

June 6, 1961

A. F. N. LINDSJO ET AL

2,987,241

MOTOR-FAN UNIT MOUNTING FOR SUCTION CLEANER

Filed Dec. 17, 1957

3 Sheets-Sheet 1

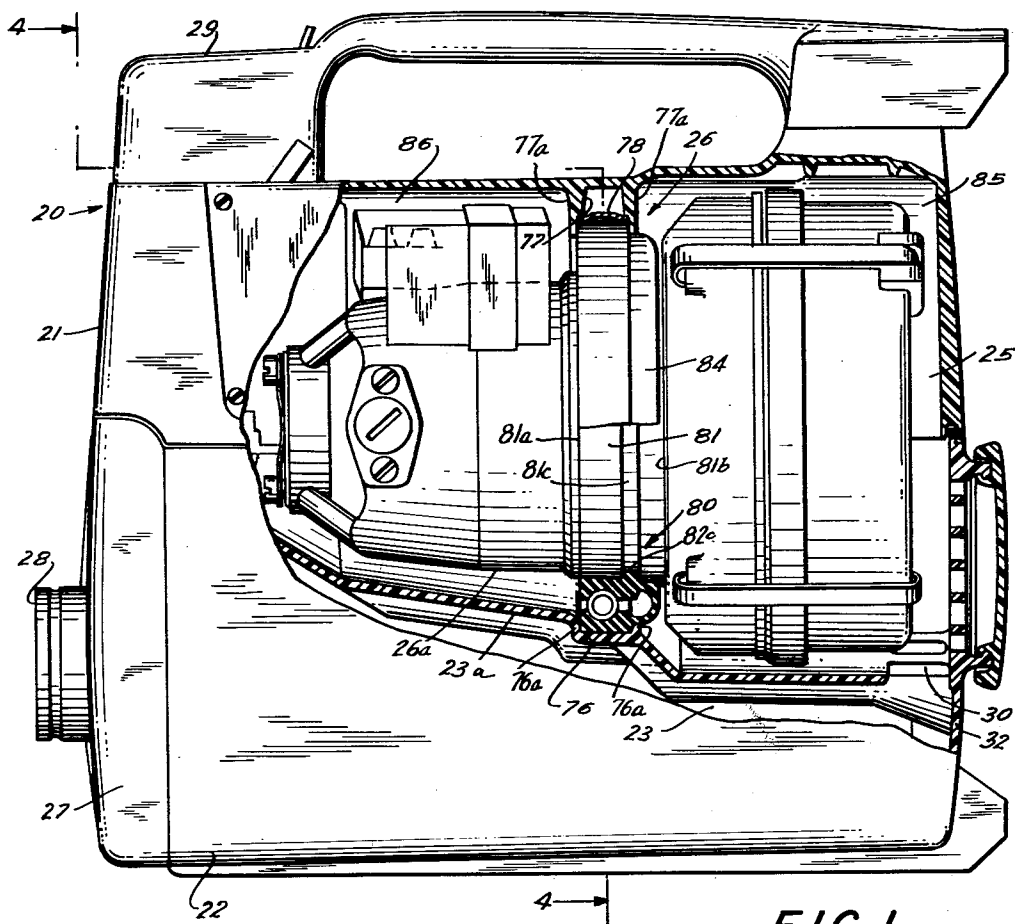


FIG. 1

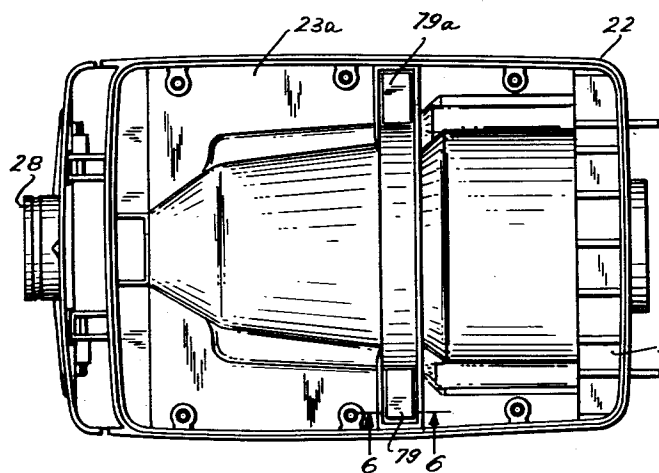


FIG. 2

INVENTORS
Anders Folke Nylund and Lindsjo
 BY *Jean Louis Regan Boine*
Edmund A. Tensler
 ATTORNEY

