H. F. SCHMIDT.

PROPELLER BLOWER.

APPLICATION FILED JUNE 3, 1921.

1,427,859.

Patented Sept. 5, 1922.

2 SHEETS—SHEET 1.

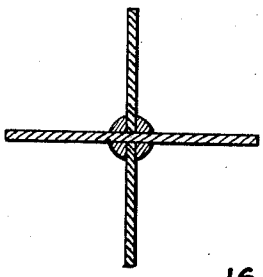

Fig. 4.

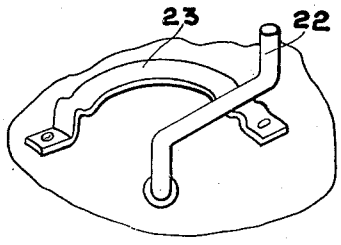

Fig. 3.

Fig. 1.

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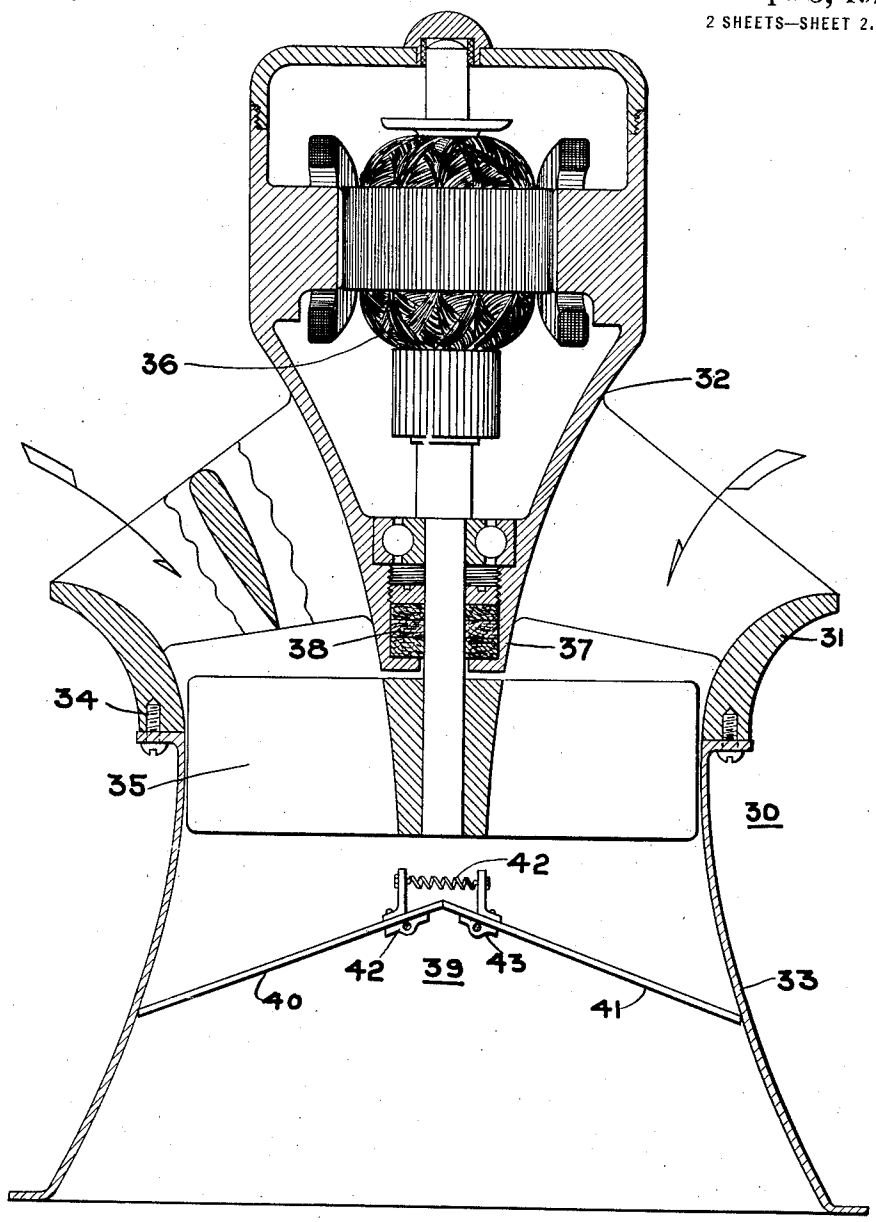

Fig. 2.

