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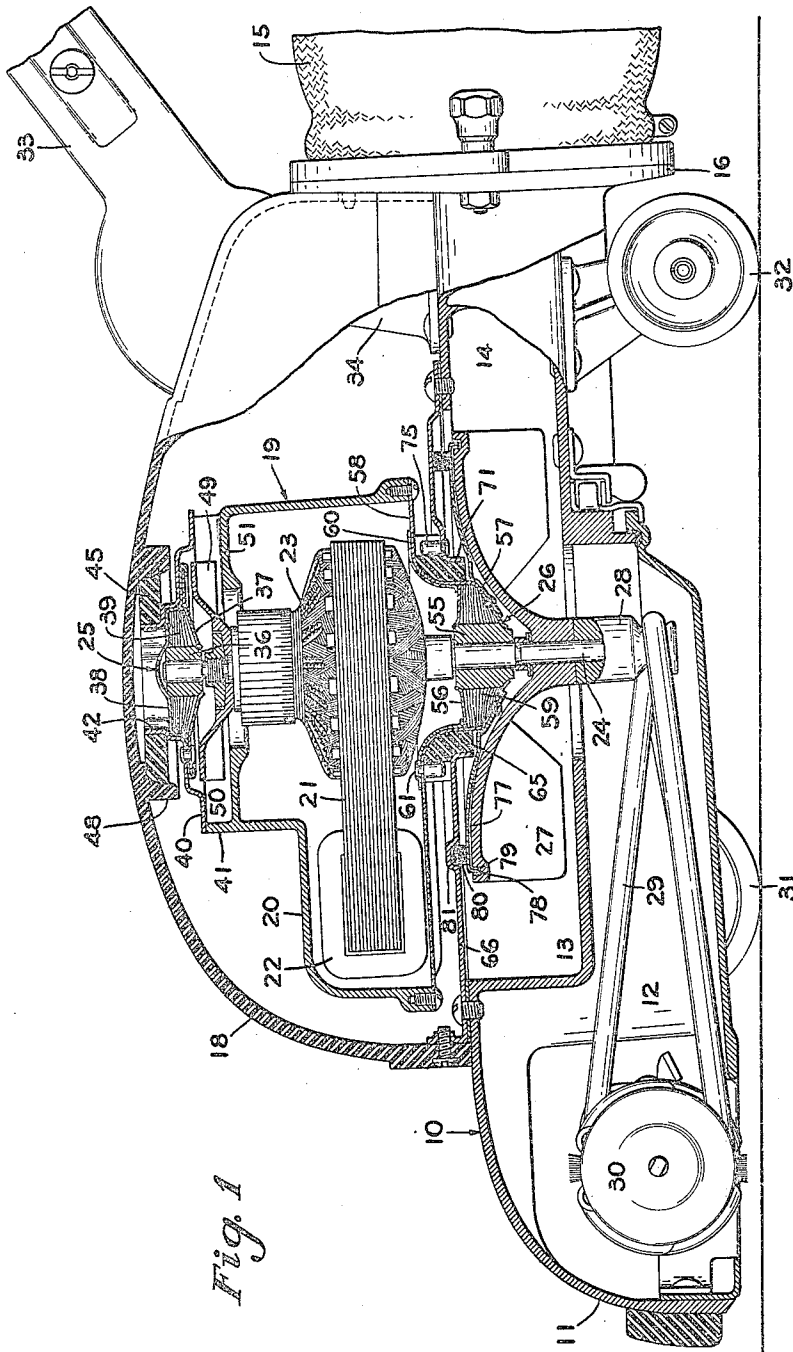
F. L. PIERCE

