

May 19, 1953

L. L. MILLER ET AL  
TANK TYPE SUCTION CLEANER

2,639,002

Filed March 25, 1946

3 Sheets-Sheet 1

Fig. 2

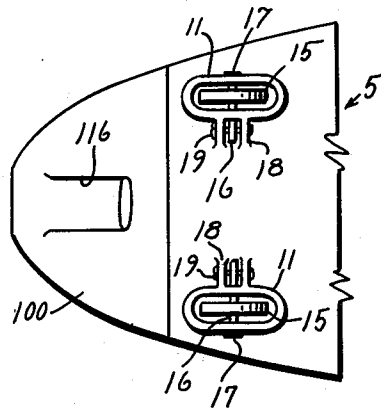
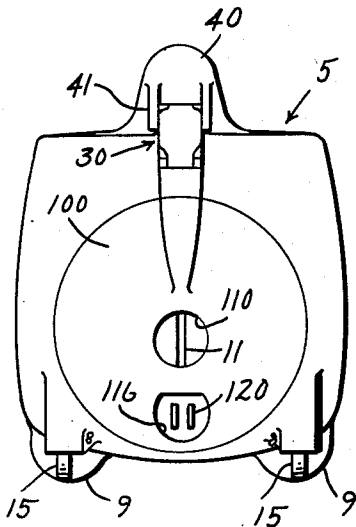
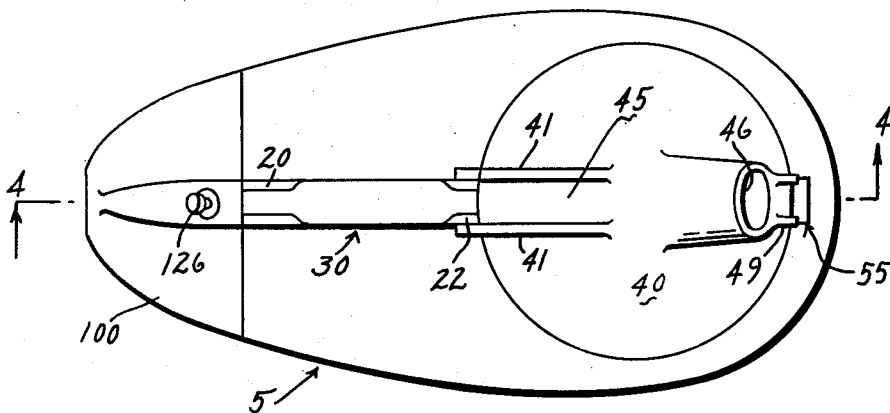


