

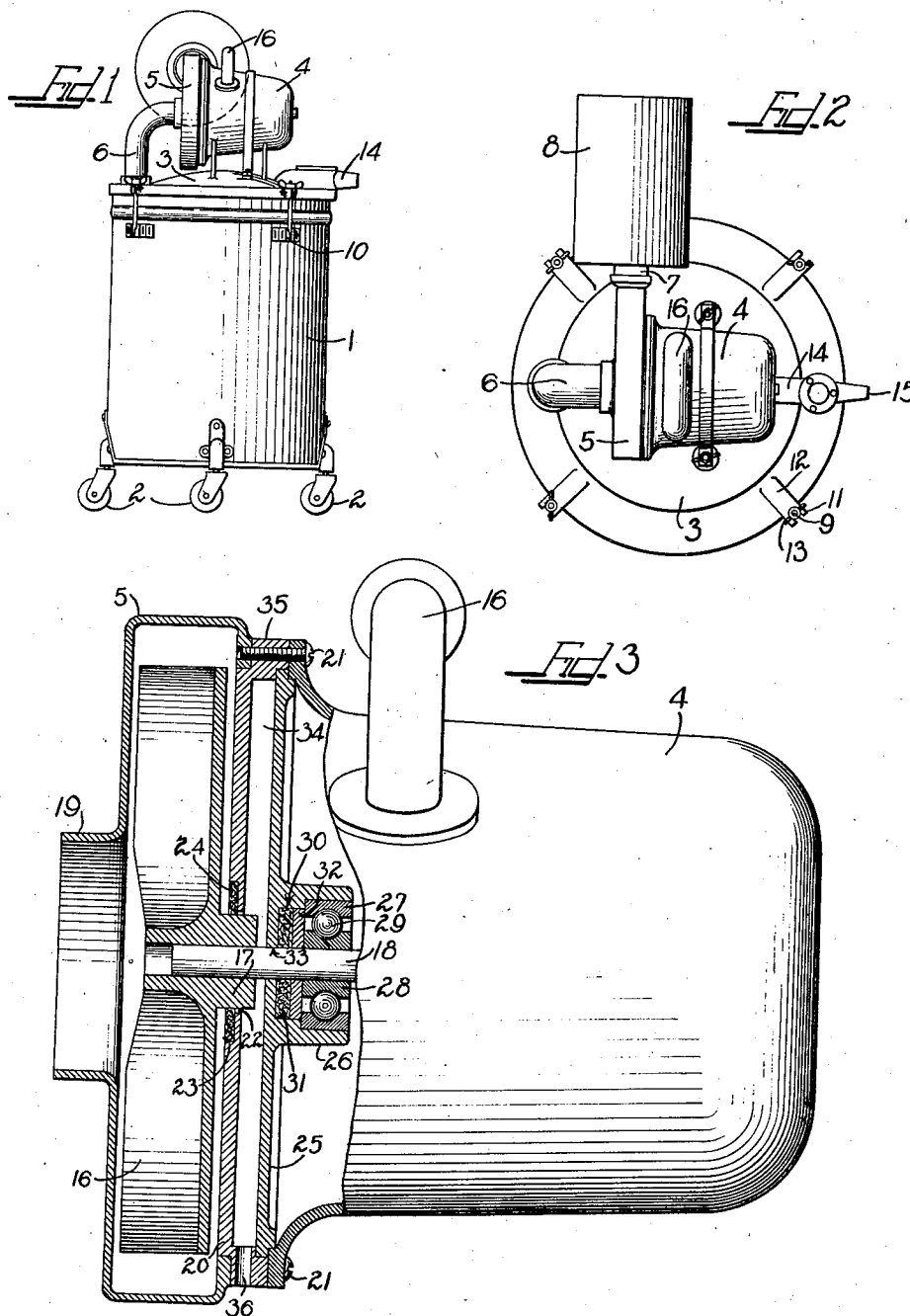
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SUCTION CLEANER MOTOR CONSTRUCTION

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SUCTION CLEANER MOTOR CONSTRUCTION

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The present invention relates to a suction cleaner motor construction and more particularly to a construction whereby liquids picked up by the suction hose, in a cleaning operation, are prevented from access to the motor shaft bearings and to the vital parts of the motor.

Extensive use of portable suction cleaners, such as that exemplified in applicant's Patent 1,868,519 dated July 26, 1932, it has been found that often, in cleaning the floors of a factory building, warehouses, piers, and the like, moisture, and many times fluid such as water, is picked up by the cleaners.

Where such cleaners pick up a considerable amount of fluid, in cleaning operations, some of the moisture, carrying dust with it, enters the motor shaft bearing, adjacent the fan chamber of the cleaner, thus gumming the bearing, abrading the bearing parts, and making repair necessary.

