

Aug. 11, 1936.

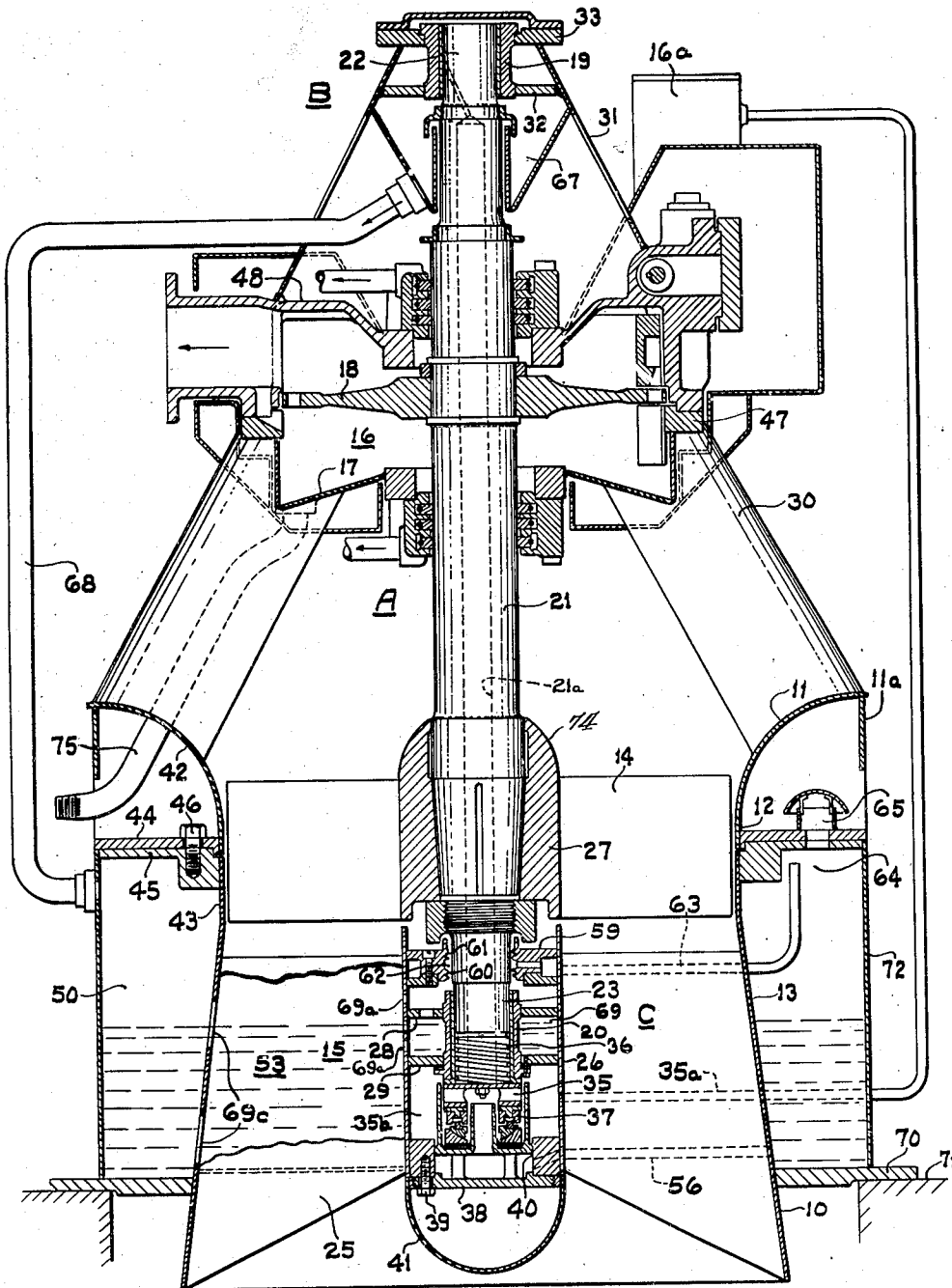
H. F. SCHMIDT

2,050,385

BLOWER

Filed May 25, 1935

2 Sheets-Sheet 1



WITNESSES:

E. Lutz
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FIG. 1.

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2 Sheets-Sheet 2

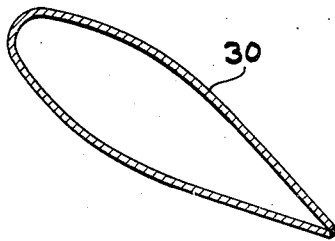


FIG. 2.

