

June 29, 1943.

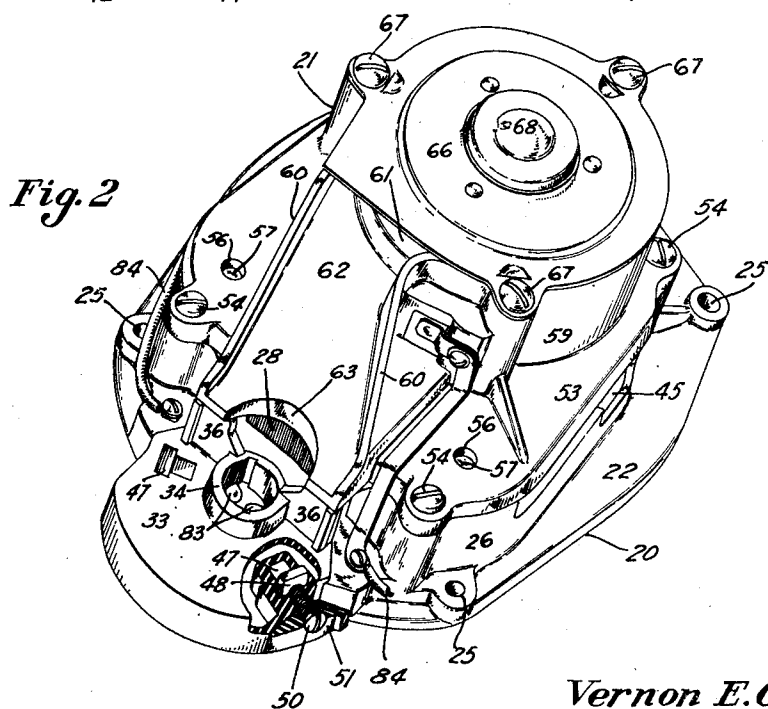
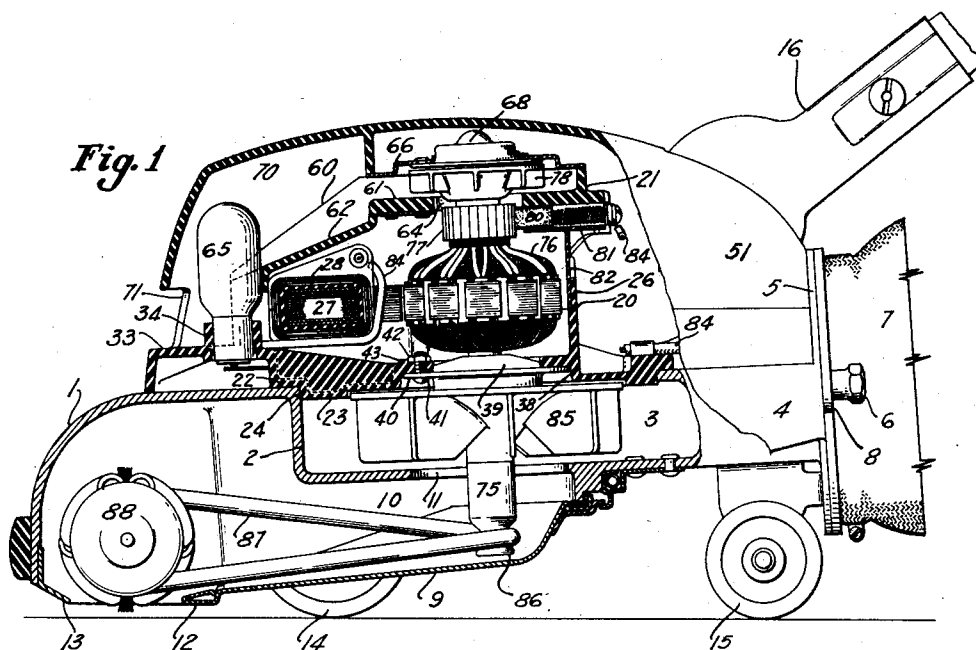
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2,322,921