Fig. 3

Fig. 1



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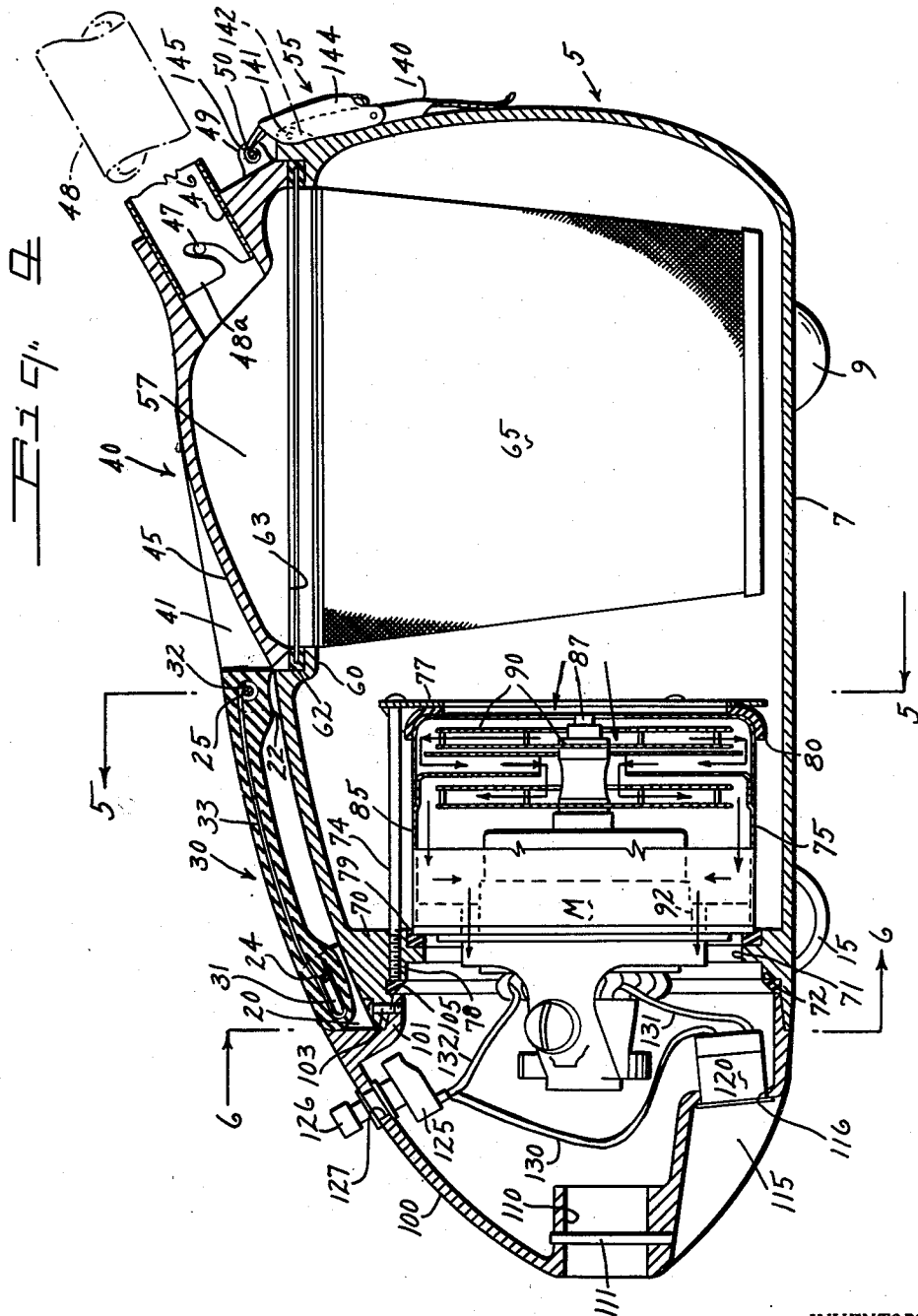
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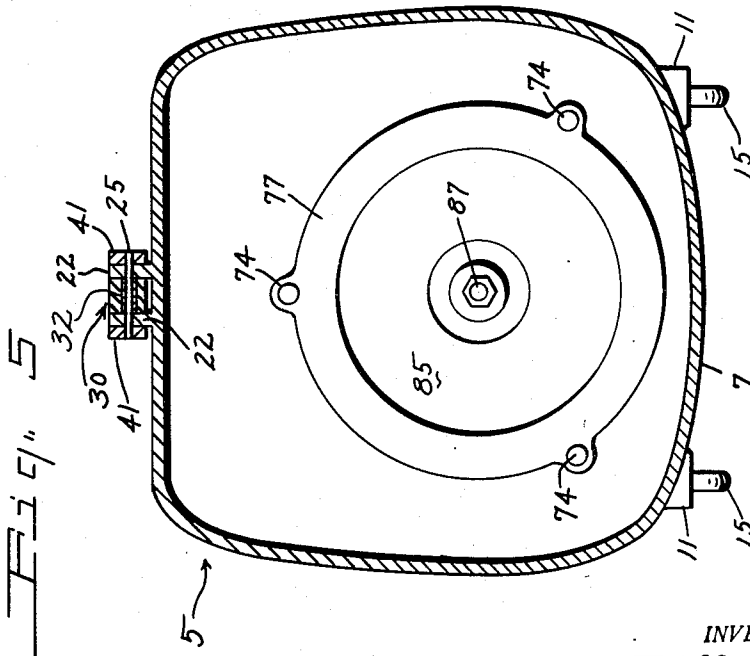
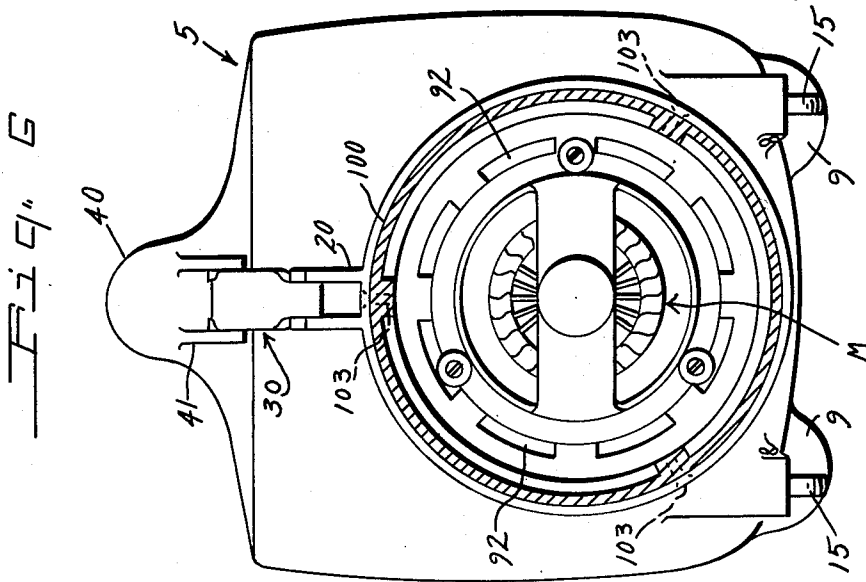
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3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