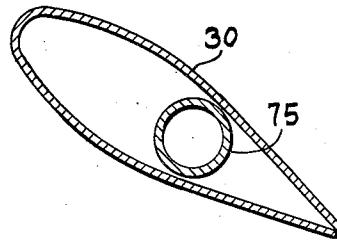


FIG. 3.

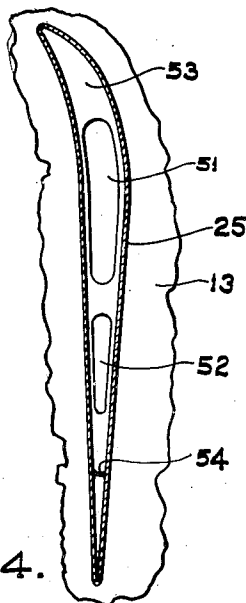


FIG. 4.

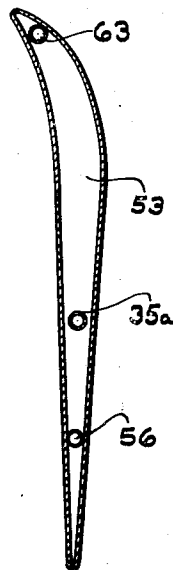


FIG. 5.

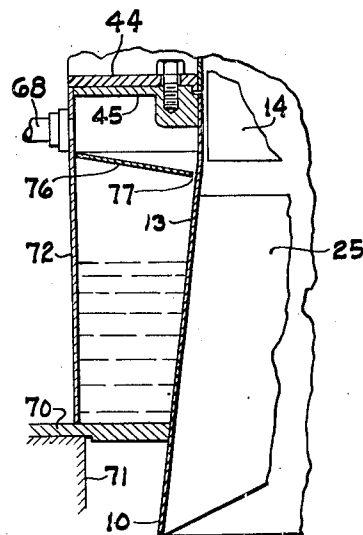


FIG. 6.

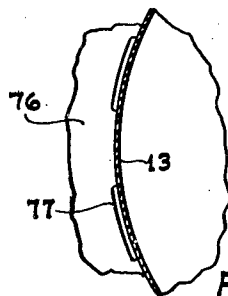


FIG. 7.

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UNITED STATES PATENT OFFICE

2,050,385

BLOWER

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Pennsylvania

Application May 25, 1935, Serial No. 23,342

15 Claims. (Cl. 230—116)

My invention relates to propeller blowers and it has for an object to provide apparatus of this character wherein the structure at the discharge side of the propeller is limited to guide vane structure in order that the housing may be readily arranged to discharge into a closed space or duct.

A further object of my invention is to provide a propeller blower wherein the motor device for driving the propeller is supported from the inlet end of the blower housing and a bearing for the blower spindle is carried by the guide vane structure at the discharge side of the propeller.

A further object of my invention is to provide improved lubricating means for apparatus of this character wherein the blower housing constitutes a wall of the lubricant reservoir in order that air translated by the propeller may be used to cool the lubricant.

A further object of my invention is to provide a propeller blower having hollow guide vanes with the hollow spaces used for any suitable purpose.

Heretofore, it has been common practice in the application of blowers to marine fire rooms, to maintain the latter under super-atmospheric pressure, to have the motor or turbine driving the propeller depending therebelow and in the fire room. In marine applications where it is desired to isolate the propeller blower discharge from the room proper so that the discharge enters ducts going to the various boilers or chambers, it is undesirable to have depending operating structure such as pointed out. Therefore, in accordance with the present invention, no structure depends below the blower housing, the lowermost structure thereof being the housing and the guide vanes therein. In this arrangement, the motor or turbine is supported from the inlet end of the housing in such manner that free ingress of air to the propeller is permitted. With the guide vane structure carried by the housing at one side of the propeller and the motor or turbine carried by the housing at the other side, it will be apparent that the structure affords a very effective arrangement for the support of the bearings, a common spindle being employed for the rotor of the motor and for the propeller and having terminal journal portions which fit the bearings carried by the stator of the motor and by the guide vane structure. Accordingly, it will be seen that I have provided a highly effective type of blower wherein the discharge end of the housing is left free for attachment to a suitable duct or space without any interference on the

part of the motor or turbine and the necessary means for supporting the latter. With a blower constructed in this manner, several other advantageous features may be incorporated. A jacket may encompass the housing to provide a lubricant reservoir, this being advantageous in that air translated by the propeller is effective to cool oil in the reservoir. Furthermore, the guide vane structure may include hollow guide vanes, and some of the hollow spaces may communicate with the reservoir so as to constitute portions of the latter. Other hollow spaces of guide vanes may be used for the accommodation of any suitable conduits. Lubricant is pumped from the reservoir to the bearings and drainage lubricant is returned to the reservoir. Another feature of the invention is the provision of a seal between the bearing carried by the guide vane structure and the hub of the propeller, the seal being furnished with air so that the centrifugal pumping effect of the propeller hub, is satisfied by air instead of by lubricant drawn along the spindle and toward and into the propeller. A further object of my invention, therefore, is to provide apparatus having these advantageous features of construction and arrangement.

