mount a motor upon the main casting and enclose the motor within a more or less ornamental cover or dome. However, with the development of improved structural materials and advanced technique in the molding or casting of these materials, it is now possible to cast or mold the entire housing for the air handling system in one piece and to introduce an improved method of assembling the motor and fan unit and forming the fan chamber and the passages leading to and from the same.

The object of the invention is therefore to provide a novel design for a suction cleaner embodying the one-piece motor housing and main casting coupled with such other arrangements of internal parts as are made necessary by the one-piece design.

A preferred embodiment of the invention is disclosed in the accompanying drawings, in which:

Figure 1 is a general perspective view of a suction cleaner embodying the improved design;

Figure 2 is a view in vertical section taken longitudinally through the cleaner;

Figure 3 is a view in cross section as taken on line 3-3 of Figure 2;

Figure 4 is a bottom plan view of the one-piece housing as it appears preparatory to the assembly operation; and

Figure 5 is a perspective view of the bottom section which completes the assembly after the motor and fan unit have been assembled.

The cleaner herein disclosed embodies a wheel supported casing 1, having a nozzle 2 extending across the forward end thereof and a centrally disposed dome-like housing 3 elongated from front to rear. A fan chamber 4 is located beneath the housing 3 and has its outlet at the rear end of the casing where the usual dirt receptacle or filter bag 5 is removably attached. A motor 6 is vertically mounted within the housing 3 and carried at its lower end is a suction fan 7 located in the fan chamber, which is separated from the space occupied by the motor by a thin metal plate 8 which also supports the motor. As clearly shown in Figure 2, the lower half of the fan chamber is formed by a separate bottom wall section 9, and below that is a removable bottom plate 10 which defines the air passage from the

nozzle to the fan chamber and forms the rear lip 10a of the suction mouth of the nozzle, which in reality is an elongated chamber extending the full width of the forward end portion of the casing 1.

Preferably mounted within the nozzle portion 2 is a rotating agitator 11, driven by means of a belt 12 carried at the lower end of a pulley 7a formed at the lower end of the hub portion of the fan 7, which is extended through a circular opening or fan "eye" 9a in the bottom wall section of the fan chamber. The agitator has the general form of a cylindric shell with floor contacting brush and beater elements on the outer surface thereof, but inasmuch as it is a feature common to suction cleaners, and furthermore, forms no part of the present invention, further details thereof will be omitted.

Immediately forward of the motor 6 is a lamp 14 supported in vertical position within a socket 15 and enclosed within a cavity or a compartment 16 separated from the space enclosing the motor. A cover plate 17 of sheet metal fits over the front side of the lamp compartment flush with the adjacent surface of the casing 1.

Referring now to the structural details of the casing 1, it is first to be pointed out that it may be cast of metal such as aluminum, magnesium or suitable alloys thereof, or it may be molded of a plastic substance as for instance, Bakelite or some other synthetic resin. In fact, the casing 1, which is the largest single element of the body structure and combines in one piece the nozzle and motor housing, is designed for commercial production by either process.

Figure 4 clearly illustrates the contour and size of the main casing member 1 as it leaves the mold or die, as the case may be, except for the drilling of holes and the usual finishing operations. A top wall section 18 extends along the sides of the housing 3 and, widening from the rear forwardly, curves downwardly around its edges to form the front and ends of the nozzle portion 2. From the underside of the top wall 18 depends an annular web 19 defining the upper half of the side wall of the fan chamber and the upper half section of the exhaust passage opening rearwardly from the fan chamber with its flanged connection.

Also integral with the underside of the casing member 1 is a pair of depending curvilinear webs 20, 20 which define the rear wall of the nozzle chamber, the full height of said wall being completed by a pair of complementary webs 21, 21 formed integral with the bottom wall section 9

of the fan chamber, as shown in Figure 5, and as will later be described in greater detail.

The motor housing 3 has a generally rounded or dome-like contour, definitely elongated in a longitudinal direction and, extending from a point well forwardly of the motor location, terminates flush with the exhaust outlet. The front central portion of the motor housing 3 is recessed to form the compartment for the lamp 14, already mentioned. This compartment 16 is generally semicircular in horizontal section and is formed by an upright wall segment 3a and closed by the removable cover plate 17. The lamp socket 15 is preferably a vertical bore in a cylindric-shaped boss formed at the bottom of the compartment and open at its lower end so that the base terminals of the lamp are exposed for contact with the ends of resilient arms 22 mounted on the motor 6 and electrically connected with the source of current through conductors 23.

