

April 25, 1961

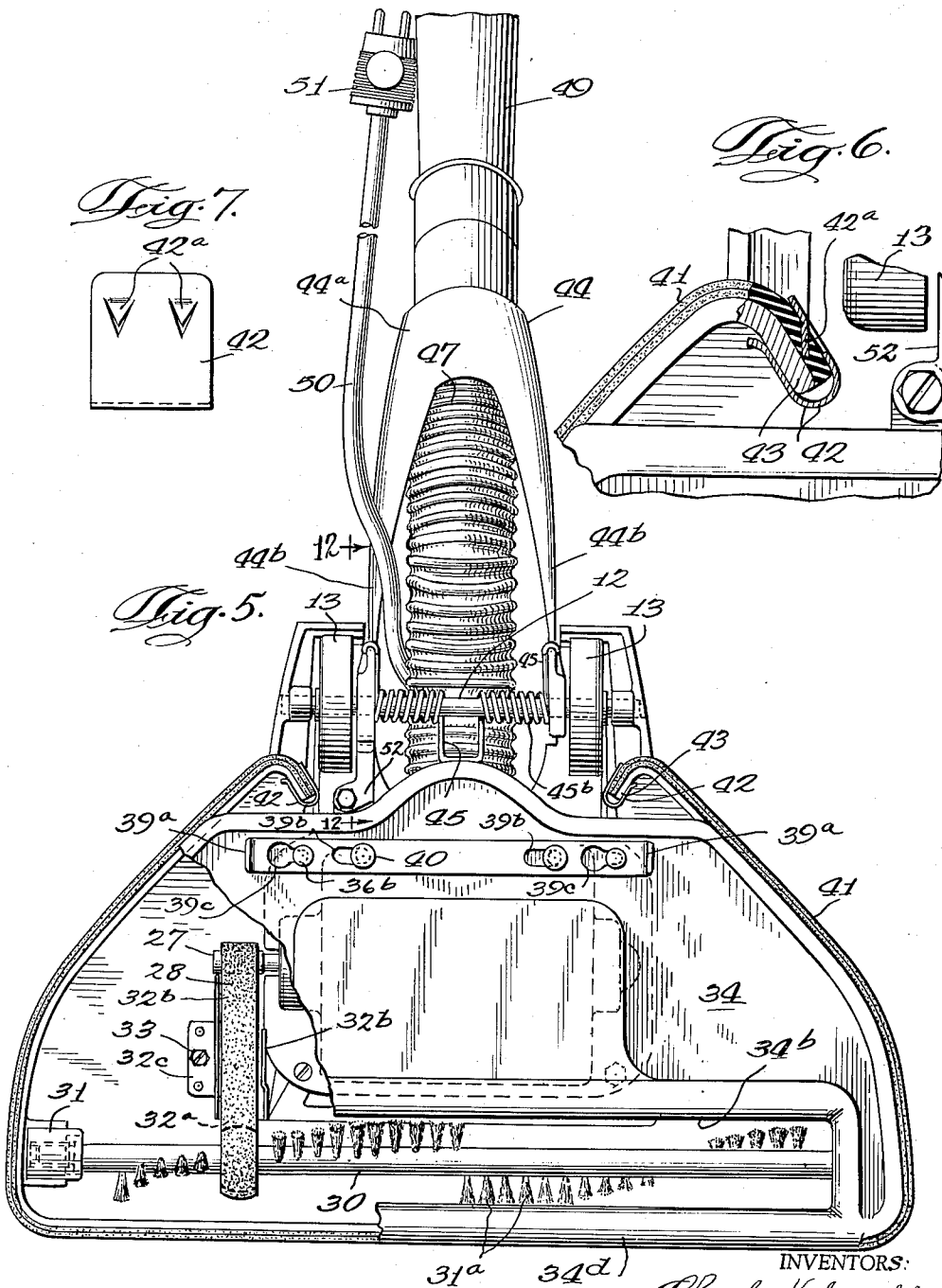
C. H. SPARKLIN ET AL

2,980,939

VACUUM CLEANER

Filed Nov. 18, 1957

6 Sheets-Sheet 1