A further object of my invention is to provide a blower which is strong, stiff, and light and one having bearings so disposed as to be highly effective to support the spindle and resist vibration.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a vertical sectional view of my improved blower;

Figs. 2 and 3 are sectional views of legs for supporting the motor stator;

Figs. 4 and 5 are sectional views of hollow guide vanes;

Fig. 6 is a detail view showing a modified form of lubricant reservoir; and—

Fig. 7 is a detail view showing the lubricant distributor plate of Fig. 6.

Referring now to the drawings more in detail, I show a blower housing 10, preferably vertical, including a converging portion 11, a throat portion 12, and a diverging portion 13. A propeller 14 is arranged in the throat portion. Guide vane structure, at 15, is supported interiorly of the diverging portion 13 of the housing at the discharge side of the propeller. A motor device or turbine, at 16, is provided for driving the propeller; the

motor device including a stator 17 and a rotor 18. A bearing 19 is supported by the stator, preferably from the side of the latter remote from the propeller, and a bearing 20 is carried by the guide vane structure. A spindle 21 carries the rotor 18 and the propeller 14 and it has journal portions, for example, terminal journal portions 22 and 23, fitting the bearings 19 and 20, respectively. Thus, it will be seen that the blower spindle is supported by bearings arranged at opposite ends thereof and that the portion of the spindle between the bearings is used to carry the propeller and the rotor of the driving motor, whereby a very rigid and steady structure results.

Referring to the guide vane structure more in detail, it will be seen that it is comprised by a plurality of guide vanes 25 having their outer radial ends connected, preferably by welding, to the interior diverging surface of the diverging portion 13 and having their inner radial ends connected, preferably by welding, to a cylindrical tubular element 26, which is approximately of the same outer diameter as, and in alignment with, the hub 27 of the propeller. The bearing 20 is supported in any suitable manner from the interior of the tubular member 26, for example, I show plate elements 28 and 29 serving this purpose. By having the guide vanes made hollow, not only may they have a desirable cross section and provide a strong and stiff support for the sleeve 26, but the interior spaces thereof may be utilized advantageously.

Referring now to the manner of supporting the motor or turbine, at 16, from the upper end of the housing 10, I show a plurality of upwardly-converging legs 30 serving this purpose, the legs preferably being hollow for the purpose of strength and lightness and being of such cross-section and so disposed, that is, streamlined, as to offer minimum interference with ingress of air to the propeller. Preferably, the lower ends of the legs 30 are welded to the diverging portion 11 and the upper ends thereof are shaped to fit the stator and are preferably welded to the latter, the rounded diverging portion 11 being reinforced, stiffened and strengthened by the flange 11a encompassing the housing and attached thereto adjacent the inlet end of the diverging portion. A conical member 31, preferably made of plate material, has its larger end welded to the stator and its smaller end is arranged to support the bearing 19, preferably by radial plate elements 32 and 33.

Referring now to the means providing for lubrication of the bearings 19 and 20, the lower end of the spindle 21 is arranged to operate suitable pumping means of the impeller type, at 35, and of the viscosity type, at 36, these pumping devices being more particularly described and claimed in my application, Serial No. 734,093, filed July 7, 1934, now Patent 2,030,611 of Feb. 11, 1936. The pumping devices supply the bearing 20 directly, and the bearing 19 by means of the shaft bore 21a. The impeller device also furnishes lubricant under pressure, by means of the conduit 35a to suitable governing apparatus 16a for the motor or turbine. As shown, the pumping devices are arranged within the central sleeve 26 of the guide vane structure and the impeller of the impeller pumping device constitutes a thrust collar cooperating with thrust bearing elements 37 carried internally of the sleeve 26 and supported by the lower end of the latter.