The cover plate 17 extending over the front of the lamp compartment is preferably formed of sheet metal and is provided with a rectangular opening or window 17a immediately in front of the lamp so that the light therefrom is directed upon the floor surface ahead of the nozzle. And in order to improve the appearance of the cleaner, the lamp compartment cover plate 17 is preferably made the forward section of a metal band 25 extending lengthwise over the top of the motor housing and consisting of a thin strip of metal fitted or inlaid into a shallow channel formed in the surface of the housing and suitably anchored as for instance, by a series of ears 25a located at intervals along the edges of the band 25 and adapted to be inserted through a corresponding series of narrow slots 26 extending through the top wall of the motor housing. And in order to obtain a flush mounting of the removable cover plate 17, the same seats along its side edges in shallow grooves and along its top edge it has overlapping contact with the forward edge of the strip 25, a portion of the casing immediately below the joint being cut away to accommodate the overlapping edges. And finally, to hold the cover plate 17 in place, a spring latch member 17b is riveted to the inner face thereof just below the window 17a with its looped end adapted to engage a locking detent 27 formed in the casing member 1 just forwardly of the lamp socket 15. A tab 17c along the lower edge of the cover plate 17 facilitates its removal.

Having described the formation of the casing member 1, the installation of the motor 6 will now be described: Except for the fact that the motor is especially designed for mounting on end, with its axis arranged vertically, it is of a standard design and characteristics. The motor frame 30 is preferably a shell stamped from sheet metal and, shaped somewhat like a turret, encloses the motor parts and supports the armature shaft end bearings and commutator brushes. The motor frame 30 is supported by the plate 8 heretofore identified and to which it is fastened by means of bolts 31 passing through said plate and a flange 30a around the base of the motor frame. The motor supporting or bottom plate 8 also forms a partition wall between the fan chamber and its exhaust passage and the space occupied by the motor. As clearly shown in Figure 4, bosses 32 are formed at intervals around the upper edge of the fan chamber and which are tapped for screws 33.

Spaced a short distance above the bottom

plate 8 and constituting substantially a counterpart thereof is a partition plate 34 adapted to separate or divide the space within the motor housing and surrounding the upper portion of the motor case 30 from the space immediately surrounding the base of the motor casing. The purpose of this horizontal partition plate 34 is to promote the circulation of air through the motor for cooling purposes, there being provided at the extreme rear end wall of the motor housing 3 just below its junction with the partition plate 34, an outlet slot 35 through which air is discharged from the lowermost space after passing through the motor case 30 and exhausted from circular holes 30b formed around the base thereof. As is common in motors of this type, a small ventilating fan is mounted on the armature shaft and although this fan is not disclosed, it will be understood that it acts to circulate the air through the motor which enters through series of ports 30c formed around the upper end of the motor casing 30, this air being supplied to the space above the partition walls 34 through an inlet opening or slot 36 formed in the rear end wall of the motor housing 3 immediately above the partition wall 34.

It is also to be noted that the commutator brushes 37, 37 are retained within cylindric brush holding members 38, 38, supported in diametric relation near the upper end of the motor case 30 as shown in Figure 3. In order to permit the convenient replacement of these brushes, the motor is assembled with the brush holders registering with bosses 39 on the sides of the motor housing 3 tapped to receive screw plugs 40 having reduced end portions projecting axially into the ends of the cylindric brush holders 38 and forming abutment for the coil springs 41, 41 which hold the brushes in contact with the commutator 42 on the armature shaft.

This completes the mounting and assembly of the motor 6, whereupon the next step is to complete the fan chamber, the upper half of which is formed as an integral part of the casing 1 and identified as the depending annular web 19. Since the motor and fan constitute a unit with the fan located just below the bottom plate 8, the latter becomes also the top wall of the fan chamber. Thus, to complete the fan chamber a separate wall section 43 is provided, comprising a shallow dish-shaped member generally annular in shape and otherwise conforming exactly to the contour of the depending web 19. This piece 43 which forms the lower half of the fan chamber, also forms the lower half of the exhaust passage with its flanged outlet connection as clearly shown in Figure 5. And for the purpose of securing the lower fan chamber section 43 in place, a series of radially extending bosses 43a are located at intervals along its contacting edges and register with companion bosses 19a around the edge of the depending web 19, and which are suitably drilled and tapped to receive screws 44. Moreover, there are formed as integral parts of the lower fan chamber section 43, the outwardly curved webs 21, 21, disposed symmetrically at the forward end of said section and adapted to register with the shallow webs 20, 20 on the underside of the casing member 1. These pairs of webs 20 and 21 are joined edge to edge by screws anchored in bosses at their outer extremities and when the assembly operation is completed, the vertical walls thus formed not only constitute the rear walls of the nozzle chamber but also define the entrance to the passage from

the nozzle chamber to the inlet opening 9a to the fan chamber, this passage being formed in part by a depending U-shaped flange 45 uniting the ends of the extended portions of the vertical webs 21, 21 and extending inwardly on the underside of the bottom section 43, includes the centrally located fan "eye" 3a.

The section 43 also carries the rear wheel supporting bracket 46 which is suitably fastened as by rivets to its underside, just rearwardly of the inlet opening "eye" 3a to the fan chamber. Without going into detail, the rear caster bracket 46 preferably includes a hinged portion 46a carrying an axle on which the rear wheels 47 are journaled, so that the latter swing in a limited arc for the purpose of adjusting the height of the nozzle with relation to the carpet surface. Suitable adjusting means are provided for this purpose but which need not be described herein.