June 6, 1961

A. F. N. LINDSJO ET AL

2,987,241

MOTOR-FAN UNIT MOUNTING FOR SUCTION CLEANER

Filed Dec. 17, 1957

3 Sheets-Sheet 2

FIG. 4

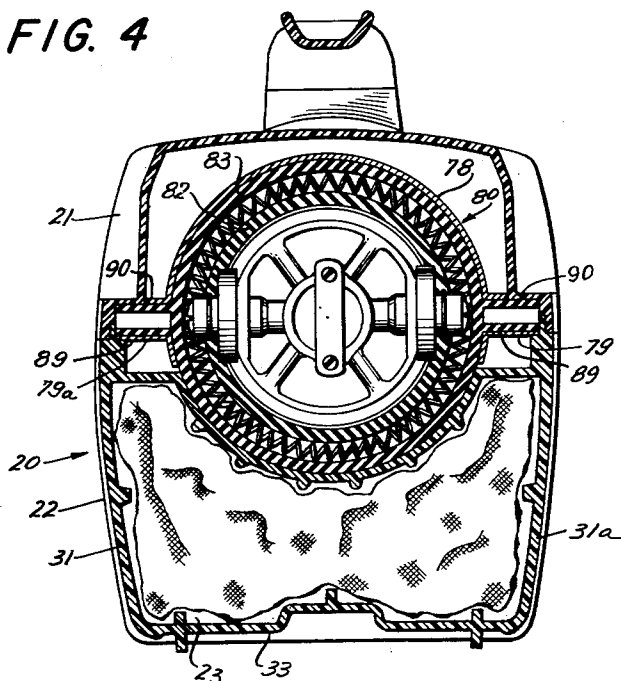
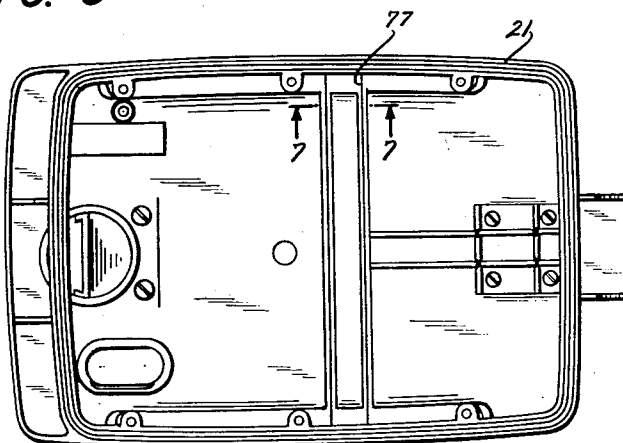


FIG. 3



INVENTORS:
Anders Folke Hagsten Lundgren
By Jean Louis Ragnar Boine
Edward A. Threlkeld
their ATTORNEY

