Jan. 26, 1943. P. E. FRANTZ 2,309,583

SUCTION CLEANER

Filed Feb. 20, 1941 2 Sheets-Sheet 1

Fig. 1

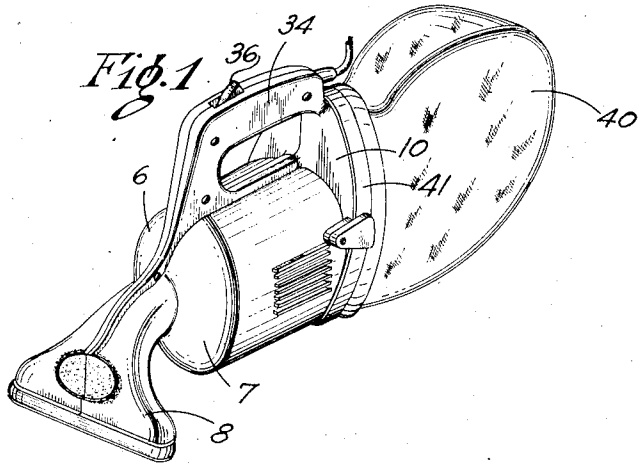
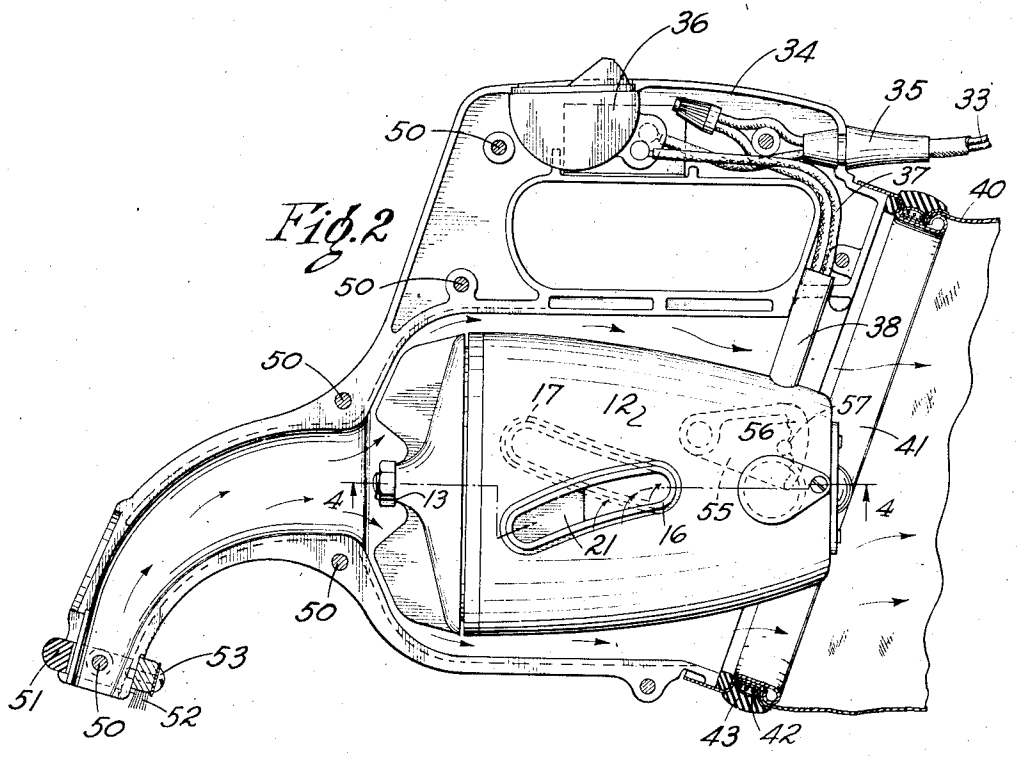


