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A. R. CONSTANTINE

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AIR CIRCULATING BLOWER

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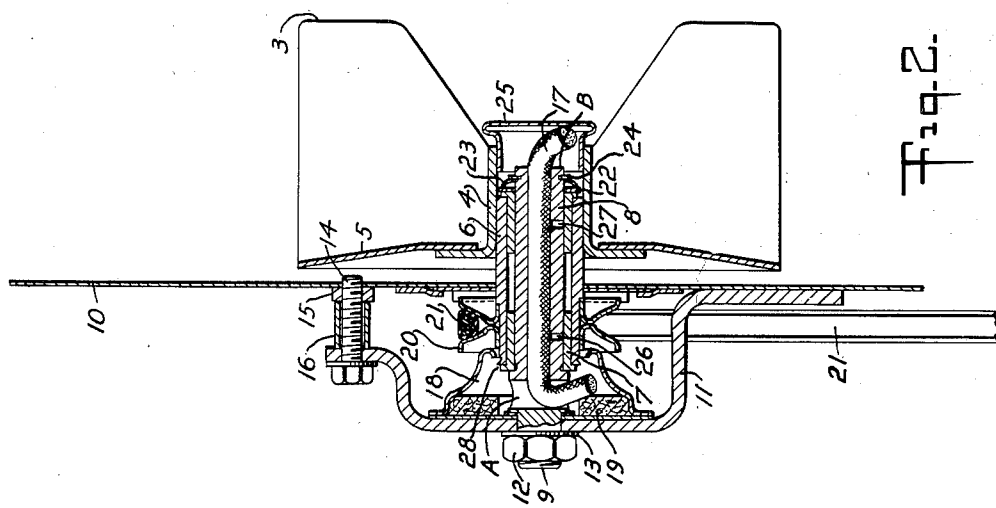


Fig. 1-

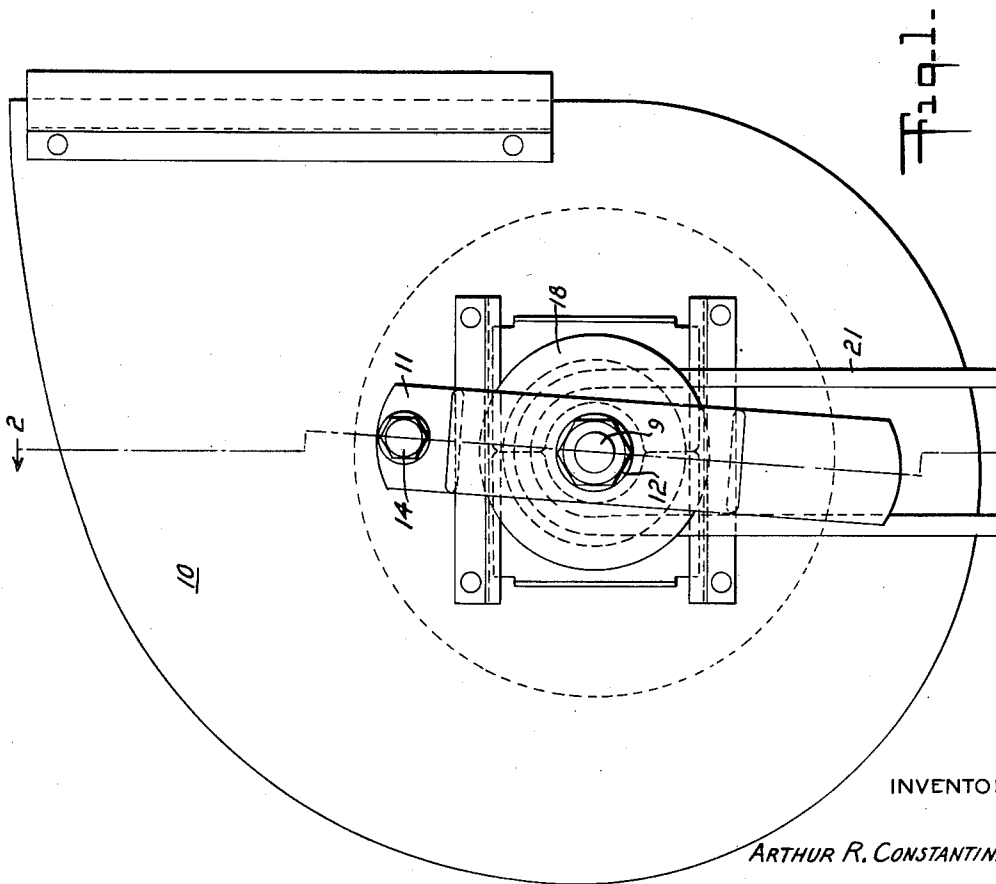


Fig. 2-

INVENTOR

ARTHUR R. CONSTANTINE

BY

M. W. Green
ATTORNEY

UNITED STATES PATENT OFFICE

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AIR CIRCULATING BLOWER

Arthur R. Constantine, South Bend, Ind., assign-
or to Bendix Home Appliances, Inc., South
Bend, Ind., a corporation of Delaware

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4 Claims. (Cl. 230—207)

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This invention relates to an air circulating blower and the mechanism illustrated is particularly adapted to be used with a clothes drying machine.