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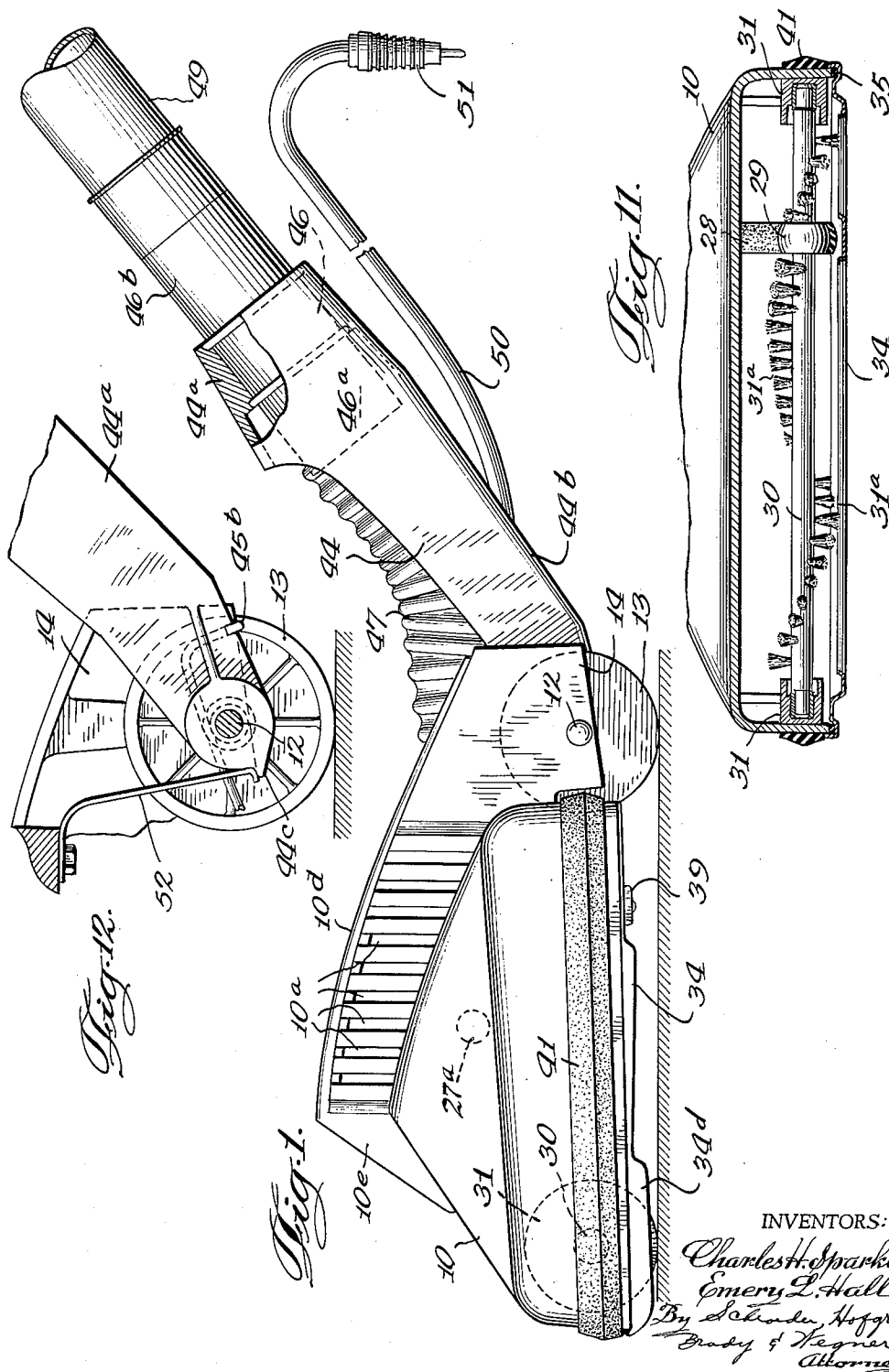
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6 Sheets-Sheet 2