SUCTION CLEANER

Filed Jan. 26, 1939

2 Sheets-Sheet 1



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Fig. 3

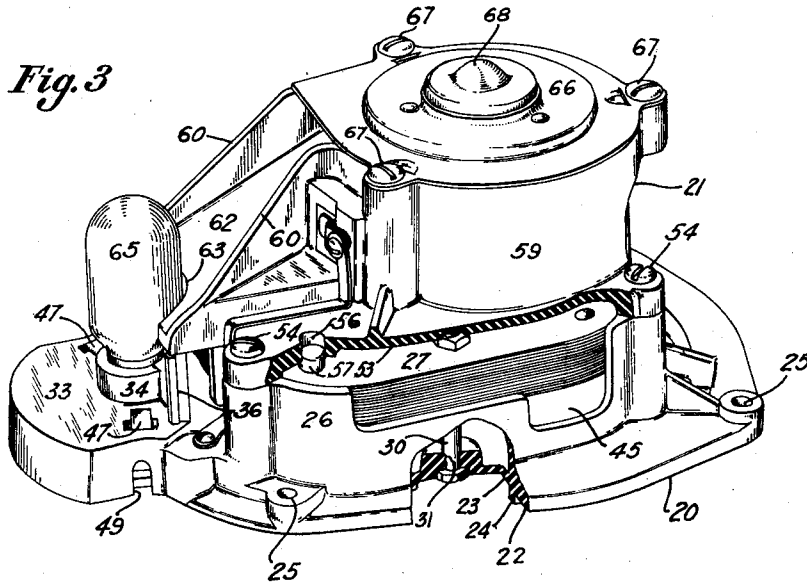
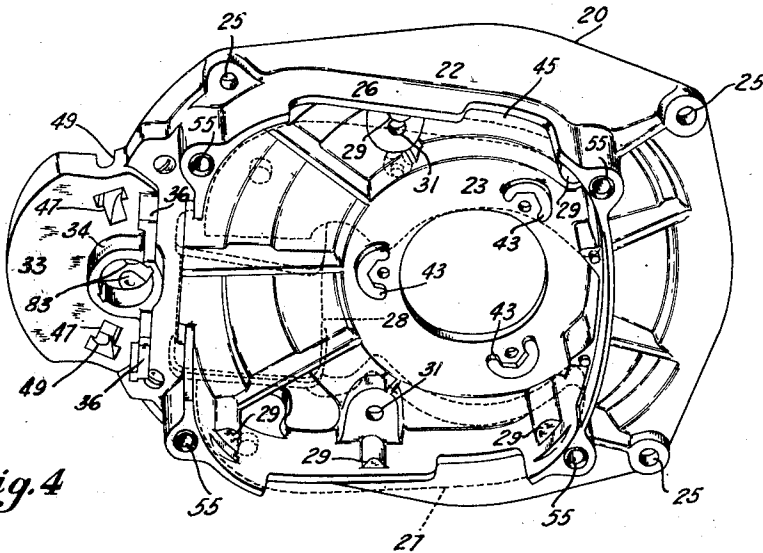


Fig. 4



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SUCTION CLEANER

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2 Claims. (Cl. 15—16)

The present invention relates to suction cleaners in general and more particularly to a new and novel suction cleaner body construction. More specifically the invention comprises an improved cleaner construction in which a single unitary piece of insulating material forms the top wall of the cleaner fan chamber and the lower section of the motor casing which serves to mount the motor stator and rotor and the upper section of the motor casing.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a new and improved suction cleaner body. A further object of the invention is to provide a new and novel fan chamber and motor casing structure in a suction cleaner. A still further object of the invention is to provide in a suction cleaner a fan chamber and a motor casing having a single, unitary common wall of insulating material. Still another object of the invention is to provide in a suction cleaner a body construction in which the motor casing is formed of a unitary cast or molded bottom section of insulating material which overlies the open wall of the fan chamber and forms the top thereof, and which also serves to support the rotor and stator, and which is provided with apertures at the junction line with the upper casing section to serve as ventilating ports. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which a preferred embodiment of the present invention is illustrated:

Figure 1 is a side view of a cleaner constructed in accordance with the present invention with certain parts broken away and shown upon a longitudinal section;

Figure 2 is a view in perspective of the cast or molded insulating motor casing removed from the cleaner main casing;

Figure 3 is a view in perspective from a different angle of the insulating motor casing with the headlight positioned therein and the ventilating apertures in the lower section of the casing clearly illustrated;

Figure 4 is a view in perspective of the interior of the bottom section of the motor casing which is also the top wall of the fan chamber.