June 6, 1961

A. F. N. LINDSJO ET AL

2,987,241

MOTOR-FAN UNIT MOUNTING FOR SUCTION CLEANER

Filed Dec. 17, 1957

3 Sheets-Sheet 3

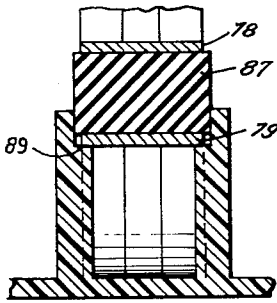


FIG. 6

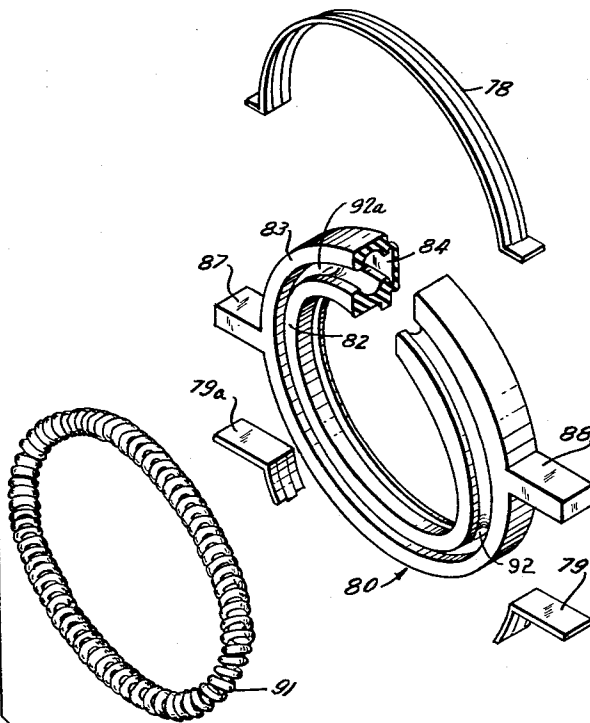


FIG. 5

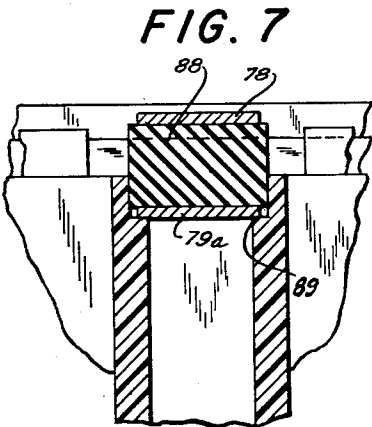


FIG. 7

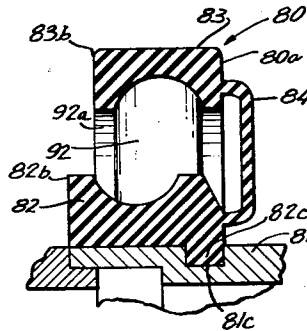


FIG. 8

INVENTORS:
Andres Folta Napoleon Kindigs
By Jean Ivan Rayner Boirie
Edmund A. Threlander
their ATTORNEY

1

2,987,241

MOTOR-FAN UNIT MOUNTING FOR SUCTION CLEANER

Anders Folke Napoleon Lindsjo and Jean Ivan Ragnar Boivie, Stockholm, Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden, a corporation of Sweden

Filed Dec. 17, 1957, Ser. No. 703,372

6 Claims. (Cl. 230-117)

This invention relates to an improved sound dampening and anti-vibration mounting for the motor-fan unit of a suction cleaner.

It is desirable in suction cleaners, particularly small ones, to reduce the noise level thereof during operation to as low a value as possible and also to dampen motor vibration so as to increase the life of the motor-fan unit and prevent damage to the cleaner housing. Accordingly, it is among the objects of this invention to provide a mounting for the motor-fan unit of a suction cleaner whereby the noise output of the motor-fan unit during operation is reduced to a minimum and vibration thereof is effectively dampened. Other objects will be in part apparent and in part pointed out hereinafter.

In the drawings wherein there is shown one embodiment of the invention:

FIG. 1 is a side elevation of the cleaner with a portion of one side wall being broken away and other portions shown in section;

FIG. 2 is a top plan view of the lower casing of the cleaner housing;

FIG. 3 is a plan view of the bottom of the upper casing of the cleaner housing;

FIG. 4 is a vertical section taken along the line 4-4 of FIG. 1;

FIG. 5 is an exploded perspective view of the mounting for the motor-fan unit;

FIG. 6 is an enlarged fragmentary section taken along the line 6-6 of FIG. 2;

FIG. 7 is an enlarged fragmentary section taken along the line 7-7 of FIG. 3; and

FIG. 8 is an enlarged fragmentary section of the rubber mounting ring shown in FIG. 5.

Similar reference characters refer to similar parts throughout the several views of the drawing.

It may now be seen that we have provided a mounting for the motor-fan unit of the cleaner which effectively reduces noise and vibration to minimum levels.

Referring now to FIGS. 1 and 4, it may be seen that the cleaner includes a housing, generally indicated at 20, which comprises upper and lower casings 21 and 22. In the lower portion of casing 22 is a dust bag chamber 23 in which a dust bag 24 is removably disposed; the upper portion of casing 22 and upper casing 21 in turn form another chamber 25 in which a motor-fan unit, generally indicated at 26, is removably mounted.