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SUCTION CLEANER

Filed Nov. 18, 1939

2 Sheets-Sheet 1



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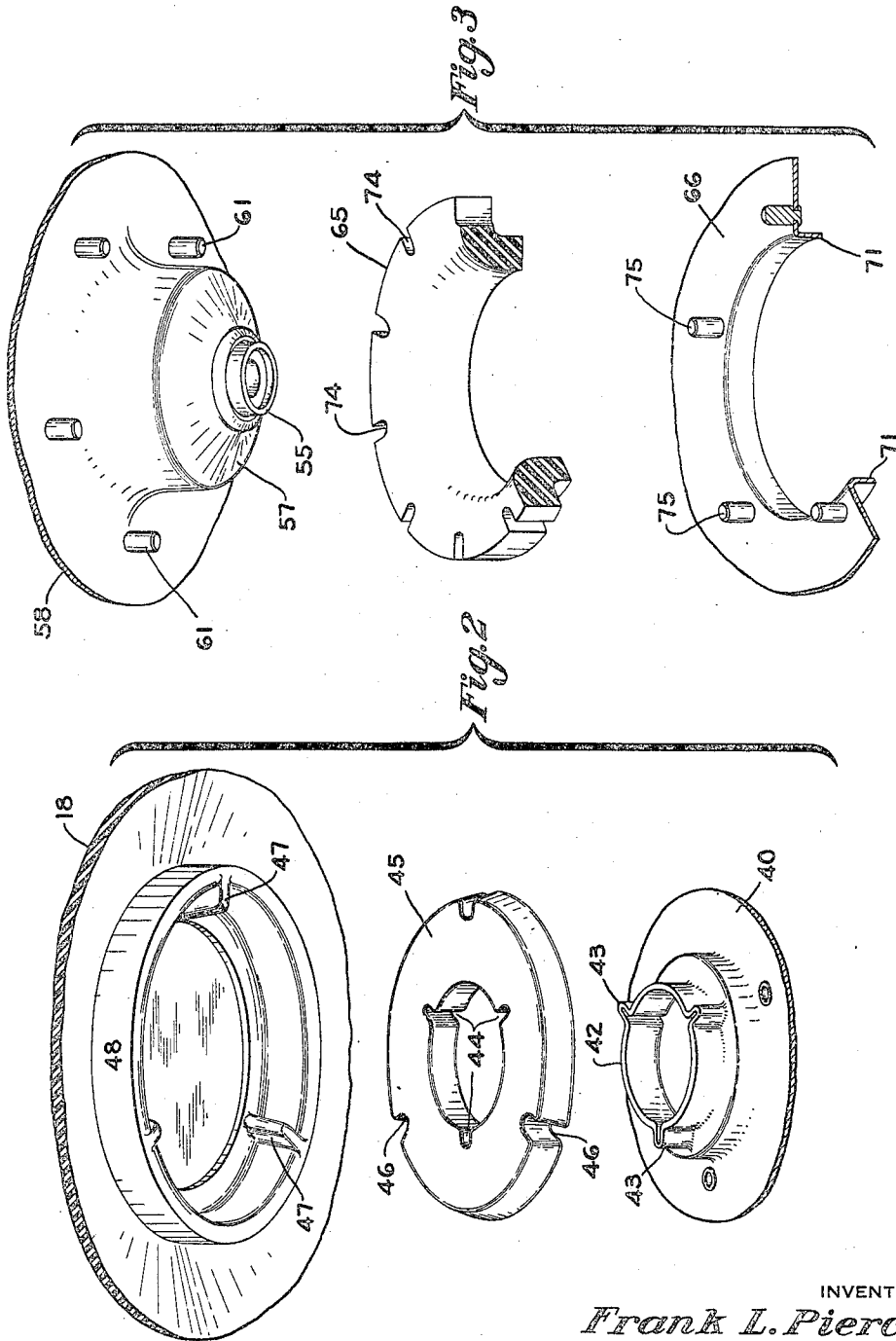
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SUCTION CLEANER

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9 Claims. (Cl. 230-117)

The present invention relates to suction cleaners in general and more particularly to a new and novel construction for resiliently mounting a motor.

It is an object of the present invention to provide a new and improved suction cleaner construction. A further object is to provide a construction for maintaining a constant clearance between the labyrinth plate and fan. Another object is to provide a construction for resiliently supporting a motor bearing and a fan labyrinth plate as a unit. A further object is to provide means for resiliently mounting the motor, labyrinth plate and fan. Other objects and advantages of the invention will be apparent from the specification and drawings, wherein;

Figure 1 is a sectional view of a suction cleaner illustrating one embodiment of the invention;

Figure 2 is an exploded perspective view of the means for resiliently mounting the top motor bearing, and

Figure 3 is an exploded fragmentary perspective view of the means for resiliently mounting the bottom motor bearing.

The embodiment of the invention herein described comprises a suction cleaner having a main casing 10 provided with a nozzle 11 communicating through a suction passageway 12 with a fan chamber 13 discharging through an exhaust passageway 14 into a dust-filtering bag 15 removably attached to a flange 16 on the casing 10. Removably mounted on the casing 10 is a motor housing 18 of electric insulating material which encloses a motor 19 provided with a frame 20, field stack 21, field coil 22 and an armature 23 having its shaft 24 supported at its opposite ends in top and bottom bearings 25 and 26 respectively. Rigidly attached to the armature shaft 24 is a fan 27 and a pulley 28 which has driving connection with a belt 29 extending through the suction passageway 12 for operating a surface contacting member 30 rotatably mounted in the nozzle 11. The casing 10 is supported on front and rear wheels 31 and 32 respectively and a handle 33 is pivoted on a bracket 34 for moving the cleaner over the surface to be cleaned.