2,639,002

## TANK TYPE SUCTION CLEANER

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4 Claims. (Cl. 183—37)

1

Our invention relates to the art of vacuum cleaners, having more particularly to do with vacuum cleaners of the enclosed bag type wherein the bag, blower or suction unit, and power elements are enclosed within a body or housing which facilitates attachment of the intake nozzle on the suction end and the outlet nozzle on the blower end by means of a flexible conduit.

It is an object of our invention to provide, in a vacuum cleaner of this type, novel means for relatively mounting the bag, motor or blower or suction elements in such novel manner as to provide an extremely compact unit, to further facilitate cleaning and to render the parts freely accessible for easy repair or replacement.

Another object of the invention is to provide in such a vacuum cleaner a novel and highly efficient motor and blower mounting which dampens noise created in operation and is conducive to longer life and service.

A further object is the provision in such a cleaner of an improved handle means for manually moving the cleaner about and which handle also serves as a bumper to arrest swinging movement of the lid of the bag-containing portion of the casing in a manner to prevent marring of the contacting surfaces.

Our invention also has as an object the provision of improved bag mounting means.

A further object is the provision in such a vacuum cleaner of novel means for latching the cover lid to the housing.

A still further object is to provide a novel and improved housing.

The invention possesses still further objects and corresponding advantages which will become apparent from the following description of one presently preferred embodiment thereof, for which purpose we shall refer to the accompanying drawings, in which:

Fig. 1 is a top plan view;

Fig. 2 is a rear end view;

Fig. 3 is a fragmentary bottom plan view;

Fig. 4 is an enlarged longitudinal sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a cross section taken on line 5—5 of Fig. 4; and

Fig. 6 is a cross section taken on line 6—6 of Fig. 4.

We wish it understood, however, that, in the broader aspects of the invention, it is not intended to be confined to the precise details of structure and arrangement now to be described except insofar as may be indicated by the appended claims.

2

Referring now to the drawings, we denote generally by the numeral 5 a housing or casing which, preferably, is cast of aluminum or a suitable aluminum alloy, having a flat bottom wall 7 presenting a pair of transversely spaced integral skids 9 and a transversely spaced pair of downwardly opening wheel wells 11. In cross section the remainder of the housing has a somewhat contoured section being larger in diameter at its forward (right hand) portion than at its rear portion. Wheels 15 are mounted, one in each well, each upon a spindle or axle 16 which is headed at one end as shown at 17 and projects inwardly through both walls and extending beyond the inner well wall to facilitate insertion of a cotter pin 19 through an opening in the spindle to secure the spindle against axial movement.