A closure on cover 27 for dust bag chamber 23 is hingedly attached to the upper front portion of casing 22 and is provided with an air inlet 28 to which a wand (not shown) may be detachably secured. At the upper front end of upper casing 21 we have provided an air exhaust 29 communicating with motor-fan chamber 25 which in turn communicates with dust bag chamber 23 by way of a port 30 formed in the upper partition 23a thereof.

It may now be seen that when the cleaner is in operation, dust laden air is drawn into dust bag 24 through inlet 28, and the filtered air is drawn through port 30 into chamber 25 and is exhausted therefrom through exhaust 29 after flowing around the motor-fan unit 26 to cool the motor.

Lower casing 22 which is preferably molded from a

2

suitable plastic so as to be light in weight yet rigid, strong and durable, includes side walls 31 and 31a (FIGS. 1 and 4), a rear wall 32, a bottom 33, and partition 23a.

As shown in FIG. 1, partition 23a slopes downwardly from the front to the rear of the cleaner and, accordingly, dust bag chamber 23 is somewhat wedge-like in form. In the upper central part of the partition there is provided a circular seat 76; a similar seat 77 being provided in upper casing 21. It is in these two seats that the motor-fan unit 26 is supported by means of sheet metal straps 78, 79 and 79a (see also FIG. 5), and a sound dampening suspension member generally indicated at 80. Suspension member 80 is held to motor-fan unit 26 at the vicinity of a projection or shoulder 81 of the housing of the motor. Suspension member 80 consists of two soft concentric inner and outer annular rings 82 and 83 (FIG. 5), respectively, which are preferably made of rubber and are held together by a thin wall or diaphragm 84 integral with them, whereby the suspension member 80 forms a seal between the suction space 85 on the right of the motor-fan unit as viewed in FIG. 1, and an exhaust space 86 in which the left-hand side of the motor-fan unit is disposed. On the outer annular part 83 of the suspension member, there are formed, as shown in FIG. 5, radially extending parts 87 and 88 which are carried by straps 79 and 79a which in turn are mounted on supporting surfaces or arms 89 and 90 formed at the edges of the upper and lower casings 21 and 22, these parts preventing the suspension member 80 from turning in the seats 76 and 77. As seen in FIG. 5, the outwardly extending parts 87 and 88 have first and second pairs of opposing sides essentially at right angles to one another which are disposed generally lengthwise of and transverse to the axis of the motor-fan unit 26. The first opposing top and bottom sides of parts 87 and 88 are gripped between the bottoms of the seats 76 and 77 and the sheet metal straps 78, 79 and 79a. The second opposing lateral sides of the parts 87 and 88 are gripped between the spaced radially extending sides of the seats 76 and 77. Hence, both the first and second pairs of opposing sides of the parts 87 and 88 are gripped within the space defined by the upper casing 21 and partition 23a by structure entirely within such space for positively anchoring the parts 87 and 88.

In order to strengthen the vibration dampening action of suspension member 80, an annular helical spring 91 is disposed in a pocket 92 of circular cross-section between rings 82 and 83. The suspension member 80, consisting of rings 82 and 83, diaphragm 84, and parts 87 and 88, forms a so-called single plane suspension, and the projection or shoulder 81 of the motor-fan unit, against which suspension member 80 rests, is placed in the vertical plane passing through the center of gravity of the motor-fan unit at right angles to the rotary part. Thus, it may be seen that the motor-fan unit is resiliently mounted between upper and lower casings 21 and 22 and may readily be removed for repair or replacement merely by disconnecting the upper and lower casings and the wiring between the motor-fan unit and the switch.

The upper casing 21 and partition 23a essentially define an elongated hollow shell having the suction and exhaust spaces 85 and 86, respectively, such shell having a longitudinally extending wall section with structure at its inner surface providing the inwardly facing seats 76 and 77. The upper casing 21 and partition 23a form sections of the shell which, when in abutting relation, provide the inwardly facing seat of circular form, each of the sections having the supporting surfaces or arms 89 and 90 extending radially outward from the seat of circular form.