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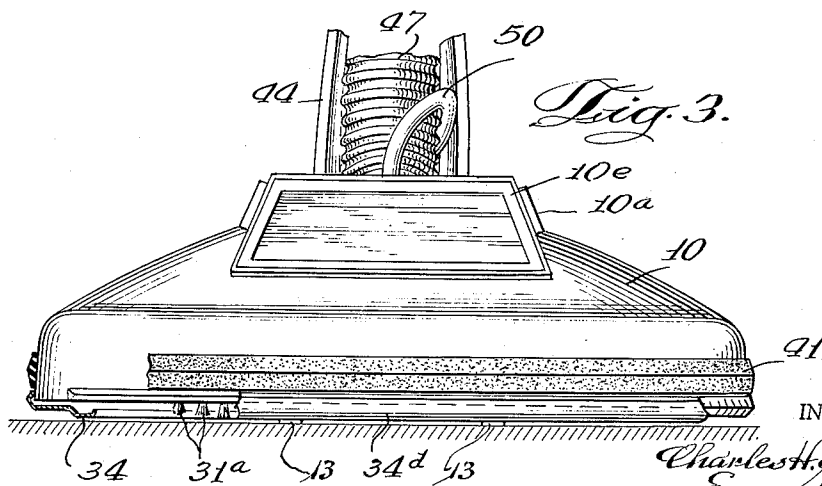
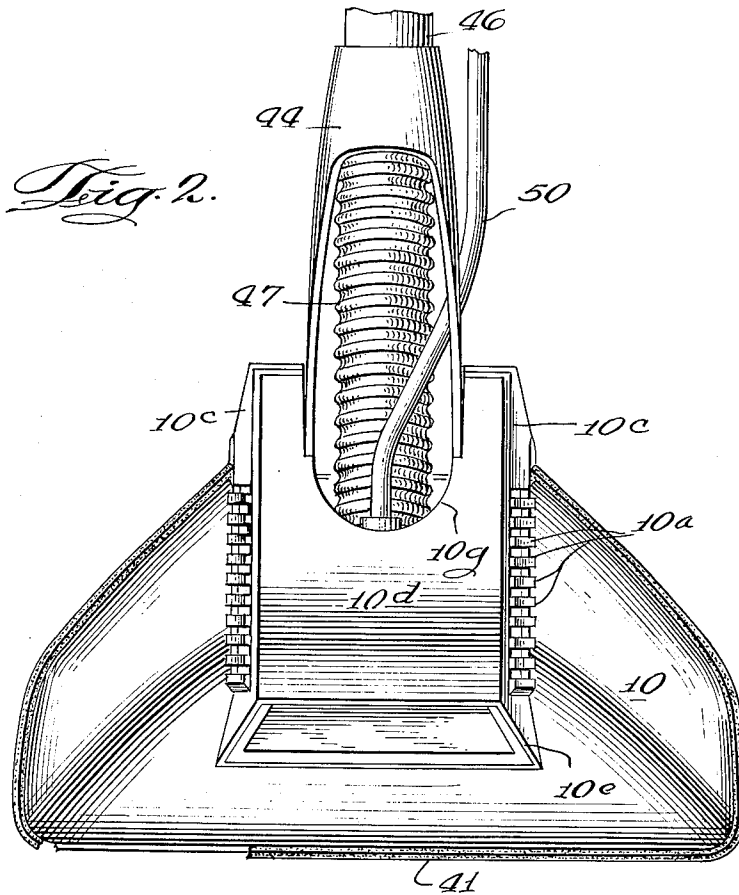
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6 Sheets-Sheet 3



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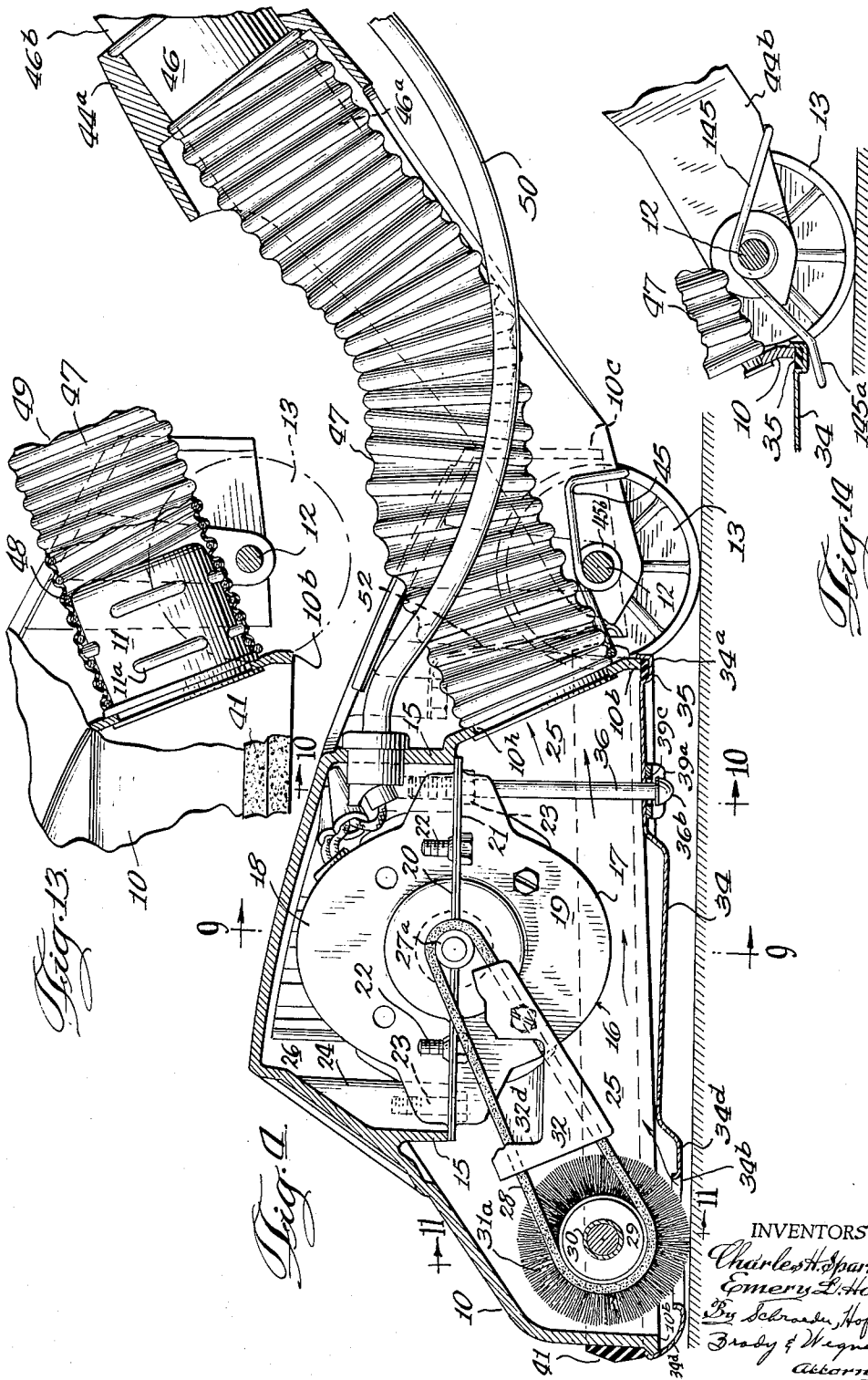
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6 Sheets-Sheet 4