The top bearing 25 includes an oil porous sleeve 36 rigidly supported between the bearing housing plates 37 and 38 which form a chamber containing oil-retaining material 39 to lubricate the porous sleeve bearing 36. The plates 37 and 38 have their peripheral edges secured together and are rigidly attached to a bearing supporting member 40 which is mounted on a projecting portion 41 of the motor frame 20. In order to resiliently

support the bearing 25 the member 40 is provided with an annular collar 42 on which are spaced projections 43 seated in similarly spaced recesses 44 along the inner circumference of a resilient ring 45. The ring 45 may be of rubber and is provided along its outer periphery with recesses 46 to receive similarly spaced projections 47 formed on a collar 48 depending integrally from the motor housing 18. Attached to the armature shaft 24, adjacent the sleeve bearing 36, is a ventilating fan 49 disposed in a chamber 50 formed by the top wall 51 and the projecting wall 41 of the motor frame, the bearing supporting member 40 and the lower bearing housing plate 37.

The bottom bearing 26 comprises an oil-porous sleeve 55 rigidly supported between a disk 56 and a cup-shaped portion 57, the latter forming part of the motor bottom plate 58 which is removably attached to the motor frame 20. Disposed between the disk 56 and the cup-shaped portion 57 is oil-retaining material 59 to lubricate the sleeve bearing 55. The disk 56 is held in position with respect to the sleeve bearing 55 by means of a depending collar 60 which is rigidly attached to the bottom plate 58 by annularly spaced pins 61, the lower edge of the collar 60 bearing against the disk 56.

In order to resiliently support the lower bearing construction 26 a resilient rubber ring 65 of inverted hat-shape configuration is interposed between the motor bottom plate 58 and a depending flange 71 defining an opening in a member 66 which is removably mounted on the casing 10 and forms the top wall of the fan chamber 13. The rubber ring 65 is supported by means of spaced recesses 74 in its outer periphery which receive the pins 61 and 75 projecting respectively from the motor bottom plate 58 and the fan chamber wall 66.

Attached to the bearing housing plate 57, which forms part of the motor bottom plate 58, is a labyrinth plate 77 having a depending peripheral flange 78 which is received in predetermined spaced relation in an annular groove 79 in the wall of the fan 27. This labyrinth construction prevents entrance of foreign material between the fan 27 and the labyrinth plate 77 and thus protects the bearing 26. A resilient rubber ring 80 is mounted in a groove 81 provided in the fan chamber wall 66 and bears against the labyrinth plate 77 to prevent entrance of foreign material therebetween.

In operation, when the surface contacting member 30 is rotating the motor 19 will be subjected to a belt pull tending to tilt the fan 27

towards the nozzle 11. Under these conditions the clearance between the labyrinth plate 77 and the fan 27 will remain substantially constant, since the labyrinth plate 77 is rigidly mounted on the bearing 26 and moves with the latter and the armature shaft 24, such movement being permitted by the resilient rings 45 and 65. In maintaining a constant clearance between the fan 27 and labyrinth plate 77 any foreign material therebetween is not compressed and thus a drag on the motor 19 is prevented.

During operation of the motor the fan 27 vibrates, however the clearance between the labyrinth plate 77 and fan remains substantially constant since the bearing 26 and the attached labyrinth plate 77 and the bearing 25 are mounted in the resilient rings 45 and 65 so as to vibrate in unison with the fan 27.

When the motor is subjected to belt pull the resilient rings 45 and 65 will be in compression and tension, and when the motor is subjected to torsional vibration the rubber rings 45 and 65 will be subjected to a shearing stress. The projections 43 and 47 extending into the recesses in the resilient ring 45, and the pins 61 and 75 extending into the recesses in the lower rubber ring 65 prevent rotation of the motor due to torsional vibration.

From the foregoing it will be perceived that the upper and lower resilient rings 45 and 65 are easily assembled by registering projections in corresponding recesses, and that the rings 45 and 65 resiliently support the top and lower motor bearings. Since the labyrinth plate 77 is rigidly attached to the lower bearing housing it will move in unison with the fan 27 to thereby maintain substantially constant clearance between the fan and labyrinth plate. Also, since the bearings 25 and 26 and labyrinth plate 77 are all rigidly attached to the motor frame 20 and the latter is at no point rigidly affixed to the cleaner, but is resiliently mounted thereon by the rubber rings 45 and 65, the motor and its rigidly attached parts will be shifted as a unit whenever the motor is vibrated.