The structure at the inner surface of the longitudinal wall section of the shell forming the semi-circular seats

3

76 and 77 includes two pairs of spaced walls 76a and 77a, respectively. The walls 76a and 77a extend radially inward from the same longitudinally extending wall section defining the shell forming the suction and exhaust spaces 85 and 86.

The shoulder 81 extends about the outer peripheral surface of the housing 26a of the motor-fan unit 26 and forms a zone of circular form having spaced lateral edges 81a and 81b, as best shown in FIG. 1. The shoulder 81 is formed with a circular groove 81c which is nearer to the lateral edge 81b than to the lateral edge 81a of the circular zone. The inner and outer rings 82 and 83 of the suspension member 80 are connected by the thin wall or circular element 84 at one lateral edge 80a of the suspension member, such lateral edge 80a being nearer to the lateral edge 81b of the shoulder 81 than its opposite lateral edge 81a. The rings 82 and 83 and connecting element 84 form a circular cavity 92 having a ring-shaped opening 92a at the lateral edges 82b and 83b of the rings opposite to the lateral edge 80a of the suspension member 80. The rings 82 and 83 are angularly movable with respect to one another about the element 84 and a stiffening element 91 of annular form is disposed in the cavity 92 formed by the rings and circular element 84.

The suspension member 80 of circular form is provided with a pair of diametrically opposed parts 87 and 88 which extend radially outward from its outer peripheral edge portion, the member 80 and arms 87 and 88 being disposed in the same plane perpendicular to the axis of the motor-fan unit 26. The parts 89 and 90, which are disposed within the interior of the shell forming the suction and exhaust spaces 85 and 86, grip the arms 87 and 88 to anchor the latter within the shell, as best seen in FIG. 2.

The inner ring 82 of suspension member 80 is formed with a collar 82c which is held and retained in the groove 81c formed about the housing 26a. In FIG. 8 it will be seen that the axial extent of the collar 82c lengthwise or axially of the motor-fan unit 26 is less than the overall axial extent of the inner peripheral edge portion of the inner ring 82 embracing and in physical contact with the circular zone 81 of the housing 26a.

Although we have illustrated and described particular embodiments of our invention, we do not desire to be limited to the particular arrangement set forth, and we intend in the following claims to cover all modifications which do not depart from the spirit and scope of our invention.

What is claimed is:

1. In a suction cleaner, a shell, a motor-fan unit having its shaft disposed lengthwise within said shell, said unit having a zone of circular form intermediate the ends thereof and said shell including structure providing an inwardly facing seat therein of circular form, said seat having spaced walls normal to the axis of said shaft, means for supporting said unit within said shell at its circular zone, said supporting means constituting the only provision for supporting said unit within said shell and comprising a resilient member of circular form having its inner peripheral edge portion embracing the circular zone of said unit and its outer peripheral edge portion held in said seat between the spaced walls thereof, said resilient member having spaced parts extending radially outward from its outer peripheral edge portion, said resilient member of circular form and parts extending radially outward therefrom being disposed in the same plane perpendicular to the axis of said motor-fan unit, said parts having first and second pairs of opposing sides essentially at right angles to one another which are disposed generally lengthwise of and transverse to the axis of said motor-fan unit, and means entirely within said shell at its inner surface for gripping the first and second pairs of opposing sides of said parts to anchor the latter within said shell.

4

2. In a suction cleaner, an elongated shell, a motor-fan unit having its shaft disposed lengthwise within said shell, said unit comprising a housing having a zone of circular form intermediate the ends thereof and said shell

5 having a longitudinally extending wall section including structure at its inner surface providing an inwardly facing seat therein of circular form, said seat having a pair of spaced walls which are both fixed to said wall section and normal to the axis of said shaft, means for supporting said unit within said shell at the circular zone of said housing, said supporting means constituting the only provision for supporting said unit within said shell and comprising a resilient member of circular form having its inner peripheral edge portion embracing and in physical contact with the circular zone of said housing and its outer peripheral edge portion held in said seat between the spaced walls thereof, the circular zone of said housing having a groove about its outer peripheral surface, said resilient member at its inner peripheral edge portion having a collar which is held and retained in said groove, the axial extent of said collar lengthwise of said motor-fan unit being less than the overall axial extent of the inner peripheral edge portion of said resilient member embracing and in physical contact with the circular zone of said housing, said resilient member comprising a pair of inner and outer concentric ring elements forming respectively the inner and outer peripheral edge portions thereof, and circular means connecting said elements at one lateral edge thereof, said ring elements and connecting means forming a circular cavity having a ring-shaped opening at the opposite lateral edge of said elements, and a resilient stiffening element of circular form in said cavity.