As more fully described in my application, Serial No. 734,093, filed July 7, 1934, the viscosity

and impeller pumping devices as well as the thrust bearing are preferably inserted after insertion of the spindle. To this end, as shown in Fig. 1, the lower end of the sleeve 26 has a supporting cap 38 connected by screws 39 to the lower end of the sleeve 26. Assuming that the spindle journal portion 23 is inserted in the bearing 20, then the impeller and thrust bearing structure may be assembled through the opening 40 from the lower end, after which, with the parts in proper position, the cap 38 may be fastened in place. Preferably, a rounded or fairing member 41 covers the cap 38.

Reference has already been made to the assembly of the spindle in place with respect to the bearing 20 and it remains to be seen how the spindle aggregate including the spindle carrying the rotor and the propeller is assembled with respect to the housing structure as a whole. For this purpose, the housing is made in upper and lower parts 42 and 43 connected to radial flanges 44 and 45, respectively, the flanges being secured together in any suitable manner as by means of screws 46. The upper housing part 42, the legs 30 and the lower part 47 of the stator constitute an intermediate structure A, while the upper part 48 of the stator and the conical member carrying the upper bearing constitute an uppermost structure B, the lower housing part 43 with the guide vane structure and other connected parts constituting the lowermost housing structure C. To assemble the apparatus, the spindle is brought into proper relation with respect to the bearings 19 and 20 after which the intermediate, lowermost and uppermost stationary or housing structures A, B, and C are secured together.

The lubricant circulating means or pumping devices are supplied with lubricant from a reservoir 50, preferably encompassing the housing 10; and, as the housing constitutes the inner wall of the reservoir, it will be apparent that air translated by the propeller will cool the oil in the reservoir. The advantage of cooling in this way may be even more effectively realized by utilizing a space or spaces of one or more hollow guide vanes for this purpose. To this end, in Fig. 4, I show the diverging portion 13 having one or more openings 51 and 52 affording access between the hollow space 53 of the guide vane 25 and the interior of the reservoir 50. Preferably, a partition 54 is arranged to provide a bottom for the interior guide vane reservoir space. In addition to guide vane hollow spaces serving to facilitate cooling of oil, such spaces may be used to accommodate conduits for various purposes to be pointed out.

Referring to Fig. 5, it will be seen that the hollow space 53 of the guide vane accommodates a conduit 56 for supplying lubricant from the reservoir 50 to the impeller pumping device 35. Also, the space may be used to accommodate the conduit 35a for the hydraulic governing apparatus 16a.

With apparatus of this kind, where the hub 27 of the propeller is arranged adjacent to stationary structure, an appreciable centrifugal pumping effect is present; and, unless opposing measures are taken, this pumping effect would cause lubricant to be drawn from the lower bearing 20 along the spindle and into the propeller and be mixed with the air translated by the latter. To avoid wastage of oil in this manner, as well as the nuisance of contamination of the air and surfaces with oil, I provide a seal 59 between the bearing 20 and the propeller hub 27, the seal

59 being in the form of an annular member fitting the interior of the tube 26 and having annular sealing portions 60 and 61, which are spaced apart axially to provide an annular air chamber 62, the annular chamber 62 being supplied with air by means of a conduit 63 from the upper portion 64 of the reservoir 50, it being understood that the quantity of oil is insufficient to fill the reservoir. Ambient air pressure is maintained in the upper portion of the reservoir in any suitable manner, for example, the drainage pipe 68 may serve this purpose, or a vent 65 may be provided. Thus, it will be seen that air is supplied by means of the conduit 63 from the upper portion 64 of the reservoir to the air chamber 62, the air supplied thereto satisfying the centrifugal pumping tendency, whereby all centrifugal pumping effect on lubricant is avoided. Preferably, the conduit 63 is arranged within the hollow space of a guide vane.

Lubricant draining from the upper bearing preferably collects in a chamber 67 and is drained, by means of a conduit 68, to the upper portion of the reservoir 50.

As shown in Fig. 1, the space 69 about the bearing 20 is effectively sealed from the pressure chamber 35b for the impeller 35, the space 69 constituting a portion of the reservoir in that communication is afforded through openings 69a, the hollow guide vane space 53 and an opening or openings 69c to the main reservoir 50.