And finally, to complete the assembly, the removable bottom plate 10 hereinbefore identified is applied over the space included between webs 21 and 45, having edge to edge contact therewith to complete the air passage from the nozzle chamber as hereinbefore stated. There is nothing particularly novel in the arrangement of the bottom plate 10, or for that matter, the spring latching device 48 which is incorporated as a part of the rear caster bracket 46 and serves to hold the bottom plate in place by engaging a projecting detent at the extreme rear end of the bottom plate. Also, the arrangement of the supporting wheels is more or less standard, including the front wheels 49 mounted on fixed bearings just rearwardly of the ends of nozzle chamber. And finally, the cleaner is provided with the usual handle 50 including a U-shaped bail 50a which straddles the motor hood and, with its end portion thereof passing through longitudinal slots 51, 51 in the top wall 18 of the casing 1 is suitably connected for pivotal movement below, the pivot point being thus concealed from view as clearly shown in Figure 1.

Thus, to summarize the outstanding structural features of the present disclosure, exclusive of the operating parts, the first to be noted is the one-piece casing and motor housing which encloses the space occupied by the motor but in nowise supports or forms any part thereof. In other words, the motor in the present disclosure is a complete power unit supported upon a plate anchored to the main casing 1 and which becomes the top wall of the fan chamber. And in connection with the fan chamber, it is further noted that the upper half of its side wall, including that of the discharge passage, is an integral part of the main casing member 1, the lower section being necessarily a separate piece, fastened in place after the motor has been assembled.

And a further feature to be noted, is the provision made for renewing the commutator brushes and providing openings through the sides of the motor housing, thus making it unnecessary to completely disassemble the cleaner in order to make a relatively minor replacement. And lastly, there are the structural advantages of lightness resulting from the casting or molding of the main body member of light material, and the use of relatively few parts capable of being quickly assembled into a compact and efficient unit.

Having set forth advantages of the novel structure herein disclosed, I claim:

1. In a suction cleaner, the combination of a

one-piece casing forming a downwardly opening nozzle chamber and a dome-like motor housing, a motor vertically mounted in said housing and including a bottom plate supporting the motor and adapted to close off the motor housing and to form the top wall of a fan chamber and exhaust outlet passage, a fan directly connected with said motor and located immediately below said bottom plate, said casing being provided on its underside with shallow webs defining the margins of the fan chamber, its outlet passage and the rear walls of the nozzle chamber, a shallow dish-shaped casting conforming to the contour of the fan chamber and outlet passage and adapted to be fastened to the underside of the one-piece casing in edge to edge contact with corresponding webs to complete the fan chamber and outlet passage, said fan chamber casting being provided with a depending web on its under surface partially surrounding an opening at the center of its bottom wall and extending forwardly to form the side walls of an inlet passage from said nozzle chamber to said fan chamber and to complete the rear walls of said nozzle chamber, and a bottom plate removably mounted for contact with the bottom edges of the external web on said fan chamber casting to close the inlet passage from said nozzle chamber to the opening into said fan chamber.

2. In a suction cleaner, the combination of a one-piece casing forming a nozzle chamber, a motor housing and sections of the side walls of a fan chamber and of the outlet passage therefrom, a motor enclosed in said housing and including a supporting plate forming the top wall of said fan chamber and outlet passage, and a separable wall section applied to the underside of said casing to complete said fan chamber and outlet passage.

3. In a suction cleaner, the combination of a one-piece casing forming a nozzle, a downwardly opening housing and the upper side wall sections of a fan chamber and outlet passage therefrom immediately below said housing, a motor mounted within said housing, a horizontal plate supporting said motor and extending over the opening to said housing to form a continuous top wall for said fan chamber and outlet passage, and a separable wall section completing the side wall and bottom sections of the fan chamber and outlet passage.

4. In a suction cleaner, the combination of a one-piece casing forming a nozzle chamber and a downwardly opening motor housing in the upper portion of said casing, said casing having integral depending webs defining the annular side walls of a fan chamber and outlet passage immediately below said housing, a plate extending over the opening to said housing to form the top wall of said fan chamber and outlet passage, a motor and fan unit supported by said plate, a separable wall section adapted to be applied to the underside of said casing to complete the fan chamber and its outlet passage through the medium of complementary abutting flanged edges, and a removable plate spaced below said separable wall section and forming the bottom wall of an air inlet passage from said nozzle to said fan chamber.

5. In a suction cleaner, the combination of a one-piece casing forming the top and side walls of a nozzle chamber and a downwardly opening housing in the upper portion of said casing, said casing having integral depending webs or under surface defining the annular side walls of a fan

chamber and outlet passage immediately below said housing, a plate extending over the opening to said housing to form the top wall of said fan chamber and outlet passage, a motor and fan unit supported by said plate, a separable wall section adapted to be applied to the under side of said casing to complete the fan chamber and

its outlet passage through the medium of complementary abutting flanged edges, and a removable bottom plate coacting with vertical webs on the underside of said separable wall section to form an air inlet passage from said nozzle to said fan chamber. 5

EUGENE L. SNYDER.