3. A suction cleaner as set forth in claim 2 in which said circular groove is nearer to one lateral edge than to the opposite lateral edge of said circular zone, said circular means connecting said ring elements being nearer to said one lateral edge than to the opposite lateral edge of said circular zone, and the ring-shaped opening of said circular cavity being nearer to the opposite lateral edge than to the one lateral edge of said circular zone.

4. In a suction cleaner, a shell, a motor-fan unit having its shaft disposed lengthwise within said shell, said unit having a zone of circular form intermediate the ends thereof and said shell comprising two sections which, when in abutting relation, provide an inwardly facing seat of annular form, each of said sections having arms extending radially outward from said seat, said seat having spaced walls normal to the axis of said shaft, means for supporting said unit within said shell at its circular zone, said supporting means constituting the only provision for supporting said unit within said shell and comprising a resilient member of circular form having its inner peripheral edge portion embracing the circular zone of said unit and its outer peripheral edge portion held in said seat between the spaced walls thereof, said resilient member having spaced parts extending radially outward from its outer peripheral edge portion, said resilient member of circular form and parts extending radially outward therefrom being disposed in the same plane perpendicular to the axis of said motor-fan unit, and means within said shell and at its inner surface for gripping said parts to anchor the latter within said shell, said means for gripping said parts including said arms.

5. In a suction cleaner, a shell, a motor-fan unit having its shaft disposed lengthwise within said shell, said unit having a zone of circular form intermediate the ends thereof and said shell including structure providing an inwardly facing seat therein of circular form, said seat having spaced walls normal to the axis of said shaft, means for supporting said unit within said shell at its circular zone, said supporting means constituting the only provision for supporting said unit within said shell and comprising a resilient member of circular form having its inner peripheral edge portion embracing the circular

5

zone of said unit and its outer peripheral edge portion held in said seat between the spaced walls thereof, said resilient member of circular form comprising a pair of concentric rings closed at one lateral edge and open at the opposite lateral edge to form a circular cavity having a ring-shaped opening, a vibration supporting element of annular form in said cavity, said resilient member having spaced parts extending radially outward from its outer peripheral edge portion, said resilient member of circular form and parts extending radially outward therefrom being disposed in the same plane perpendicular to the axis of said motor-fan unit, and means within said shell and at its inner surface for gripping said parts to anchor the latter within said shell.

6. In a suction cleaner, a shell, a motor-fan unit having its shaft disposed lengthwise within said shell, said unit having a zone of circular form intermediate the ends thereof and said shell including structure providing an inwardly facing seat therein of circular form, said seat having spaced walls normal to the axis of said shaft, means for supporting said unit within said shell at its circular zone, said supporting means constituting the only provision for supporting said unit within said shell and comprising a resilient member of circular form having its inner peripheral edge portion embracing the circular zone of said unit and its outer peripheral edge portion

6

held in said seat between the spaced walls thereof, said resilient member of circular form comprising a pair of concentric rings which are closed at one lateral edge and angularly movable with respect to one another and open at the opposite lateral edge to form a circular cavity having a ring-shaped opening, a resilient stiffening element of annular form in said cavity, said resilient member having spaced parts extending radially outward from its outer peripheral edge portion, said resilient member of circular form and parts extending radially outward therefrom being disposed in the same plane perpendicular to the axis of said motor-fan unit, and means within said shell and at its inner surface for gripping said parts to anchor the latter within said shell.

References Cited in the file of this patent

UNITED STATES PATENTS

2,012,688	Leland	Aug. 27, 1935
2,372,007	Kroenlein	Mar. 20, 1945
2,372,749	Taylor	Apr. 3, 1945
2,438,133	Sparklin	Mar. 23, 1948
2,717,748	Martinet	Sept. 13, 1955
2,789,661	Brace	Apr. 23, 1957

FOREIGN PATENTS

409,563	Great Britain	May 3, 1934
---------	---------------	-------------