In the construction of a blower for use in circulating air where it is necessary that the air handled by the blower shall be free from oil particles, and where the blower must rotate at a relatively high rate of speed, special consideration must be given to the type of bearing employed for the rotating part of the blower since it is necessary that satisfactory lubrication be provided together with satisfactory sealing of the bearing and particularly the portion thereof which extends into the air stream.

In the type of blower under consideration the rotating fan or impeller portion extends into a housing and the assembly is rotated and supported from the outside of the housing.

It is a primary object of this invention to provide a bearing supported on the outside of a housing and extending into the housing with means to circulate lubricant to all parts of the bearing without allowing leakage therefrom.

The above and other objects of the invention will appear more fully in the following more detailed description and by reference to the accompanying drawings forming a part hereof and wherein:

Figure 1 is a view of the blower and drive showing the manner in which the blower and bearing are attached for support and the manner in which the supporting bracket is secured to the blower housing.

Figure 2 is a sectional view of the blower the section being taken longitudinally through the center of the drive shaft.

Referring to the drawings, a plurality of blades 3 shown in Figure 2 are attached to a flanged member 4. The flange on the member 4 serves to secure it to the blower wheel 5. A tubular member 6 fits inside and is attached to the flanged member 4, this member 4 fitting over the outside of tubular member 6 in integral sealed relationship therewith. Two bearings 7 and 8, which surround a shaft 9, are carried in the tubular member 6 and rotate with it and permit freedom of rotation of the blower wheel assembly about the shaft 9 which remains stationary. A blower housing plate 10 is provided with a circular hole of sufficient diameter to allow the insertion of the tubular member 6 which encloses the shaft 9. Support for the end of shaft 9 is furnished by a mounting bracket 11 with threads on the end of the shaft 9 permitting it to be secured to the bracket 11 by the check nut 12 which is tightened against the lock washer 13. The bracket 11 is formed by bending a strip of metal, the lower end of which is attached to blower housing plate 10 by welding, and the upper end of which is attached to the blower housing plate 10 by a screw 14 which screws into a projection weld 15 on the

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face of the blower housing plate 10. A spacer 16 surrounds the screw 14 and is intended to hold the upper end of the bracket 11 at a sufficient distance from the blower housing plate 10. Cantilever support of the entire blower wheel assembly is thus provided from the bracket 11 through its support of the end of shaft 9.

The shaft 9 is provided with a hollow center extending horizontally through the greater part of its length, and with a hole at right angles to the hollow center which is bored at point A on the shaft just inside the bracket. This hollow center is designed to contain a felt oil wick 17 which protrudes through the end of the shaft at point B and through the vertical hole in the shaft at point A. In order to keep the oil wick 17 saturated at all times an oil reservoir assembly 18 surrounds the shaft 9 at a point just inside the mounting bracket 11. Inside the oil reservoir 18 and surrounding the shaft 9 is a felt washer 19 which is saturated with oil and with which one end of the oil wick 17 is in continual contact.

Mounted on the tubular member 6 at a point outside of and adjacent to the blower housing plate 10 is a pulley 20 which is rotated by a belt 21.

In order to retain the blower wheel assembly 5 and tubular member 6 on the shaft 9 a flange 22 is provided on bearing 8 which is retained by a spring washer 23 and a snap ring 24 which fits in a groove cut around the end of the shaft 9.

A sealing cap 25 fits inside the flanged member 4 and seals the end of the unit so that there are no openings where oil can escape or lint can enter the bearing from the inside of the blower housing. The seal of member 25 is carefully made preferably both by close fit and hardening sealing agent. In effect the shaft 9 supported from the outside end on bracket 11 extends into the housing and tubular member 6 carrying bearings 7 and 8 fits over the shaft 9 and has its outer end sealed. The wick 17 is of sufficient length to bend as shown in Figure 2 to contact the sealing cap 25 on its inside surface at a point definitely outside the center of rotation of the cap 25. Such contact on rotation of cap 25 will assist flow of oil from the end of wick 17.

Thus it is apparent that for the portion of the assembly which extends inside the blower housing a completely sealed in system of lubrication is provided. Before the unit is assembled the oil wick 17 and the felt washer 19 are saturated with oil. A small hole 26 in the shaft 9 connects the hollow center of the shaft with the bearing 7, and a similar hole 27 in the shaft 9 connects the hollow center of the shaft with the bearing 8. Oil travels along the wick 17 carried in the hollow center of shaft 9 and runs down the holes 26 and 27 thus providing continual lubrication for the bearings 7 and 8.