The present invention is directed to a suction cleaner motor construction in which access of moisture and dust to the motor shaft bearings, and also to the vital parts of the motor, is prevented.

An object of the present invention is to provide a suction cleaner motor construction in which moisture and dust is prevented from entering the motor shaft bearings.

Another object of the present invention is to provide, in a suction cleaner motor construction, means for elimination of such pressure created in the fan chamber of a suction cleaner, which prevents access of moisture and dust to the motor shaft bearing adjacent the fan chamber.

A further object of the present invention is to provide a suction cleaner motor construction with a space between the fan chamber and the motor casing, which space is open to the atmosphere, to thereby eliminate any admission of moisture and dust to the motor shaft bearing adjacent the fan chamber, thereby prolonging the life of the motor.

The above, other and further objects of the present invention will be apparent from the following description and accompanying drawing.

The present invention has been illustrated in connection with a portable suction cleaner such as that illustrated in applicant's Patent 1,868,519, supra.

An embodiment of the present invention is illustrated in the accompanying drawing, and the views thereof are as follows:

Figure 1 is an elevational view of a portable suction cleaner, equipped with a suction motor con-

structed in accordance with the principles of the present invention;

Figure 2 is a top plan view of the cleaner of Figure 1; and

Figure 3 is an enlarged side elevational view, partially in central section, through the fan chamber and a portion of the motor casing of the suction cleaner motor, showing details of one form of the present invention.

The drawing will now be explained.

The portable suction cleaner is illustrated in Figure 1, comprising a tank 1 supported by a plurality of wheels or rollers 2, equipped with a removable lid 3 on which is carried a suction cleaning device including a motor casing 4 and a fan casing 5. Communication between the interior of the tank and the inlet of the fan casing 5 is effected by means of a pipe 6.

The outlet 7 from the motor casing carries a muffler 8 removably secured to it in any suitable manner.

The lid 3 is removably attached to the tank 1, by means of bolts 9 secured at 10 to the tank and engaging ears 11 formed in lugs 12 as integral parts of the lid, with wing nuts 13 on the bolts to be tightened against the ears.

A hose connection 14 is formed as an integral part of the lid 3 and has a tapered end 15 to which a hose may be removably applied.

A handle 16 is secured to the motor casing 4, for ease in handling the suction cleaning device when it is removed from the lid, and also for removing the device from the tank.

Referring to Figure 3, the fan casing 5 receives a fan 16, having a hub 17 which is bored to receive one end of an armature or motor shaft 18. The hub is suitably secured to the shaft to cause rotation of the fan with the shaft.

The outer face of the fan casing is provided with an outturned neck 19 constituting the inlet opening to the fan casing and arranged to cooperate with the pipe 6 for affording communication between the interior of the tank 1 and the fan casing.

The other side of the fan casing is closed by a partition 20 secured between the margins of the fan casing and of the motor casing 4 by suitable bolts 21 spaced peripherally as is common practice. Partition 20 has a central aperture 22 through which the hub 17 of the fan projects. Adjacent the interior of the fan casing the partition is counterbored at 23 to receive a suitable gasket or packing 24 to make a tight joint between the partition 20 and the hub 17.

The adjacent end of the motor casing 4 is

closed by a partition 25 which is formed with an integral hub 26 for receiving a suitable ball bearing, comprising an outer race 27 and an inner race 28, between which races a plurality of balls 29 are interposed in the usual manner. The inner race 28 surrounds the shaft 18 in the usual manner. Between the bearing just described, and the partition 25, the hub portion 26 thereof is counterbored at 30 in which counterbore is inserted a suitable packing 31, and a washer 32 against the bearing races.

The partition 25 is apertured at 33 for the shaft 18.

As the parts are constructed and shown, the diameter of the hub 17 of the fan is greater than the aperture 33 through the partition 25 so that any moisture or dust seeping along the exterior of the hub is spaced from the aperture 33 in the partition 25 about the shaft 18, thus keeping such moisture and dust away from the shaft and preventing its travel into the bearings.

The partitions 20 and 25 are spaced axially to provide an annular space 34 between the fan casing and the motor casing.

The wall 35 which is an integral part of the partition 20 is apertured at 36 to afford communication between the space 34 and the atmosphere.

With the suction device arranged as illustrated in Figure 1, the aperture 36 will be at the bottom of such space, so that any condensed moisture accumulating within the space 34 may escape to the atmosphere.

A suction device as illustrated, when in operation, operates at high speed.