The modern suction cleaner comprises an ambulatory body which is adapted to be manually propelled over a surface to be cleaned to dis-

lodge from that surface foreign material and to remove that material by means of air flow. Power-driven surface agitating means accomplish the dislodgment of the foreign material and suction-creating means move the air which carries the dirt away. These functions and relationships are broadly old in suction cleaners but in the present invention a cleaner body construction is provided which is of improved design and which results in greater safety to the cleaner operator, in greater efficiency in the cleaner itself, and in economy in manufacturing. In the usual cleaner the fan in the fan chamber is driven by a motor positioned in a motor casing immediately adjacent the fan chamber. In the suction cleaner constructed in accordance with the present invention the fan chamber and the motor casing have a common wall of insulating material which wall serves to close one side of the fan chamber in an air sealed relationship while the other side directly supports, without intermediate insulation, the stator or field winding and the lower bearing of the rotor which supports the rotor itself and the fan in the fan chamber. The top section of the motor casing seats upon this common wall and is aligned relative thereto by projecting pins carried upon the field stack. The upper section of the motor casing like the lower is of insulating material and carries without intermediate insulation the motor brushes. Additionally the cleaner headlight is carried by the motor casing construction, the entire construction being enclosed by a hood which is formed adjacent the headlight with a headlight aperture. Referring again to the drawings, the cleaner body is seen to comprise a main casing which is a unitary construction comprising a nozzle 1, bottom and side walls of a fan chamber 2, an exhaust passageway 3 leading from the fan chamber 2, and side skirts 4 which extend at the sides of the exhaust passageway 3 and the fan chamber 2. A vertical flange 5 is formed at the rear of the exhaust outlet 3 and carries bag securing means 6 by which a detachable bag 7 is secured at its connecting ring 8. A removable bottom plate 9 extends rearwardly from the nozzle 1 below the fan chamber 2 to form an air passageway 10 which connects the interior of the nozzle with the eye 11 of the fan chamber. The rear nozzle lip 12 is formed upon this removable bottom plate and cooperates with the front nozzle lip 13 to define the nozzle mouth. The cleaner supporting means comprise front wheels 14 and rear wheels 15 which are connected directly to the main casing as in the usual cleaner, and there is also

mounted upon the main casing in any suitable manner above the exhaust outlet 3 a pivoted propelling handle 10, partially illustrated in Figure 1.

The motor casing comprises a lower section 20 and an upper section 21. The lower section 20 seats directly upon the upper flat surface of the cleaner main casing and above the fan chamber 2 in the form of a plate or wall, the portion immediately adjacent the fan chamber being formed as a flange 22 which is separated from the fan chamber wall portion 23 by a shoulder 24. At spaced intervals around the flange 22 are formed reinforced apertured bosses 25 which are adapted to receive and seat securing screws which extend into the upper face of the main casing.

The lower motor casing section 20 is formed within the limits of the main casing contacting flange 22 with a vertical wall 26 which is contoured to enclose in closely spaced relationship the motor stator comprising the field stack 27 and winding 28. Integral abutments 29 extend from the section bottom plate upon the inner face of the vertical wall 26 which serve to support the field stack which is secured in place by bolts 30 the lower headed ends of which are embedded in the fan chamber wall portion 23 of the section 20 and which extend through bolt apertures 31 formed therein.