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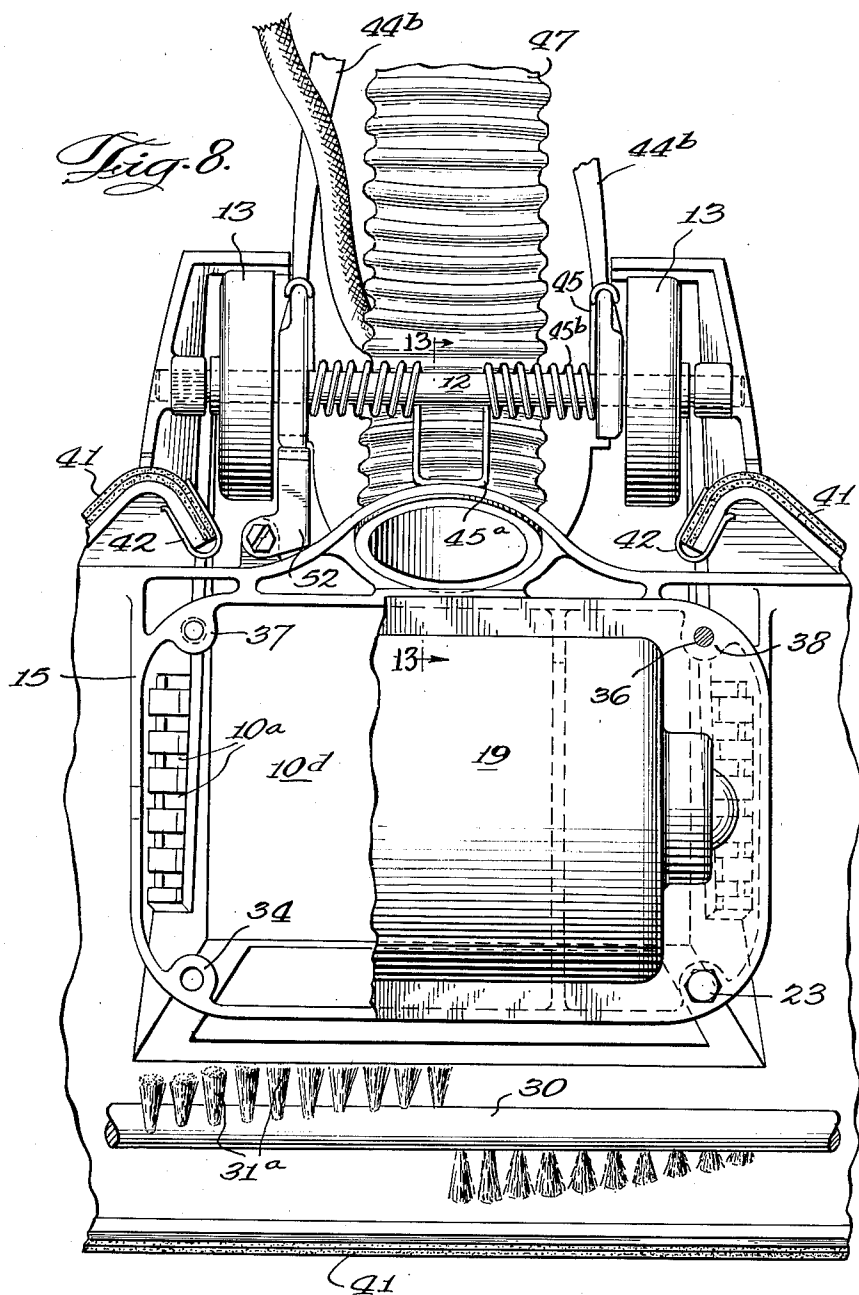
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6 Sheets-Sheet 5