While the blower may be supported from a suitable structure, such as the deck of a ship, in any desired manner, I prefer to have the diverging portion of the housing 13 provided with an outwardly-extending supporting flange 70 connected thereto, the flange resting on and being secured to supporting structures 71. With the flange 70 connected to the housing as shown in Fig. 1, it will be seen that it is connected to such housing within the longitudinal extent of the guide vane zone of the blower structure, whereby a relatively very stiff portion of the blower structure is connected to such flange. Furthermore, with the flange 70 positioned, as shown, it functions as a bottom for the oil reservoir 50. Additional strength and rigidity may be afforded by the outer wall 72 of the oil reservoir, such outer wall being connected at its upper end to the outer periphery of the flange 45 and at its lower end to the top surface of the flange 70.

The upper end of the propeller hub is alined or tapered, as indicated at 74; and, as the sleeve 26 aligns with the hub 27 and extends substantially for the length of the divergent portion 13, it will be apparent that the blower has an annular, convergent-divergent passage, the convergent portion of the passage being defined between the convergent portion 11 of the casing and the hub end surface 74 and the divergent portion of the passage being defined between the sleeves 26 and the divergent portion 13 of the casing. The propeller vanes 14 are arranged in the throat portion of the annular convergent-divergent flow passage.

From the foregoing, it will be apparent that I have devised a blower structure, which, not only has the advantage that the discharge end of the housing may be conveniently connected to any suitable conduit or passage, but the structure is inherently rigid, stiff, light, and strong. Also, the structure is so arranged as to give very effective support for the spindle, the spindle having terminal journal portions fitting bearings carried by the stationary structure and supporting the

motor rotor and the propeller between the bearings.

Referring now to the features contributing to strength, rigidity, stiffness, and lightness, it will be noted that the housing 10 is of such form, namely, convergent-divergent tubular structure, that it is inherently strong and stiff in all directions and relatively very light. In addition, the stiffness, strength, and rigidity of the housing 10 are aided by the guide vane structure, at 15, and by the cylindrical flange 11a encompassing the housing and attached to the converging portion 11 adjacent to the inlet edge thereof, as well as by the effect of the outer wall 72 of the lubricant reservoir. The guide vane structure is especially strong and stiff in all directions and relatively light because of the cross-sectional shape and the hollow construction of the guide vanes. In addition to these features giving strength, rigidity, and lightness to the blower housing, it will be noted that such housing is supported in a very effective manner, the supporting flange 70 thereof preferably being attached to the housing within the longitudinal extent of the guide vane region. The convergent portion 11 and the reinforcing and encompassing cylindrical flange 11a attached thereto provides a rigid, strong, and stiff foundation for the legs 30 having their lower ends attached thereto and converging upwardly for attachment to the lower portion 47 of the stator structure, the upper portion 48 of the stator structure having the larger end of the hollow cone 31 connected thereto and the upper bearing 19 being carried by the smaller end of the cone. As the legs 30 converge toward the stator and as such legs are tubular or hollow, it will be apparent that a relatively very rigid, light, and strong supporting structure is provided both for the stator and for the upper bearing 19. Not only are the legs made hollow for these reasons, but also they are so shaped in cross-section, as shown in Figs. 2 and 3, as to offer minimum resistance to ingress of air to the propeller. Furthermore, if desired, the hollow spaces may be used to accommodate any suitable part or parts, for example, the drain pipe 75 in Fig. 3. The structure as a whole provides a relatively stiff, light, and strong framework for supporting the upper and the lower bearings 19 and 20, whereby the spindle with the rotor 18 and the propeller 14 carried thereby and arranged between the bearings may rotate at relatively high speeds without noticeable vibration. Furthermore, the advantageous features just referred to also cooperate to provide for lubrication as well as cooling of the lubricant. The structure of the lubricant reservoir reinforces the blower housing; and, as walls of the lubricant reservoir are constituted in part by the housing and by one or more guide vanes, lubricant will be effectively cooled by air translated by the propeller. The hollow guide vanes also function to provide for accommodation of any suitable conduits, such as the inlet conduit for the lubricant conveying means, the lubricant pressure conduit for the governor, and the air supply conduit for the sealing device.