The housing has, at its top, handle mounting members 20, 22 each consisting of a transversely spaced pair of upright walls. Cross pins 24, 25 extend through openings in each respective pair of walls to provide pivotal mountings for the ends of the handle element 30 to be described. The handle element, shown in longitudinal section in Fig. 4, has an elongated transverse slot 31 at one end, through which pin 24 extends, and a round opening 32 at its other end through which pin 25 extends. The handle has a reinforcement core portion 33 made of flat spring metal bent at one end to outline elongated slot 31 and bent at its opposite end to outline an opening 32, the core being molded or encased in a soft rubber sheathing 34. The slot 31 enables axial movement of the handle about pin 24 so that when not in use the handle is retracted to be flush with the top surface of the body, but may be bowed outwardly for grasping.

The housing or body has a swingable cover cap 40 whose top has parallel bifurcations 41, between which fit the walls 22 and which have aligned transverse openings through which pass the pin 25, so that the cover cap is pivotally mounted on the housing by means of the same pin that pivotally mounts one end of the handle. When the cover lid is swung open or to the left in Fig. 1, the bifurcations swing over the walls 22 and the soft handle engages the surface 45 between the bifurcations 41 to provide a soft bumper for the cover lid.

The cover lid 40 has an angularly disposed conduit receiving opening 46 provided with two pins 47 extending inwardly from opposite walls of the opening to engage in a cam-like slot provided in an end collar 48a of a flexible conduit

3

48 leading to a nozzle element not shown. The lid 40 has at its rear portion a pair of parallel spaced ears 49 carrying a cross pin 50 to be engaged by the latch element 55 to be described.

Surrounding the opening 57 in the housing, which opening is covered by the lid 40, there is an annular flange 60 cast integral with the housing, upon which rests the annular rubber covered rim 62 of a fabric bag 65 which acts as a filter as well as a collector for the dust, etc., drawn into the housing through the lid opening 46. This rim of the bag is compressed between the annular bottom surface 63 of the cover lid and said flange to provide an airtight seal.

In the left-hand end of the housing there is an inwardly disposed annular boss 70 having an annular flange 71 and providing an annular shoulder 72.

The motor-blower or suction unit to be described, generally denoted 75, is of conventional construction, no claim being made to it here per se. The forward portion or suction end of said unit is the right-hand end portion carrying the driven impellers, the rear or blower end portion carrying the motor. This unit is suspended from the boss 70 by means of screws 74, of which we preferably use three, the screws entering through a retaining plate ring 77 and being threaded at their ends in threaded opening 78 in the boss. An annular rubber gasket 79 is interposed between the rear end of the casing 85 of the unit 75 and the flange 71, and a rubber gasket 80 is interposed between the ring 77 and the forward end of the casing 83, so that said unit is floatingly mounted and substantially all of its vibrations dampened.

The unit 75 generally consists of housing shell 85 housing the motor M on whose driven shaft 87 is carried the blowers or impellers 90, the air being induced in by the impellers following the path indicated by arrows in Fig. 4, passing out of the unit through openings 92 and thence through opening 116. Any suitable motor-blower unit may be substituted for that just described since no claim is here made to the motor-blower unit per se.

As will be observed from the drawing, the diameter of the motor blower unit is such that it may be readily inserted into the casing through the opening 57 and after it has been introduced into the casing it may be positioned against the seat afforded by the boss 70 which faces toward the filter bag 65 and secured thereto by means of the screws 74. This enables the forward portion of the casing to be made entirely of one piece except for the cover 40, or, if fabricated, the casing may be made up of parts that are permanently associated together. Removal of the motor blower unit for purposes of inspection or repair is consequently also afforded by the ability of the motor blower unit to be withdrawn through the opening 57.