I claim:

1. A suction cleaner comprising a motor, a fan chamber having a fan mounted on said motor, means for resiliently supporting said motor to permit vibration of the same, a labyrinth plate having a portion rigidly mounted on said resiliently supported motor and its unsupported portion spaced from said fan to prevent foreign material from entering therebetween, said labyrinth plate and fan vibrating in unison with said motor upon vibration of the latter on said resilient means to thereby maintain said clearance between said fan and labyrinth plate substantially constant.

2. A suction cleaner comprising a motor, bearing means for said motor, means for resiliently supporting said bearing means to permit vibration of said motor, a fan chamber having a fan rigidly on said motor, a labyrinth plate having its inner periphery rigidly attached to said resiliently mounted bearing means for movement therewith, said labyrinth plate having its outer periphery unsupported and spaced from said fan to prevent foreign material from entering therebetween, said labyrinth plate, bearing means and fan moving in unison with said motor upon vibration of the latter on said resilient means to thereby maintain said clearance between said fan and labyrinth plate substantially constant.

3. A suction cleaner comprising a motor, a fan

chamber, a fan in said chamber and mounted on said motor, spaced bearing means rigidly attached to said motor and supporting the motor armature shaft, a labyrinth plate having its inner periphery rigidly attached to one of said spaced bearing means and its outer periphery unsupported, means for resiliently supporting said spaced bearing means, said motor, spaced bearing means, fan and labyrinth plate moving as a unit in said resilient means upon vibration of said motor.

4. A suction cleaner comprising a motor, a frame for said motor, a motor armature shaft bearing rigidly attached to said motor frame, means for supporting said motor frame, resilient means interposed between said motor frame and supporting means for resiliently supporting said motor to permit vibration of the latter with respect to said supporting means, a fan mounted on said motor, and a labyrinth plate rigidly attached to said bearing and having an unsupported portion spaced from said fan, whereby said motor frame, bearing, labyrinth plate and fan vibrate in unison to maintain a constant clearance between said fan and labyrinth plate.

5. In a suction cleaner having a casing, a motor in a frame mounted on the casing and operating a fan, the combination of a bearing attached to the frame for the motor, a labyrinth plate having its inner periphery rigidly attached to said bearing and its outer periphery unsupported and spaced from said fan to prevent accumulation of foreign matter therebetween, and resilient means interposed between said motor frame and casing for resiliently supporting said motor frame on said casing, the motor, fan, bearing and labyrinth plate moving as a unit in said resilient means with respect to said casing upon vibration of said motor.

6. In a suction cleaner having a casing, a motor in a frame mounted on the casing and operating a fan, the combination of a bearing attached to the frame for the motor, a labyrinth plate having its inner periphery rigidly attached to said bearing and its outer periphery unsupported and spaced from said fan, resilient means interposed between said motor frame and casing for resiliently supporting said motor frame on said casing, means for subjecting said resilient means to shearing stress upon torsional vibration of said motor frame, said bearing and labyrinth plate moving as a unit with said motor frame upon torsional vibration of said motor frame.

7. A motor-fan unit comprising a casing for said fan and supporting said motor, a bearing attached to said motor, a labyrinth plate having its inner periphery rigidly attached to said bearing and its outer periphery unsupported and spaced from said fan, and resilient means interposed between said casing and motor for resiliently supporting the latter with respect to said casing, the motor, fan, bearing and labyrinth plate moving as a unit in said resilient means with respect to said casing upon vibration of said motor.

8. A suction cleaner comprising a motor, a fan chamber, a fan in said chamber and mounted on said motor, a labyrinth plate between the back of said fan and a wall of said fan chamber to prevent foreign material from entering between said fan and labyrinth plate, said labyrinth plate being unsupported at its outer portion, and resilient means between said fan chamber wall

and said labyrinth plate to prevent foreign material from entering therebetween.

9. A suction cleaner comprising a motor, a fan chamber having an opening in a wall thereof through which the motor shaft extends into said chamber, a fan in said chamber and mounted on said motor shaft, resilient means in said opening for resiliently supporting said motor and also

to close said opening in said wall to said fan chamber, and a labyrinth plate between said fan and said fan chamber wall and unsupported at its outer portion to prevent foreign material from entering between said fan and labyrinth plate.

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