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VACUUM CLEANER

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Fig. 9.

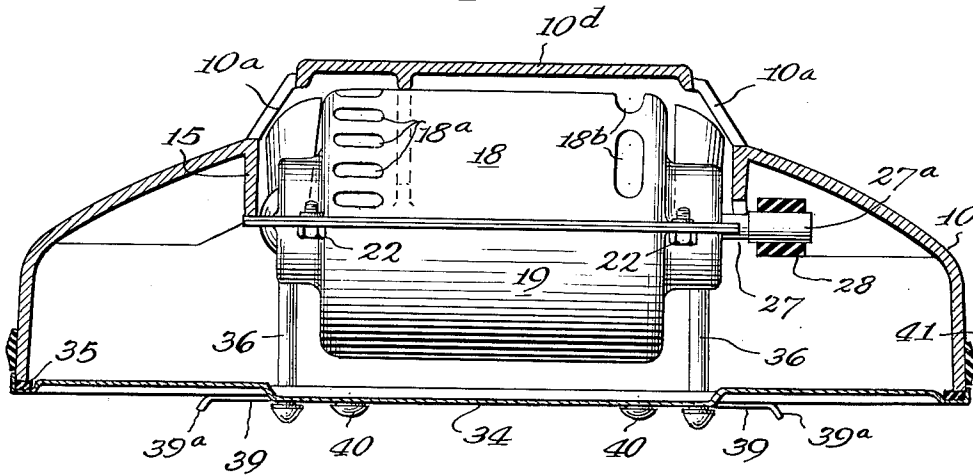
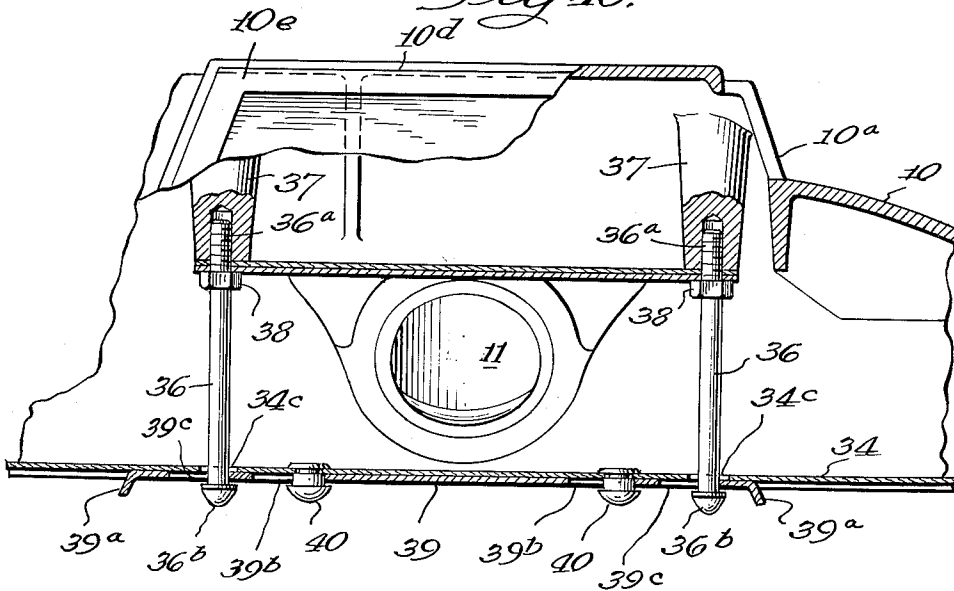


Fig. 10.



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2,980,939

VACUUM CLEANER

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1 Claim. (Cl. 15—377)

This invention relates to a vacuum cleaner nozzle structure adapted to be attached to the end of an ordinary vacuum cleaner wand and to be propelled by said wand over the surface, such as a rug, that is being cleaned.