In Fig. 6, I show means for improving the transfer of heat from the lubricant to the air or medium translated by the propeller. Instead of having the lubricant returned directly to the body thereof in the reservoir 50, as shown in Fig. 1, such lubricant is directed, by a drain plate 76 in Fig. 6, inwardly toward the diverging portion 13 of the housing; and the plate 76 is formed with arcuate recesses 77 adjacent to the exterior

of the diverging portion, the recesses providing for filming of lubricant along the exterior of the diverging portion before joining the main body of lubricant in the reservoir, whereby heat is

transferred from the lubricant in the film stage. While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:—

1. In a blower, a housing having a convergent portion joined by a throat portion to a divergent portion, a propeller in the throat portion and having a hub, a guide vane structure at the discharge side of the propeller and including hollow guide vanes having their outer radial edges secured to the interior of the divergent portion of the housing and having their inner radial edges joined to a central cylindrical sleeve aligned with the hub, a motor including a stator and a rotor, a plurality of hollow legs joined at one end to the convergent portion of the housing and converging toward and joined at the other end to the stator, whereby the stator is supported from the convergent portion, said legs being streamlined in cross-section to promote ingress of media to the propeller, a first bearing, a hollow cone having its larger end joined to the side of the stator remote from the propeller and having its smaller end supporting the first bearing, a second bearing supported within said sleeve, and a spindle carrying the rotor and the propeller and having terminal journal portions fitting the bearings.

2. In a vertical blower, a vertically disposed housing, a propeller in the housing, a guide vane structure at the lower side of the propeller and supported from the interior of the housing, a motor above the propeller and including a stator and a rotor, means for supporting the motor from the housing and providing for ingress of media to the propeller, an upper bearing carried by the upper side of the stator, a lower bearing carried by the guide vane structure, a spindle carrying said stator and propeller having terminal journal portions fitting the upper and the lower bearings, and means providing for lubrication of the bearings and including a lubricant reservoir, said housing providing a wall for the reservoir in order that air translated by the propeller may cool oil in the reservoir.

3. In a blower, a housing, a propeller in the housing and having a hub, a guide vane structure at the discharge side of the propeller and including guide vanes having their outer radial edges secured to the interior of the housing and having their inner radial edges joined to a central sleeve aligned with the hub, a motor including a stator and a rotor, means for supporting the stator from the inlet end of the housing and providing for ingress of media to the propeller, a first bearing carried by the stator, a second bearing supported within said sleeve, a spindle carrying the rotor and the propeller and having journal portions fitting the bearings, a supporting flange for the blower joined to the exterior of the housing at the guide vane region thereof, and means providing for lubrication of the bearings and including a wall cooperating with the housing and with said supporting flange to provide a lubricant reservoir.

4. In a vertical blower, a vertically disposed housing, a propeller in the housing, a guide vane structure at the lower side of the propeller and supported from the interior of the housing, a motor device positioned above the propeller and including a stator and a rotor, means for supporting the stator from the upper end of the housing and providing for ingress of air to the propeller, an upper bearing carried by the stator, a lower bearing carried by the guide vane structure, a spindle carrying said rotor and propeller and having journal portions fitting the upper and the lower bearings, means cooperating with the housing to provide a main lubricant reservoir portion, said guide vanes being hollow and one or more of the hollow spaces thereof being in communication with the main reservoir portion so as to constitute other portions of the reservoir, means operated by the spindle for conveying lubricant from the reservoir to the upper and the lower bearings, and means providing for the return of lubricant drainage to the reservoir.

5. In a vertical blower, a vertically disposed housing, a propeller in the housing, a guide vane structure at the lower side of the propeller and supported upon the interior of the housing, a motor device positioned above the propeller and including a stator and a rotor, means for supporting the stator from the upper end of the housing and providing for ingress of air to the propeller, an upper bearing carried by the stator, a lower bearing carried by the guide vane structure, a spindle carrying said rotor and propeller and having journal portions fitting the upper and the lower bearings, means cooperating with the housing to provide a lubricant reservoir whose inner wall is constituted by the housing, whereby air translated by the propeller is effective to cool oil in the reservoir, means for conveying lubricant from the reservoir to the upper and the lower bearings and including a bore provided in the spindle and leading to the upper bearing, and means providing for the return of lubricant drainage to the reservoir.

6. In a vertical blower, a vertically disposed housing, a propeller in the housing, a guide vane structure at the lower side of the propeller and supported from the interior of the housing, a motor device positioned above the propeller and including a stator and a rotor, means for supporting the stator from the upper end of the housing and providing for ingress of air to the propeller, an upper bearing carried by the stator, a lower bearing carried by the guide vane structure, a spindle carrying said stator and propeller and having journal portions fitting the upper and the lower bearings, means cooperating with the housing to provide a lubricant reservoir so that a wall thereof is defined by the housing, circulating means operated by the spindle for conveying lubricant from the reservoir to the upper and the lower bearings, and drainage means for returning lubricant to the reservoir and including means to cause the lubricant to flow as a film along the exterior of the housing in the upper portion of the reservoir.