Fig. 2



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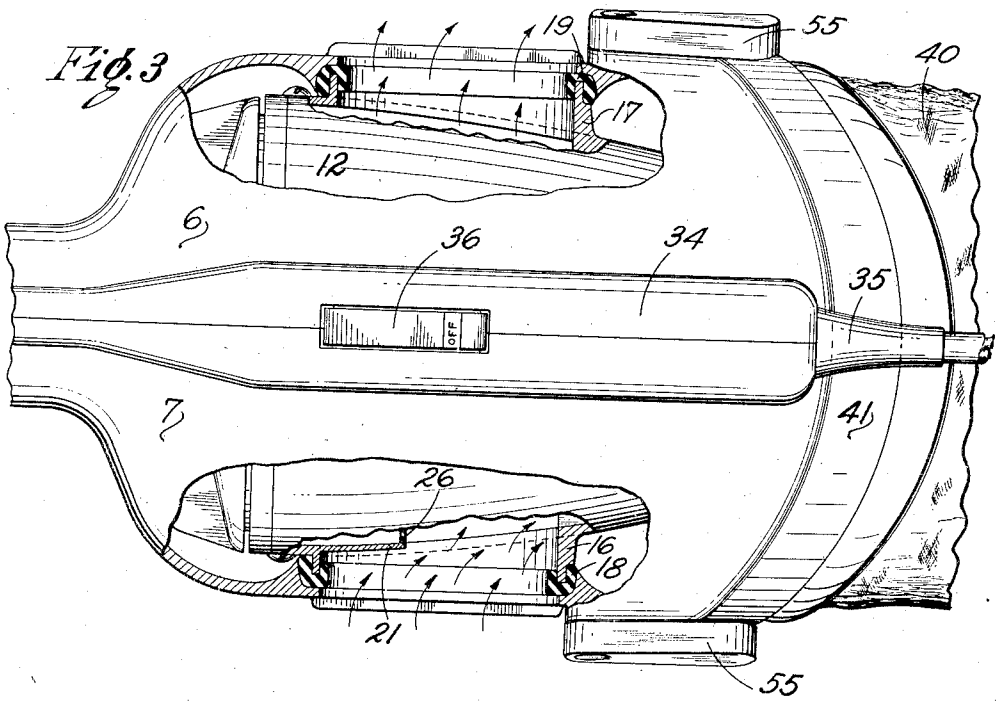
Filed Feb. 20, 1941 2 Sheets-Sheet 2

Fig. 3



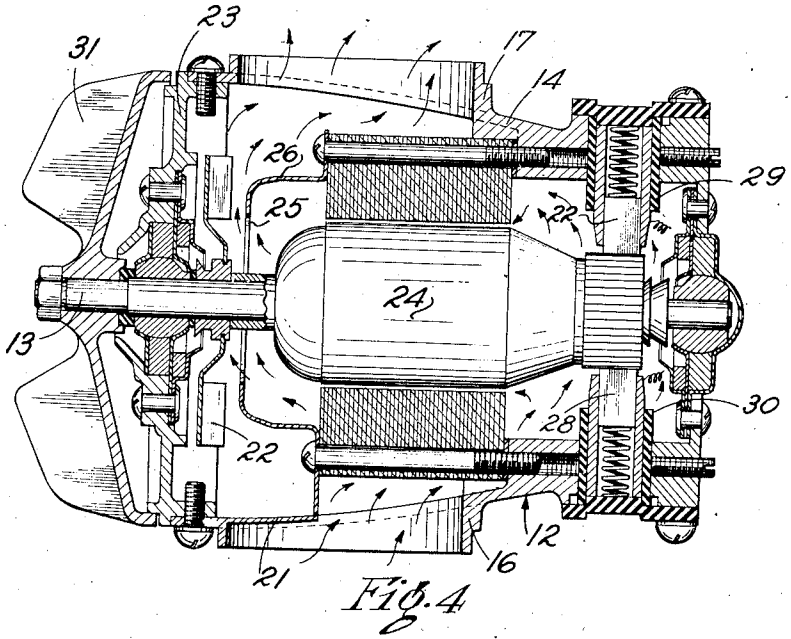


Fig. 4

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SUCTION CLEANER

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Application February 20, 1941, Serial No. 379,744

2 Claims. (Cl. 15—16)

This invention relates to suction cleaners and more particularly to that type of suction cleaner known generally as a hand cleaner in that it is suited for carrying about by the hand as distinguished from a cleaner supported by the floor or other surface undergoing cleaning.

