

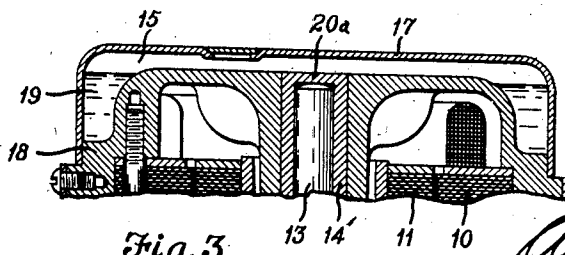
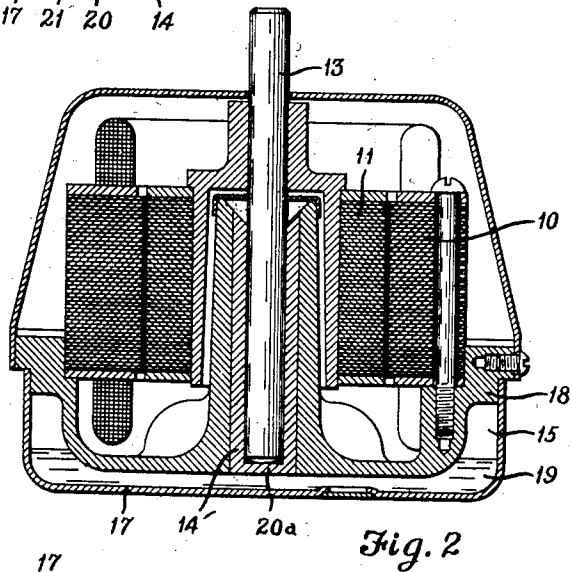
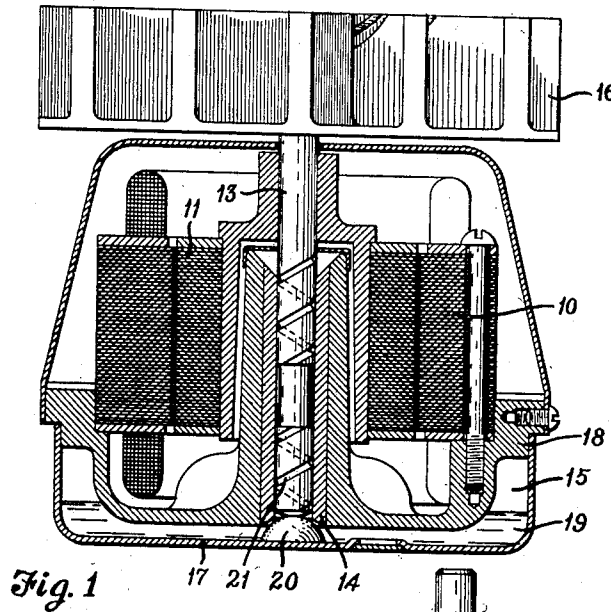
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REFRIGERATION

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REFRIGERATION

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7 Claims. (Cl. 308—168)

This invention relates to a motor for driving a fan or other object.

In a refrigerating apparatus it is desirable to provide a motor for driving a fan, for example, where air is forced over the condenser of the refrigerating system. In household refrigeration, where a refrigerating system is associated with a cabinet, it is sometimes customary to utilize a motor-compressor unit for compressing the refrigerant sealed within a casing, so that no drive shaft passes through the casing. Under such conditions, where it is desired to provide a forced draft over the refrigerant condenser, it is necessary to employ an additional motor for driving a fan to produce the forced draft. The lubrication of such additional motor is a serious problem, since a great advantage to be gained by the sealed motor-compressor unit, above referred to, is that lubrication of the main parts of the refrigerating system is automatically obtained by the circulation of lubricant sealed in with the refrigerant. However, the fan motor is not in the flow path of the refrigerant and associated lubricant and hence must be provided with a localized lubrication system. Under such conditions, it is desirable to provide a lubricant well for the fan motor which can carry a sufficient quantity of lubricant to last during the life time of the refrigerator; but when such well is provided, there is danger that the lubricant will flow out of the well when the refrigerator is being transported, or when the refrigerating system is being assembled on the cabinet.

It is among the objects of this invention to provide a motor, which is particularly useful when associated with refrigerating systems as above described, in which a lubricant well is provided, but in which there is no danger that the lubricant in the well shall be spilled if the motor is tilted to some abnormal position.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a vertical cross-sectional view of a motor embodying features of my invention;

Fig. 2 is a vertical cross-sectional view of a slightly modified form; and

Fig. 3 is a vertical cross-sectional view of a portion of the motor shown in Fig. 2, but in an inverted position.

A motor embodying features of my invention includes, in general, a stator 10, a rotor 11, a drive

shaft member 13, a bearing member 14 for said drive shaft member and a lubricant well 15. The drive shaft member 13, when a motor is associated with a refrigerating system or the like, is provided with a fan or blower 16 which creates a forced draft. In the preferred embodiment, the well 15 is provided with a flat bottom 17 which forms a stand for the well and motor, and a frame 18 is provided which extends into the lubricant 19 in the well 15, and this frame carries the stator 10, rotor 11, drive shaft member 13 and bearing member 14. A thrust bearing 20 or 20a may be provided, and this bearing may be carried either by the well 15 as shown in Fig. 1, or by the bearing member 14 as shown in Figs. 2 and 3.