The customary tank or canister type vacuum cleaner employs a flexible hose to which is attached a tubular wand adapted to carry a nozzle on its outer end for contact with the work being cleaned. These nozzles have customarily employed a brush for contacting the work in order to loosen dirt that is embedded in the rug or similar article being cleaned. However, these brushes have been fixed in position and perform their brushing action only by reason of the propelling force that moves the nozzle over the rug. It has not been customary practice to provide a rotatable brush in a structure of this type.

In the nozzle of the present invention improved means are provided for mounting and rotating a rotatable brush so that the nozzle functions very much as the ordinary stick type cleaner that is ordinarily employed in cleaning rugs and carpets.

One of the features of this invention, therefore, is to provide an improved vacuum cleaner nozzle construction employing a motor and a rotatable brush driven by the motor. Means are also employed for providing a dirt-laden air passage through the nozzle structure and of providing a separate clean air passage for cooling air to the fan.

Another feature of the invention is to provide an improved bottom closure plate and improved means for mounting the plate on the nozzle structure so that it is securely fastened in position but which is easily removed for servicing the brush, motor, belt and similar interior parts of the nozzle.

Other features and advantages of the invention will be apparent from the appended claim and from the following description of one embodiment of the invention as shown in the accompanying drawings. Of the drawings:

Figure 1 is a side elevational view of the vacuum cleaner nozzle structure of this invention partially broken away for clarity of illustration and showing the lower end of an ordinary vacuum cleaner wand attached thereto.

Figure 2 is a plan view of the nozzle structure.

Figure 3 is a front elevational view of the nozzle structure.

Figure 4 is a vertical sectional elevational view taken substantially through the center of the nozzle structure and showing parts broken away for clarity of illustration.

Figure 5 is a bottom view of the vacuum cleaner nozzle with a portion of the bottom closure plate broken away.

Figure 6 is a bottom fragmentary enlarged detailed view showing the means for locking in place one end of the bumper strip.

Figure 7 is an elevational view of an end fastener

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for retaining one end of the bumper strip in place on the nozzle structure.

Figure 8 is a fragmentary bottom view of the nozzle structure with the bottom closure plate removed and with portions of the structure broken away for clarity of illustration.

Figure 9 is a vertical sectional view taken substantially along line 9—9 of Figure 4.

Figure 10 is a vertical sectional view taken substantially along line 10—10 of Figure 4 and with portions broken away for clarity of illustration.

Figure 11 is a vertical sectional elevational view taken substantially along line 11—11 of Figure 4.

Figure 12 is a vertical sectional view taken substantially along line 12—12 of Figure 5.

Figure 13 is a fragmentary sectional view taken substantially along line 13—13 of Figure 8.

Figure 14 is a fragmentary sectional view illustrating an alternate embodiment.

The vacuum cleaner shown in the accompanying drawings comprises a casing 10 having a central ridge on the top containing side openings 10a. The casing has a bottom edge portion 10b, substantially all portions of which are coplanar. The rear of the casing 10 is provided with substantially parallel spaced rear extensions 10c. The top 10d of the central raised portion 10e is extended rearwardly as shown in Figure 2 to the rear of these rear extension parts 10c. This top 10d is provided with a forwardly extending cutout portion 10g of generally U-shape.

The rear of the casing 10 is provided with an exhaust opening 10h in which is positioned a short rearwardly and upwardly extending exhaust conduit 11.

Located rearwardly of the main casing 10 and extending between the rear casing extensions 10c is an axle 12 on which is located a pair of wheels 13. These wheels are positioned within the rear extensions 10c so that the skirts 14 of these extensions serve to hide the upper parts of the wheels as shown most clearly in Figure 1.

Located within the casing 10 and extending downwardly from the top thereof is a short wall 15 with the rear of this wall forming the rear of the casing 10. The bottom edge of this wall defines an essentially horizontal plane. This lower edge of the wall is spaced a considerable distance above the bottom of the casing and extends around the area occupied by the casing openings 10a and the top 10d of the casing.

Mounted within the casing 10 is a motor structure 16 that includes a housing 17. This housing includes an upper generally semi-cylindrical shell 18 and a similar lower shell 19. Each of these shells is provided with an outwardly extending planar flange 20 and 21 that are adapted to be bolted together by means of spaced bolts 22 in order to hold the shells in assembled relationship. The outwardly extending cooperating flanges 20 and 21 provide the means for mounting the motor 16 within the casing. The outer edges of the flanges 20 and 21 rest against lower edge of the wall 15 and are fastened thereto by means of spaced bolts 23 engaging bosses 24 that are formed as a part of the wall 15. The upper motor casing shell 18 is provided with end openings 18a and 18b on the cylindrical surface of the shell adjacent to each end thereof and adjacent to the openings 10a in the casing 10.