It is among the objects of my invention to provide a suction cleaner wherein the casing which comprises a nozzle, fan chamber and motor housing is made of two complementary castings.

It is a further object of my invention to provide a cleaner wherein two complementary castings support and house a motor and fan unit.

It is a further object of my invention to provide a suction cleaner according to the preceding objects, wherein the motor is supported within the castings so that the supports provide inlet and outlet ventilating passageways for the motor.

It is a further object of my invention to provide a suction cleaner according to the preceding objects wherein the motor and fan unit are constructed and arranged within the air stream leading from the nozzle to the bag so that the motor is cooled by the dirt-laden air moving into the dust bag.

It is a further object of my invention to provide a suction cleaner according to the preceding objects wherein the two castings which constitute the casing of the cleaner are so constructed and arranged that an integrally-formed carrying handle houses the switch mechanism for the motor of the suction cleaner.

Further objects and advantages relating to simplicity of construction and economies in manufacture will appear from the following description and the appended drawings; wherein:

Figure 1 is a perspective view of the hand cleaner made according to my invention;

Figure 2 is a longitudinal section;

Figure 3 is a plan view with parts in section; and

Figure 4 is a sectional view of the motor and fan unit.

I have obtained the objects and advantages set forth above by providing two complementary castings indicated in the drawings as at 6 and 7 and arranging said two castings so that the forward portions thereof provide a nozzle indicated as at 8, a casing surrounding and housing a fan and motor unit and an outlet portion for attaching the bag indicated as at 10.

The motor indicated in its entirety as at 12 is provided with a shaft 13 which projects forwardly of the motor casing 14 and the fan and motor as a unit are shaped to conform generally to the interior of the casing adjacent that portion of the casing which provides the suction nozzle. The motor and fan unit is supported within the casing by means of laterally projecting, integrally formed portions 16 and 17 formed on the outer walls of the motor casing, said portions are preferably arranged within gaskets 18 and 19 so that the ventilating passageways therethrough are sealed against the dirt-laden air and the motor in its entirety is prevented from transmitting motor noises to the outer casing.

The portion 16 is inclined downwardly toward the front end of the motor and is provided with a baffle 21 so that ventilating air drawn into the motor is conducted toward the commutator end of the motor. The portion 17 at the other side of the motor is inclined upwardly toward the forward end and its open interior area is proportioned to exceed the open area provided by the portion 16.

Secured to the motor shaft 13 interiorly of the forward wall 23 is a ventilating fan 22 with the blades so disposed that ventilating air is drawn longitudinally of the armature 24 through the opening 25 in the baffle 26.

The motor is provided with the usual brushes 27 and 28 which are carried by the insulating tubes 29 and 30, respectively, and the ventilating air drawn in through portion 16 is conducted rearwardly through the field laminations around the brushes 27—28, forwardly between the armature 24 and the field, and thence outwardly through the supporting portion 17.

It will be appreciated that the motor is thus cooled on the exterior of the motor casing by the dirt-laden air and is cooled and ventilated by clean air drawn through portion 10 and exhausted through the portion 17.

I have found that the above described arrangement efficiently cools and ventilates a motor of the type shown and that such cooling and ventilating permits the use of a comparatively light and inexpensive motor.

It will be observed that the inclination of the portions 16 and 17 conforms in part to the directional swirl of the air stream provided by the main fan 31 and that the contour of said portions is such that there is no substantial restriction in the annular air stream surrounding the motor.

The electrical cord 33 leads into the handle 34 through the strain relief 35 and the handle part of the casting is proportioned to house the body of the switch 36 conveniently projecting at the

upper surface of the handle. Wires 37 lead downwardly from the switch through the hollow rear portion of the handle casting, through the insulating tube 38 into the motor casing. The rear portion of the castings 6 and 7 are enlarged to provide an elliptical portion 10 having an opening leading to the dust bag 40.

The two complementary portions of the casing which form the elliptical opening are surrounded by a sheet metal band 41 which is shaped to provide a reentrant channel to receive the open end of the dust bag 40. The dust bag 40 is secured to said band by a clamp 42 surrounded by a resilient rubber seal 43.