Corresponding parts in the modification shown in Fig. 1 or in Figs. 2 and 3 have been similarly numbered. In the modification shown in Fig. 1, the lubricant from the well 15 is forced upwardly along the bearing surfaces between the drive shaft 13 and the bearing 14 by means of a screw thread 21 which carries a sufficient quantity of lubricant to provide the necessary lubrication. In the modification shown in Figs. 2 and 3, the bearing member 14' may be made of any of the well-known porous metal graphite materials, such for example, as are described in the patents to Williams et al., Nos. 1,642,347; 1,642,348 and 1,642,349 patented September 13, 1927. Since the bearing member 14' shown in Figs. 2 and 3 extends below the normal lubricant level, a sufficient quantity of lubricant is absorbed by the bearing member 14' to maintain the necessary lubrication between this member and the drive shaft member 13.

When the motor shown in either Fig. 1 or Fig. 2 is tilted, so as to place the drive shaft member 13 and bearing member 14' in a direction which slopes downwardly from the well, so that, without the advantages of my invention, there would be danger of spilling the lubricant, according to my invention the well is so proportioned that the lubricant level changes to a position so that it cannot flow along the bearing surfaces of the members because the new lubricant level is below one or the other of the members 13 or 14' as shown in Fig. 3. However, under normal operation where the motor is in its normal position, the lubricant level is such that one or the other of the members 13, 14' extend below the lubricant level and thus provide the necessary lubrication as shown in Figs. 1 and 2.

It will be seen that by this construction a very efficient lubrication is provided for the motor,

and that a large quantity of lubricant is available for an extremely long period of time, and that the danger of spilling lubricant is entirely obviated.

5 While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

10 What is claimed is as follows:

1. In a permanently lubricated vertical axis motor, in combination, a stationary part and a rotary part, said stationary part being secured to a stationary mounting and said rotary part 15 being adapted to drive a load device exposed to the atmosphere, a vertically disposed bearing for said rotary part having an entrance for lubricant adjacent the lower end thereof and exposed to the atmosphere at the upper end thereof, a lubricant reservoir sealed from the atmosphere except through said bearing and extending above and below said entrance for lubricant, said reservoir and the amount of lubricant therein being 20 proportioned to main the lubricant level above said entrance for lubricant only while the motor is positioned with the exposed end of the bearing above said entrance for lubricant whereby loss of lubricant through said bearing is prevented when the motor becomes inverted.

2. In a permanently lubricated vertical axis motor, in combination, a stationary part and a rotary part, said stationary part being secured to a stationary mounting and said rotary part 25 being adapted to drive a load device exposed to the atmosphere, a vertically disposed bearing for said rotary part having an entrance for lubricant adjacent the lower end thereof and exposed to the atmosphere at the upper end thereof, a lubricant reservoir extending above and below said 30 entrance for lubricant, said reservoir and the amount of lubricant therein being proportioned to maintain the lubricant level above said entrance for lubricant only while the motor is positioned with the exposed end of the bearing above 35 said entrance for lubricant whereby loss of lubricant through said bearing is prevented when the motor becomes inverted.

3. A motor-blower unit comprising a cup having a shaft extending through the top of said 40 cup, a blower on said shaft above said cup, a motor in said cup drivingly connected to said shaft, a lubricant reservoir in said cup, a bearing for said shaft in said cup, said bearing being the sole bearing for said shaft and extending 45 into said reservoir, said reservoir being so shaped

that lubricant therein can not spill from said cup when tilted or inverted.

4. A motor-blower unit comprising an outer cup having an opening to the atmosphere at its 5 upper end, a bearing aligned with said opening and extending throughout the major vertical extent of said cup, a motor stator surrounding said bearing, a motor rotor surrounding said bearing and having a shaft in said bearing and extending 10 out through said opening, a blower supported solely on said shaft outside said cup, said bearing being supported in said cup by a smaller cup, lubricant in said outer cup below said smaller cup and extending to said bearing, said smaller cup forming an oil retaining barrier when said 15 unit is tilted or inverted.

5. A motor-blower unit comprising a motor stator frame in the form of a cup having an upwardly extending central bearing and radially extending flange, a lower cup secured to said 20 flange, an upper cup secured to said flange, said upper cup having an opening therein, a shaft extending through said opening and into said bearing, a carrying fan outside said upper cup, a motor rotor secured to said shaft inside said 25 upper cup and surrounding said bearing, and lubricant in said lower cup extending to said bearing and being sealed against spillage when said unit is tilted or inverted.

6. In a motor, a frame structure, bearing means 30 provided in the frame structure, a drive shaft supported by the bearing and extending outwardly of one end of the frame structure, a motor stator mounted on the frame structure, a motor rotor operatively connected to the outwardly extending portion of the drive shaft for driving 35 the same, sealing means cooperating with the frame structure for providing a lubricant reservoir at the opposite end of the drive shaft, and means for preventing the escape of lubricant from the end of the shaft to which the motor rotor 40 is connected.

7. In a motor for driving a device, a frame structure, bearing means provided in the frame structure, a drive shaft supported by the bearing 45 means, a motor stator mounted on the frame structure, a motor rotor operatively connected adjacent one end of the drive shaft for driving the same, said drive shaft overhanging the frame structure at the rotor end for driving the device, 50 means forming with the frame structure a sealed lubricant reservoir at the opposite end of the drive shaft, and means for preventing escape of lubricant from the overhanging end of the drive shaft.

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