7. In a propeller blower, a housing having a throat portion, a propeller in the throat portion and having a hub, a guide vane structure supported internally of the housing and by the latter at the discharge side of the propeller, said guide vane structure including a central sleeve aligned with the hub and one or more hollow guide vanes, a motor device including a stator and a rotor, means for supporting the stator from the hous-

ing at the inlet side of the propeller, a first bearing carried by the stator, a second bearing mounted in said sleeve, a spindle carrying the rotor and the propeller and having journal portions fitting the bearings, means for supplying lubricant to the bearings, a sealing device arranged in the sleeve between the second bearing and the propeller hub and preventing leakage of lubricant from the bearing toward and into the propeller, said sealing device including annular seals cooperating with the spindle and axially spaced to provide an air chamber, and means utilizing the hollow space of a guide vane for conducting air from the exterior of the housing to said air chamber.

8. In a propeller blower, a housing having a throat portion, a propeller in the throat portion and having a hub, a guide vane structure supported internally of the housing and by the latter at the discharge side of the propeller, said guide vane structure including a central sleeve aligned with the hub and one or more hollow guide vanes, a motor device including a stator and a rotor, means for supporting the stator from the housing at the inlet side of the propeller, a first bearing carried by the stator, a second bearing mounted in said sleeve, a spindle carrying the rotor and the propeller and having journal portions fitting the bearings, means for supplying lubricant to the bearings, a sealing device arranged in the sleeve between the second bearing and the propeller hub and preventing leakage of lubricant from the bearing toward and into the propeller, said sealing device including annular seals cooperating with the spindle and axially spaced to provide an air chamber, and means for supplying air to the chamber including a conduit communicating therewith and extending through the hollow space of a guide vane to the exterior of the housing.

9. In a propeller blower, a housing having a throat portion, a propeller in the throat portion and having a hub, a guide vane structure supported internally of the housing and by the latter at the discharge side of the propeller, said guide vane structure including a central sleeve aligned with the hub and one or more hollow guide vanes, a motor device including a stator and a rotor, means for supporting the stator from the housing at the inlet side of the propeller, a first bearing carried by the stator, a second bearing mounted in said sleeve, a spindle carrying the rotor and the propeller and having journal portions fitting the bearings, means for supplying lubricant to the bearings, a sealing device arranged in the sleeve between the second bearing and the propeller hub and preventing leakage of lubricant from the bearing toward and into the propeller, said sealing device including annular seals cooperating with the spindle and axially spaced to provide an air chamber, said lubricant supply means including a lubricant collection chamber encompassing the housing so that the housing provides a wall of the chamber, means providing for maintenance of air under suitable pressure in the upper portion of the lubricant reservoir, and means for supplying air to said chamber including a conduit communicating therewith and extending through the hollow space of a guide vane to the upper portion of said lubricant reservoir.

10. In a vertical propeller blower, a vertical housing having a throat portion, a propeller in the throat portion and having a hub, a guide vane structure supported internally of the housing and by the latter at the lower side of the propeller, said

guide vane structure including a central sleeve aligned with the hub and a plurality of hollow guide vanes, a motor device including a stator and a rotor, means for supporting the stator from the housing at the upper side of the propeller, an upper bearing carried by the stator, a lower bearing mounted in said sleeve, a spindle carrying the rotor and the propeller and having bearing portions fitting the bearings, means cooperating with the exterior of the housing to provide an annular lubricant reservoir portion encompassing the housing so that the housing provides a wall for the reservoir, and the hollow spaces of one or more of the guide vanes being in communication with said reservoir portion so that such hollow spaces constitute other portions of the reservoir, lubricant pumping means arranged in said sleeve and operated by the lower end of the spindle for supplying lubricant to the bearings, means including a conduit extending through one of the hollow guide vanes for supplying lubricant from the reservoir to the pumping means, a sealing device arranged in the sleeve between the lower bearing and the hub and preventing leakage of lubricant from the bearing toward and into the propeller, said sealing device including annular seals cooperating with the spindle and axially spaced to provide an air chamber, means providing for maintenance of air under suitable pressure in the upper portion of the lubricant reservoir, and means including a conduit extending through the hollow space of a guide vane for supplying air to said air chamber.