An end cap 100 has a flanged tapered inner end 101 extending into the rear end of the housing and being secured thereto by three screws 103 radially located and set in countersunk holes in the cap, a rubber sealing gasket 105 being interposed between the inner end of the flange and the annular shoulder 72. The cap has at its rear end an opening 10 provided with a cross pin 111. The collar 48a of a flexible conduit leading to a nozzle, not shown, is adapted to fit in either the inlet opening 46 or the outlet opening 110 and the cross pin 111 fits in the cam-like slots in the collar in the same manner as do pins 47.

4

The bottom end portion of the cap is provided with a recess 115 into which an aperture 116 opens from the interior of the cap, a conventional electrical connection plug socket 120 being suitably secured in the aperture for the purpose of connecting the device to a source of electrical current. A conventional electrical switch 125, of the type operable by a spring-loaded, foot-operated pin 126 is mounted in opening 127 in the end cap. From the connection element 120, one wire 130 leads to the switch and one wire 131 leads to the motor, and a wire 132 leads from the switch to the motor.

After the motor blower unit has been mounted within the casing on the boss 70 the wires 131 and 132 leading from the connection element 120 and switch 125 may be connected thereto prior to the application of the cap 100. When this connection has been made the cap 100 may be applied. If it is necessary at any time to remove and replace the motor blower unit, the cap 100 may be detached from the casing and the wires 131 and 132 disconnected from the motor blower unit prior to removal of the motor blower unit from the casing through the opening 57.

We find that great efficiency is obtained by the relative association and mounting of the parts shown; that is, the bag or dust receptacle 65 is disposed upright, for accessibility, and conserves the over-all length; and the motor-blower unit is mounted about an axis of rotation at right angles to the longitudinal axis of the bag, no partition wall being present in the housing between the bag and motor-blower unit, so that full suction efficiency is obtained. The motor-blower unit is readily accessible to be removed by simply unscrewing the screws 74 for which access may be had through the housing opening 57.

The latch element 55 is of the toggle type embodying a channeled arm 140 pivotally secured at one end by means of a cross pin 141 mounted in boss 142 on the housing. A second channeled arm 144 is pivotally secured at one end to the arm 140, between the ends of the latter, and has at its outer end a hook 145 to engage over the cross pin 50 carried by ears 49. Thus when the arm 140 is swung upwardly from the position of Fig. 4, the hook is disengaged from the pin 50, but when the arm 140 is swung against the housing, the position of Fig. 4, the hook is engaged with the pin and the cover lid is securely fastened down.

We claim:

1. In a vacuum cleaner, an elongated hollow casing whose rear end has an inwardly disposed boss providing an annular shoulder, a resilient gasket mounted against said shoulder, a motor-blower unit having its rear end disposed against said gasket, a retainer ring, a resilient gasket interposed between said ring and the forward end of said unit, screw means engaging said ring and threadedly mounted in the boss to confine said unit between said gaskets, the front end of the casing presenting an inlet opening.

2. In a vacuum cleaner, an elongated, hollow, horizontally disposed casing, said casing having a conduit-receiving inlet opening adjacent one end and terminating at the other end in an opening defined by a radially inwardly extending annular flange, said flange presenting an inner and an outer shoulder, a resilient gasket mounted against each of said shoulders, a rear cap fitting against the gasket positioned against said outer shoulder, means securing said cap to said casing, said cap having an outlet opening, a power driven

5

suction unit mounted against the gasket positioned against said inner shoulder with its inlet communicating with the interior of said casing, and means connecting said unit and said flange securing said unit to said flange.

3. In a vacuum cleaner, an elongated, hollow, horizontally disposed casing, said casing having a conduit-receiving inlet opening adjacent one end and terminating at the other end in an opening defined by a radially inwardly extending annular flange, a resilient gasket mounted against the inner side of said shoulder, a power-driven suction unit mounted against the gasket positioned against said inner shoulder with its inlet communicating with the interior of said casing, and means connecting said unit and said flange securing said unit to said flange.

4. A vacuum member as defined in claim 3 in which the means connecting said unit and said flange comprises an annular retaining plate in abutment with the inner end of said unit and elongated screws mounted in said plate extend-

6

ing axially of said unit and threadedly mounted in said housing in the region of said flange.

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