Should any moisture or dust seep from the fan casing along the exterior of the hub 17 of the fan, into the space 34, any pressure on such moisture or dust will immediately be dissipated as the same enters the space 34, as the space is in communication with the atmosphere.

Due to the fact that the diameter of the hub 17 of the fan is greater than the diameter of the aperture 33 in the partition 25, any moisture or dust entering the space 34 along the hub, will be out of alignment with the aperture 33, and thus prevented from having any tendency to travel along the shaft into the bearing.

In the operation of the cleaning device as herein illustrated, any water or other liquid picked up by the hose connected to the inlet 15 will accumulate in the tank 1.

Should any moisture be carried along through the pipe 6 into the fan casing 5, by the suction stream, it is discharged into the muffler 8. The amount of moisture, however, is infinitesimal and is never in such amount as its discharge from the muffler 8 is objectionable.

Should any moisture or dust enter the space 34 by pressure created within the fan chamber 5, any pressure would immediately become dissipated as the space 34 is in communication with the atmosphere. Any moisture or dust therefore, entering the space 34, will fall by gravity through the aperture 36 in the bottom of said space and not foul the shaft bearing carried by the partition 25.

As substantially nothing but air is discharged from the fan casing 5, the muffler 8 is utilized to diffuse such air to prevent turbulence at the muffler outlet and also to reduce any noise that may be incidental to the operation of the suction cleaning device.

The suction cleaning motor construction herein embodied has been found very successful in

commercial application where such devices are used for cleaning wet or damp floors.

The present invention is also useful where the suction device is used for cleaning dry floors, as it prevents access of any dust to the motor shaft bearing.

When used to clean dry material from floors, a dust bag will be substituted for the muffler.

Communication between the interior of the chamber 34 and the atmosphere may be effected by one or more apertures, or by other means, as conditions warrant.

Any dust or moisture entering the chamber 34 along the hub will be thrown by centrifugal force towards the periphery of the chamber and thus kept away from entry to the motor bearing.

Even though the chamber 34 became filled with dust or moisture, no dust or moisture would pass from the chamber to the motor bearing as the chamber is open to the atmosphere.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts, and equivalents may be substituted, without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. In combination in a suction cleaning apparatus, a fan casing having a revoluble pressure-producing fan housed therein, a motor casing having bearings therein, a revoluble shaft extending through said bearings and secured to said fan, means to direct the movement of air-borne moisture from said fan casing away from said bearings, said means comprising a pair of diaphragms retained in spaced opposed relation to define an air chamber therebetween open to atmosphere, one of said diaphragms providing a closure member for said motor casing and the other of said diaphragms providing a closure member for said fan casing, respectively, said shaft being arranged extending through said pair of diaphragms and in said air chamber, and a hub on said fan arranged extending through said other diaphragm and having a peripheral portion in contact with air in said fan casing and another peripheral portion in said air chamber, said hub being arranged to pick up moisture in said fan casing at one air pressure and to discharge it in a direction away from said bearings and at a lower air pressure.

2. In combination, a motor casing, a bearing in said casing, a first diaphragm closing one end of said casing, a revoluble shaft journaled in said bearing and extending outwardly of said casing and through said first diaphragm, a fan secured to the outward end of said shaft and adapted to discharge air-borne moisture under pressure, means to direct air-borne moisture under pressure from said fan away from said bearings, said means comprising a second diaphragm retained in spaced opposed relation to said first diaphragm to define an air chamber therewith open to atmosphere, and a hub on said fan having a peripheral surface in communication with air under pressure and extending through said second diaphragm to communicate with air at atmospheric pressure in said air chamber to discharge moisture in said air chamber in a direction normal to the longitudinal axis of said shaft and away from said bearings.

3. In combination, a motor casing provided with a closure member on one end thereof, a bearing in said casing, a revoluble shaft jour-

naled in said bearing and extending outwardly through said closure member, a fan casing having a fan therein adapted to discharge air-borne moisture under pressure, said shaft being secured at its outward end to said fan, a diaphragm substantially closing one end of said fan casing and disposed in spaced opposed relation to said closure member to define an air chamber therewith open to atmosphere, said diaphragm having its face in said casing exposed to air-borne moisture under pressure, and having its outer face at atmospheric pressure, said shaft having its outward end arranged extending through said diaphragm,

means to direct air-borne moisture against travel along the longitudinal axis of said shaft to protect said bearing against the entrance of moisture thereto, said means comprising a member revolvable with said fan and arranged with a peripheral portion of said member extending through said diaphragm and adapted to expel by centrifugal force, and in a direction normal to the longitudinal axis of the shaft, the air-borne moisture which leaks along said member from the pressure-exposed face to the atmosphere-exposed face of said diaphragm.

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