The shell flanges 20 and 21 and wall 15 cooperate to divide the interior of the casing 10 into a dirt-laden air passage 25 in the lower part of the casing and a clean air passage 26 in the upper part that are separated from each other. The upper air passage 26 provides ventilation air for the motor 16 with this air being forced through the opening 10a, 18a, and 18b so as to provide cooling air for the interior of the motor. This air is

moved by the usual motor cooling fan (not shown) that is customarily provided in motors that are used in vacuum cleaner constructions.

The motor 16 is provided with a shaft 27, one end of which extends from the motor housing 17 and is provided with a belt driving spindle 27a that is in driving engagement with an endless belt 28. The belt 28 also drivingly engages a pulley 29 that is mounted on a rotatable brush 30 located at the front of the casing 10. This brush is of customary construction and is provided with bristles 31a.

The ends of the brush 30 are rotatably held in bearings 31 of customary construction that are mounted on the inside of the casing 10. In order to hold the belt 28 in driving engagement with the spindle 27a and the pulley 29, there is provided a belt guard 32.

The belt guard 32 is of generally inverted U-shape in cross-section with a flat base 32a and depending substantially parallel side flanges 32b adapted to be located on opposite sides of the belt as shown most clearly in Figure 5. Extending outwardly from the outer side flange 32b is a mounting flange 32c which is struck from its side flange to leave an opening 32d. The belt guard 32 is mounted in place by means of a bolt 33 that engages the top portion of the casing 10.

Mounted on the bottom of the casing 10, so as to engage the bottom edge portion 10b of the casing, is a removable closure plate 34. This closure plate is provided at its rear and side edges with a channel 34a that contains a sponge rubber gasket strip 35. This gasket strip, which is preferably coated with a cement such as a rubber cement, is adapted to make sealing contact with the edge 10b and with the channel 34a. The front of the closure plate 34 is provided with a laterally extending opening 34b which is located beneath the brush 30 in the customary manner to serve as the suction inlet to the nozzle structure and to expose the bottom of the brush for contact with the rug, or the like, being cleaned.

In order to service the interior of the nozzle casing 10 in order to replace the belt 28, remove long threads or other materials that may be wound around the brush 30, and for similar servicing, the closure plate 34 is readily removable.

In the embodiment shown the means for holding the closure plate 34 in position includes a pair of spaced rods 36 located adjacent to the rear of the nozzle and having threaded ends 36a that are held in bosses 37 that form a part of the dividing wall 15. These rods 36 also aid in retaining in position the flanges 20 and 21 as the rods are provided with nuts 38 which bear against the bottom surface of the bottom flange 21.

The bottom ends of the rods 36 are each provided with an enlarged head 36b which are located beneath the closure plate 34. Each rod 36 extends through an opening 34c in the plate 34 which is large enough to pass the head 36b.

The bottom closure plate 34 is locked in position by means of an elongated slidable bar 39 on the bottom of plate 34. This bar has downturned ends 39a for manipulation of the bar and the bar is held on the plate 34 by means of a pair of rivets 40 that extend through elongated aligned slots 39b in the bar 39. The rivets have enlarged heads on the bottom which hold the bar 39 in position.

Each rod 36 extends through a keyhole-shaped opening 39c in the bar 39. When the narrow portions of the openings 39c engage the rod heads 36b in the manner shown in the accompanying drawings, the closure plate is locked in position on the casing 10. Then when the bar 39 is moved to the right as shown in Figure 10 so that the enlarged portions of the openings 39c are aligned with the heads 36b, the closure plate 34 may be easily removed from the bottom of the casing 10.

Extending around the outside of the lower part of the casing 10 is a resilient furniture bumper strip 41 that is preferably made of a synthetic rubbery material such as

polyvinyl chloride. The front end 34d of the closure plate is curved upwardly as shown in Figure 4 and abuts against the bottom of the bumper strip to hold the front portion of the strip in position. The remaining portions of the strip are held in position by the side edges of the closure plate 34 in the manner shown most clearly in Figure 9.

In order to lock the ends of the bumper strip 41 in position, each end of the bumper strip has attached thereto a spring metal clip 42. Each clip is provided with a flat side with inwardly directed sharp pointed spurs 42a that are normally embedded in the end of the bumper strip. The other side of each clip 42 is shaped as a spring finger to engage the inner surface of a downwardly extending flange 43 at the rear of the casing 10. Each flange 43 is located adjacent to a wheel 13 and extends generally forwardly as shown in Figure 5. Each flange 43 is of generally V-shape so that the end of the bumper strip that extends away from a clip 42 is bent around the apex of the V in a manner shown most clearly in Figure 6.