The end of the tubular member 6 which extends inside the oil reservoir assembly 18 is provided

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with a sharp edge 28 which is designed as an oil slinger to throw the excess oil returning from the bearings 7 and 8 against the felt washer 19 where it will be absorbed. The end of the tubular member 6 is also provided with a groove adjacent to the edge 28, which groove prevents the oil creeping back toward the blower wheel 5. Although it is extremely unlikely that any oil could escape from the reservoir assembly 18, nevertheless, if this should happen due to an excess of oil added before assembly, the outside face of the pulley 20 is curved outwardly in order to act as a secondary slinger to throw any excess oil in a direction away from the blower wheel 5, thus affording an additional preventative measure to preclude the possibility of any oil flowing into the blower housing from the outside end.

In operation the tubular member 6 carrying the fan blades 3 is rotated from the belt 21 and pulley 20 as shown. The supporting shaft 9 carries the wick 17 and this wick 17 extends downwardly at each end and at the outer end extends against the sealing cap 25, as previously mentioned, at a point outside the center of rotation, so that the tendency on rotation is for the centrifugal force to act on the oil at the end of the wick 17 and to throw the oil outward thus assisting oil circulation from the end of the wick 17. Inasmuch as the oil which is collected at the end of the wick 17 near the sealing member 25 gradually finds its way backward along the bearings 7 and 8 carried inside the tubular member 6, the result is a continuous circulation of oil through the wick 17, induced both by capillarity in the wick 17 and centrifugal force on the oil at the end of the wick, thus bringing oil to the inside of the sealed end 25 and back through the bearings 7 and 8 to the oil slinger edge 28 on the end of the tubular member 6 and into reservoir 18 to be absorbed by washer 19 and again picked up by the end of wick 17 to start the circulation over again. Because of the sealed end made up of members 4 and 25, however, oil cannot leak out into the blower housing although satisfactory circulation of oil in all parts of the bearing assembly is assured.

Inasmuch as under normal conditions there is no way in which oil can escape from the lubricating system, and there is no opening in the blower housing through which lint or dirt can enter, this unit is capable of continuous operation over a very long period of time without the necessity of supplementing the oil supply. This naturally results in less need for servicing and a reduced cost of upkeep.

Although this invention has been described in considerable detail, it is not intended to limit the scope of the invention by those details or otherwise than by the terms of the appended claims.

I claim:

1. In a blower having a housing for directing air circulation of said blower, a support shaft supported outside said housing and extending into said housing, a tubular member carrying said rotatable member and extending over said shaft and having an end thereof sealed, a sharp edge oil slinging portion on said tubular member on the end thereof extending outside said housing, an oil reservoir surrounding said sharp edged portion, a wick extending through a hollow central portion of said shaft from said reservoir to contact said sealing member at a point away from the center of rotation of said tubular member whereby oil circulation from said reservoir through said wick to the outer end of said shaft adjacent said tubular member is induced on rotation of said

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tubular member and oil returning to said sharp edge oil slinging portion is returned to said reservoir on rotation of said tubular member.

2. In a blower having a housing for directing air circulation, a rotatable member inside the housing of said blower, a support shaft supported outside said housing and extending into said housing, a tubular member carrying said rotatable member and extending over said shaft and having an end thereof inside said housing sealed, an oil circulating system for carrying oil from outside said housing into and out of said sealed tubular member comprising a wick extending through the hollow central portion of said shaft and contacting a rotating portion of the interior of said sealed end at position away from the center of rotation whereby flow of oil from the end of said wick is assisted by centrifugal force.

3. In a blower having a housing for directing air circulation, a non-rotatable hollow shaft which projects inside said housing through an opening provided therein, a cylindrical bearing carrying member which surrounds said shaft, said cylindrical member being closed at the end which extends inside said housing and open at the opposite end which is outside said housing, a fan wheel mounted upon said cylindrical member at its closed end, an absorbent wick which is saturated with lubricant and inserted inside the hollow center of said shaft, an oil reservoir assembly which surrounds said shaft and said cylindrical member at its open end outside the housing, an opening in said hollow shaft allowing said absorbent wick to protrude into said oil reservoir, conduits comprising transverse holes in said shaft which conduct oil from said wick inside said shaft to said bearings, an oil slinger which comprises a sharp edge on the end of said cylindrical member which is enclosed in said oil reservoir assembly, an absorbent member inside said oil reservoir which absorbs oil thrown off by said slinger.

4. In a blower of the type described which is adapted to rotate about a fixed shaft supported at one end and having a hollow center, a cylindrical bearing member which surrounds said shaft, said cylindrical member being sealed at one end and open at its opposite end, a blower wheel mounted on said cylindrical member adjacent its closed end, an absorbent wick which is saturated with lubricant and inserted inside the hollow center of said shaft, an oil reservoir assembly which surrounds said shaft and said cylindrical assembly at its open end, an opening in said hollow shaft permitting said absorbent wick to protrude into said oil reservoir, an oil slinger which comprises a sharp edge on the end of said cylindrical member which is enclosed in said oil reservoir assembly, an absorbent member inside said oil reservoir which absorbs oil thrown off by said slinger.

ARTHUR R. CONSTANTINE.

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