The bottom plate of the casing section 20 over the nozzle 1 is formed as a raised platform 33 which is integral with the remainder of the section and is formed with a headlight socket 34 at the opposite sides of which extend sections of a wall, 36. The ends of wall 36 are spaced from the adjacent stator enclosing wall 26 which does not itself extend across the field winding 28 positioned rearwardly of wall 36, but instead leaves that element exposed. Centrally of the fan chamber wall portion 23 of section 20 a recessed circular seat 38 is formed which carries the lower bearing 39 for the rotor and specifically the peripheral flange 40 thereof through the agency of small bolts 41 the nuts 42 for which are non-rotatably retained in integral seats 43 formed upon the upper side of the wall portion.

The field enclosing wall 26 of the lower casing portion 20 is formed with cut out sections in its longest sides and adjacent the field stack. These cut out portions, so far as the section 20 is concerned, are open topped and in part extend below the field stack to provide ventilating openings to the interior of the motor casing, as indicated at 45.

The detailed description of the lower motor casing section 20 is completed by referring to the hood-retaining means provided in the platform 33 at the forward edge of the section. A T-shaped vertical socket 47 is formed upon each side of the platform 33 near its rear and a nut 48 is adapted to be positioned within the head of the T from above the platform and non-rotatably retained therein. Each side wall of the platform is formed with a downwardly opening slot 49 which opens into the outer face of the head of the T and provides means by which a screw 50 can be inserted and screwed into the non-rotatably retained nut 48, the relationship being such that the screw can pass through the nut and extend into the base of the T. In Figure 2 this relationship is possibly best evidenced, a section of the motor hood 51 being illustrated.

The entire motor casing section 20 is characterized by the fact that it is cast or molded integrally of insulating material and is formed with an entire absence of recesses requiring the drawing of

side cores, the construction being one which is preferably molded. Every recess, slot, wall, opening and abutment can be made by drawing one core member directly from a second member.

This relationship makes for economy in manufacture, simplicity in the molds, and a reduction in the time required and skill necessary.

The top section of the motor casing 21 is formed with a flange or rim 53 which seats directly upon the top of the lower section wall 26 and is secured thereto by a plurality of screws 54 which pass downwardly into seats 55 formed in that wall. The casing section 21 is also formed of molded insulating material which, as compared to rigid metal, is relatively brittle and to provide additional contact surfaces with the lower supporting section and to decentralize strains, seats 56 are provided in the rim 53 which receive pins 57 extending rigidly from the field stack 27. This pin and seat relationship serves not only to distribute the strains which would result from a lateral force acting against the upper section, but also serves to position the upper and lower sections relative to each other in their proper relationship before the securing screws 54 are inserted in the assembly of the machine.

From the base flange or rim 53 of the upper section 21 rises a wall 59 which is cylindrical in its general outline. This wall extends forwardly and downwardly, as indicated at 60, to contact the wall sections 36 formed on the headlight platform 33. Below the top of the wall 59 the section 21 is provided with a top wall 61 which also extends downwardly and forwardly between the walls 60, as indicated at 62, and extends across the top surface of the wall 36 with the exception of a cut out section at 63 which is shaped to permit the insertion of and seating of a removable headlight lamp 65 in the platform socket 34. As is clearly seen in Figure 1 the top wall 61 is centrally apertured at 64.

Seated upon the top of the circular portion of wall 59 is a metallic closure plate 66 secured in place by screws 67 extended therethrough into the wall 59. The upper motor bearing is riveted fixedly in the center of this plate 66 and is indicated at 68, the plate and the bearing being spaced from the top wall 61 of the casing to provide a chamber which opens to the downwardly directed passageway formed by the walls 60 and the wall 62. This chamber also is open through the aperture 64 to the interior of the motor casing formed by the sections 21 and 20 and forms, as will be apparent, a motor cooling fan chamber into which air is drawn in the machine operation. The exhaust passageway for this chamber is formed by downwardly sloping walls 69 and 62 in cooperation with downwardly extended walls 70 upon the interior of the motor hood 51 which lie along the wall 60 and the top of the platform 33. The exhaust into the exterior from the hood is provided by the headlight opening 71 formed in the hood 51 forwardly of the platform 33.