11. In a blower, a casing having convergent inlet and divergent outlet portions joined by a throat portion; a propeller in the throat portion and having a hub; guide vane structure at the discharge side of the propeller and including guide vanes having their outer ends joined to the divergent portion of the casing and having their inner ends joined to a central sleeve aligned with the hub; said sleeve extending for a substantial portion of the axial length of the divergent portion of the casing and the guide vanes being sufficiently wide so that their outer and inner ends extend substantially for the lengths of the divergent portion and of the sleeve, respectively; said casing, the propeller hub and the sleeve defining a convergent-divergent annular flow passage with the propeller vanes in the throat portion thereof; a motor spaced axially from the convergent inlet portion of the casing to provide adequate space for ingress of air to the convergent portion of said annular flow passage and including a stator and a rotor; a plurality of legs for supporting the stator from the convergent portion of the casing and converging from the casing toward the stator; a bearing carried by the side of the stator remote from the propeller; a bearing carried interiorly by said sleeve; a spindle extending through and connected to the propeller hub and to the rotor and having terminal journal portions fitting said bearings; said guide vane structure, the stator, and legs constituting means for supporting the moving parts of the blower from the casing so that the latter serves as supporting and positioning means for all parts of the blower; and blower supporting means extending circumferentially from the casing.

12. In a blower, a casing having convergent inlet and divergent outlet portions joined by a throat portion; a propeller in the throat portion and having a hub; guide vane structure at the discharge side of the propeller and including guide vanes having their outer ends joined to

the divergent portion of the casing and having their inner ends joined to a central sleeve aligned with the hub; said propeller hub having a tapered end at the inlet side of the propeller and said tapered hub end, with the remainder of the hub and the aligned sleeve, cooperating with the housing to define an annular convergent-divergent flow passage with the propeller vanes at the throat portion thereof; a motor spaced axially from the convergent portion of the casing to provide adequate area for easy ingress of air to the convergent portion of said annular flow passage and including a stator and a rotor; a plurality of legs for supporting the stator from the convergent portion of the casing and converging from the casing toward the stator; a bearing carried by the side of the stator remote from the propeller; a bearing carried interiorly by said sleeve; and a spindle extending through and connected to the propeller hub and to the rotor and having terminal journal portions fitting the bearings.

13. In a blower, a casing having convergent inlet and divergent outlet portions joined by a throat portion; a propeller in the throat portion and having a hub; guide vane structure at the discharge side of the propeller and including guide vanes having their outer ends joined to the divergent portion of the casing and having their inner ends joined to a central sleeve aligned with the hub; a motor spaced axially from the convergent portion of the casing to provide adequate area for easy ingress of air to said convergent portion and including a stator and a rotor; a plurality of legs for supporting the stator from the convergent portion of the casing and converging from the latter toward the stator; a bearing carried by the side of the stator remote from the propeller; a bearing carried interiorly of said sleeve; and a spindle extending through and connected to the propeller hub and to the rotor and having terminal journal portions fitting the bearings.

14. In a blower, a casing having convergent inlet and divergent outlet portions joined by a throat portion; a propeller in the throat portion and having a hub; guide vane structure at the discharge side of the propeller and including hollow guide vanes having their outer ends joined

to the divergent portion of the casing and having their inner ends joined to a central sleeve aligned with the hub; a motor spaced axially from the convergent portion of the casing to provide adequate area for easy ingress of air to said convergent portion; said motor including a stator and a rotor; a plurality of hollow legs for supporting the stator from the convergent portion of the casing and converging from the latter toward the stator; a bearing carried by the side of the stator remote from the propeller; a bearing carried interiorly by said sleeve; and a spindle extending through and connected to the propeller hub and to the rotor and having terminal journal portions fitting the bearings.

15. In a blower, a casing having convergent inlet and divergent outlet portions joined by a throat portion; a propeller in the throat portion and having a hub; guide vane structure at the discharge side of the propeller and including guide vanes having their outer ends joined to the divergent portion of the casing and having their inner ends joined to a central sleeve aligned with the hub; a motor spaced axially from the convergent portion of the casing to provide adequate area for easy ingress of air to said convergent portion; said motor including a stator and a rotor; a plurality of legs for supporting the stator from the convergent portion of the casing and converging from the latter toward the stator; a bearing carried by the side of the stator remote from the propeller; a bearing carried interiorly by said sleeve; a spindle extending through and connected to the propeller hub and to the rotor and having terminal journal portions fitting the bearings; means for supplying lubricant to the bearings; a sealing device arranged in the sleeve between the second bearing and the propeller hub and preventing leakage of lubricant from the bearing toward and into the propeller; said sealing device including annular seals cooperating with the spindle and axially spaced to provide an intervening air chamber; and means providing a passage arranged within the confines of a guide vane for conducting air from a region external to the casing to said air chamber.

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