Extending rearwardly of the casing 10 is a yoke 44 that includes a bight 44a and diverging legs 44b. These legs 44b are adapted to be rotatably mounted on the axle 12 on opposite sides of the exhaust conduit 11. The yoke 44 and casing 10 are urged upwardly by means of a spring 45 having a central part 45a bearing against the rear end of the casing 10 at the exhaust conduit 11, and ends 45b wrapped around the axle 12 on opposite sides of the central part 45a and bearing upwardly against the bottoms of the legs 44b.

The bight 44a is generally tubular and carries a short tube 46 having inner end 46a and outer end 46b extending, respectively, below and above the bight 44a. Interconnecting the exhaust conduit 11 and the inner end 46a is a flexible air conduit hose 47. This hose 47 is of customary construction that includes a helical wire 48 covered with a continuous plastic sheet 49. The inner end of the hose 47 is assisted in being retained on the conduit 11 by means of outwardly extending ridges forming a part of the conduit. These ridges 11a are discontinuous but are arranged generally in helical alignment.

The outer end 46b of the bight tube 46 is adapted to releasably receive the lower end of a vacuum cleaner wand 49 in the customary manner that a wand is received in an ordinary nozzle. The wand is used in the customary manner to propel the nozzle over the surface being cleaned and to convey dirt-laden air.

The electrical connections to the motor 16 are conventional and include an electric cord 50 that carries on its outer end a plug 51 for connection with an electrical receptacle to receive electrical energy therefrom.

In order to raise the front end of the casing 10 such as when it is desired to lift the casing over a projection means are provided so that when the yoke 44a is moved downwardly it will engage a catch and raise the casing. The catch may be of any construction desired. In the embodiment shown, it comprises a downwardly extending plate 52 bolted to the casing and adapted to be engaged by a spur 44c formed on the lower end of a yoke leg 44b.

In the embodiment shown in the drawings, the front of the vacuum cleaner nozzle is shown as supported on the brush bristles 31a. In actual use, however, the front end of the structure will be supported on the rug or other surface on the laterally extending and downwardly projecting rounded front portion 34d of the closure plate 34.

In the embodiment shown in Figure 14 the bottom closure plate 34 is held in position at the rear end by providing the spring 145 with a projecting forward end 145a to extend under the rear edge of the plate 34. As in the earlier described embodiment, the front end of

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the plate 34 is held in position as illustrated in Figure 4 at the lefthand side.

With this alternate construction the holding elements including the rods 36, bar 39 and rivets 40 may be eliminated.

In this alternate embodiment the suction in the interior of the nozzle when the nozzle is being used adds to the force of the spring to hold the closure plate securely in position. This suction is, of course, effective in the first embodiment in a similar manner.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations are to be understood therefrom, as some modifications will be obvious to those skilled in the art.

We claim:

A vacuum cleaner nozzle structure, comprising: a casing; a movable brush mounted on said casing; a motor for moving said brush; means mounting said motor within the casing, the motor mounting means including an air barrier on which the motor is supported substantially horizontally, the air barrier dividing the casing into first and second air chambers isolated from each other on opposite sides of said barrier; motor cooling means including said first chamber; means defining a dirt laden air passage including said second chamber, the dirt laden air passage having an exit from said casing; means forming a first por-

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tion of said motor extending into the first chamber; and means forming a dirt impermeable second portion of said motor extending into said second chamber and restricting the cross-sectional area of said dirt laden air passage immediately beneath said motor and forwardly of said passage exit.

References Cited in the file of this patent

UNITED STATES PATENTS

10	D. 179,867	Swann -----	Mar. 12, 1957
	1,639,959	Owen -----	Aug. 23, 1927
	2,136,247	Kroenlein -----	Nov. 8, 1938
	2,136,268	Watts -----	Nov. 8, 1938
15	2,168,899	Dow -----	Aug. 8, 1939
	2,218,180	Schug -----	Oct. 15, 1940
	2,287,515	Dow et al. -----	June 23, 1942
	2,334,732	Taylor -----	Nov. 23, 1943
	2,380,782	Owens -----	July 31, 1945
20	2,691,791	Humphrey -----	Oct. 19, 1954
	2,716,254	Hoffmann -----	Aug. 30, 1955
	2,807,824	Coons -----	Oct. 1, 1957

FOREIGN PATENTS

25	801,152	France -----	May 16, 1936
----	---------	--------------	--------------