The motor shaft 75 is rotatably supported in the bearings 39 and 68 carried by the motor casing. Within the motor casing itself the shaft 75 carries an armature 76 which is positioned largely within the field stack 27. The motor being of the universal type includes a commutator 77 positioned immediately below the opening 64 in the top wall 61 of the casing. Within the fan chamber formed by the wall 61 and the plate 66 is positioned a motor-cooling fan 78 which is also carried by the motor shaft

75. This fan in armature rotation draws air into the motor casing through the ventilating apertures 45, upwardly around the field windings and stack and armature, past the commutator 77 and through the opening 64 into the surrounding chamber. The air is then exhausted through the exhaust passageway leading downwardly to and around the headlight 65 and passes out over the platform 33 and to atmosphere via the headlight opening 71.

Current is conducted to the rotor through the commutator 77 which is contacted by a plurality of brushes, one of which is indicated at 80 in Figure 1. Brush 80 is slidably mounted in its seat 81 formed upon the underside of the top wall 61 of section 21, it being found for purposes of economy that the wall 59 can be cut out immediately adjacent the location of the brush seat and in practice this aperture is thereafter closed by a fiber board element 82 which seats upon the wall 26 of the lower section. Incoming current is conducted to the brushes and to the field windings by conductors indicated at 84, which are as well connected to the lamp contacts 83 extended under the socket 34.

As in the usual suction cleaner the motor shaft 75 carries a suction-creating fan 85 within the fan chamber 2 which functions in the cleaner operation to draw air into the nozzle 1 and exhaust it through the exhaust outlet into the filter bag 7. Also the lower end of the motor shaft 75 is formed as a pulley 86 which drives a power-transmitting belt 87 connected to a rotatable agitator 88 of the brushing and beating type which is adapted to contact a surface covering undergoing cleaning between the surface-contacting lips 12 and 13.

The operation of the suction cleaner constructed in accordance with the invention is not different from that of the ordinary cleaner in its general aspects. The rotating motor drives the fan 85 which draws cleaning air through the nozzle and carries it to the dust bag together with all foreign material which has been dislodged from the covering undergoing cleaning by the driven agitator within the nozzle. This is the principle common to all modern cleaners. The advantages and novelty in applicant's construction lies in the improved construction of the parts by which these known functions are obtained. In the present invention the formation of the common wall between the motor cas-

ing and the fan chamber of a single unitary piece of insulating material such as Bakelite insulates the interior of the motor casing from the interior of the fan chamber and also eliminates the necessity for the presence of insulating seats and washers between the wall and the main casing of the cleaner. Additionally a reduction in the noise of cleaner operation is effected by the mounting of the rotating parts of the cleaner in a casing made entirely of a cast or molded insulating material which is a poor conductor of sound vibrations. The construction of the cast or molded motor casing in two parts with entire absence of any openings requiring the pull of side cores advantageously results in the reduction of the expense of manufacture and makes for simplicity of construction.

I claim:

1. An electric motor adapted for use in a suction cleaner, and comprising a motor housing including a first and second section, said first section having motor supports therein, a field core seated on said motor supports, projections on said field core extending from the surface opposite said seated portion, said second section being mounted on said first section, and recesses in said second section receiving said core projections to align said motor housing sections and to distribute strains in said second motor housing section resulting from forces tending to displace said sections transversely.

2. In a suction cleaner, a metal casing including an open-sided fan chamber, a motor housing including a first and second section of insulating material, said first section resting on said metal casing and having its bottom wall completely closing the open side of said fan chamber, means in said insulated bottom wall to support an armature bearing, said second section being mounted on said first section and supporting another armature bearing, supports formed in said first section, a motor field core seated on said supports, projections on said field core extending from the surface opposite said seated portion, and recesses in said second section receiving said core projections to align said motor housing sections and to distribute strains in said second motor housing section resulting from forces tending to displace said sections transversely.

VERNON E. CARLSON.