The bag ring 41 which carries the dust bag 40 is removably secured in operative position to the cleaner body by pivoted latches 55. The interior of each latch is provided with a notched cam surface 56 adapted to engage a pin 57 carried by the bag ring 41.

Among the advantages flowing from the construction I have provided is that the assembly is facilitated by simply securing the two complementary castings 6 and 7 to each other. The securement of the castings to each other is effected by screws or rivets 50 which extend transversely through the two castings. The motor and fan unit is merely arranged in position on one of the castings and the other casting is fastened in position so as to mount the motor. The two castings are substantially encircled at their forward end by a rubber bumper 51 and a brush 52 is mounted in alignment with this bumper by screw 53. The rear portion of the two castings is encircled by the metal band 41 which also assists in holding the castings in their assembled position. From the above it will be understood that the switch, strain relief, motor and fan unit are maintained in operative position by securing the two complementary main castings to each other.

From the foregoing description it will be understood that the motor and fan as a unit are resiliently suspended and electrically insulated within the dirt-laden air stream and that the motor noises are effectively dampened by the resilient mounting within the casing.

It will also be understood that the dirt-laden air is drawn upwardly through the nozzle and exhausted into the bag without substantial change in direction from the nozzle opening to the bag. An advantage of this construction is that no portion of the power of the motor is dissipated by a fan chamber or other conduit which would occasion a substantial change in direction of the air stream. This arrangement contributes to the high efficiency of the motor with respect to the suction induced in the nozzle 8. I am aware that the ventilating function of the hollow portions 16 and 17 combined with the cooling effect of the dirt-laden air stream contributes to the high efficiency obtained.

The terms casting or casing as employed herein with reference to the parts 6 and 7 are intended to describe the parts 6 and 7 without restriction as to the method of forming or the materials of which they are formed. For instance, the parts 6 and 7 may be molded phenolithic resin or like plastic material.

Although I have shown and described in considerable detail one form of my invention, it will be appreciated by those skilled in the art that modifications may be made therein without departing from the scope of my invention as defined in the following claims.

I claim:

1. A suction cleaner comprising a pair of similar complementary castings joined to each other on a vertical plane, each of said castings having re-entrant portions to provide a continuous passageway leading upwardly through the nozzle portion of the cleaner, thence rearwardly in a horizontal direction to form a fan and motor chamber and thence rearwardly to form a dust bag opening, the upper section of each of said castings having integrally formed therewith complementary handle portions provided with re-entrant sections housing a switch and communicating with the fan and motor housing, the side walls of each of said castings in the motor housing area being provided with apertured bosses inclined with respect to the horizontal axis through the cleaner, a motor and fan unit supported with said fan and motor housing by said bosses, said unit having inclined bosses on the sides thereof adapted to be aligned with the inclined bosses on the housing whereby the motor and fan unit is spaced from the walls of the housing and is cooled by dirt-laden air passing through the housing around the motor unit and the motor is ventilated by air drawn through said bosses on one side of the cleaner and exhausted through the bosses on the other side of the cleaner.

2. A suction cleaner comprising a pair of similar complementary castings joined to each other on a vertical plane, each of said castings being recessed on their abutting faces to provide a nozzle forming portion leading to a motor and fan chamber, which chamber terminates in a dust bag opening, each of said castings having integrally formed complementary handle portions along the upper edge thereof, said handle portions being recessed to provide a switch housing and a conduit leading into the fan and motor chamber, a horizontally disposed motor and fan unit having hollow bosses on each side thereof in said fan and motor chamber, similarly inclined bosses formed on the inner walls of each of said castings adapted to be aligned with and support the bosses on the fan and motor unit, the bosses on the castings being apertured to lead ventilating air through the casting wall and into the motor and fan unit on one side of the cleaner and to lead ventilating air out of the motor and fan unit and through the other casting wall on the other side of the cleaner, the bosses on the motor and fan unit extending outwardly from the walls thereof and the bosses on the castings extending inwardly from the walls thereof, whereby the motor and fan unit is spaced from the walls of the chamber and is cooled by the dirt-laden air passing through the chamber.

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