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UNITED STATES PATENT OFFICE.

HENRY F. SCHMIDT, OF SWARTHMORE, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

PROPELLER BLOWER.

Application filed June 3, 1921 Serial No. 474,840.

To all whom it may concern:

Be it known that I, HENRY F. SCHMIDT, a citizen of the United States, and a resident of Swarthmore, in the county of Delaware and State of Pennsylvania, have invented a new and useful Improvement in Propeller Blowers, of which the following is a specification.

This invention relates to blowers and more particularly to blowers of the propeller type employing fluid-directing guide vanes, and it has for an object to provide apparatus of the character designated in which the guide vanes employed therein may in addition serve in the capacity of a damper. It has for a further object to produce a blower of the character designated which shall be compact, light in weight, economical to manufacture, and simple in construction. With the above and other objects in view, the invention consists in novel features of construction and combination of parts as will be hereinafter more fully set forth.

In the accompanying drawing, Fig. 1 is a longitudinal view, in section, of a blower embodying a set of damper guide vanes embodying a fairing cone;

Figure 2 is a longitudinal view in section showing a modification of the apparatus shown in Figure 1 in which two vanes are provided in the discharge portion of the blower;

Figure 3 is a view in perspective showing a resilient device adapted to retain the damper vanes shown in Figure 1 in position; and

Figure 4 is a view, in section, of the vanes taken on line IV—IV of Figure 1.

This invention contemplates a motor-blower set of the character designated consisting of a motor casing and a converging-diverging blower casing. The blower casing is composed of two detachable members, namely, a converging member having integrally formed therein a motor casing adapted to carry the motor and propeller parts, and a diverging casing member adapted to accommodate a guide-vane damper mechanism. The damper mechanism embodies guide vanes of a conventional type arranged to operate so as to cut off the flow of fluid through the blower.

Referring to the drawing for a more detailed description of an apparatus constructed in accordance with my invention, I indicate in Figure 1 a casing member 10 embodying a converging inlet portion 11 and a diverging outlet portion 12. The casing members 11 and 12 are secured together in any suitable manner as, for example, by a flange means 13 having a plurality of screws 14. Forming an integral part of the converging casing portion 11 is a motor casing 15 which contains a suitable power device as, for example, an electric motor 16. The motor casing 15 is preferably cast integrally with the converging member 11 to form a smoothly curved inlet fluid passage. The electric motor 16 is directly connected to a propeller 17 by means of a shaft 18. Located within the diverging discharge portion 12 of the casing 10 and adjacent to the propeller 17 is a set of guide vanes 19, as shown in Fig. 4, the four vanes may be considered to be disposed about a common axis and at substantially 90° apart, and to be provided with a conical hub portion 20, the arrangement being such as to prevent eddy currents of the fluid passing therethrough. The guide vane set is mounted on a pivot member 21 extending diametrically through the discharge portion 12 of the casing 10. The guide vane set is rotated by the pivot member 21 in any suitable manner, for example, by a handle 22 arranged to cooperate with a suitable resilient means 23 for holding the handle 22 in the desired position, as shown in Figure 3. In rotating the vane set to function as a damper, two vanes effect the closing of the blower casing and the other two vanes move in a common plane substantially at right angles to the vanes closing the casing.

The blower set above described is assembled by mounting the guide vane set 19 in the discharge portion 12 of the casing 10 and then attaching the converging portion 11 which carries the motor casing 14. It will be observed that the converging portion of the casing carries the driving and driven blower elements and ready access thereto is had by detaching the casing members 11 and 12.

The blower construction above described finds particular adaptability in blower installations for furnaces where a number of blowers are operated in parallel. It is oftentimes necessary to cut out some of the blow-

ers and this condition is most favorably met by the means of a damper installed in accordance with the present invention. By embodying guide vanes, a fairing cone and a damper in one mechanism, a blower may operate most efficiently and should it be shut down for any reason a back draft through the blower is prevented by the damper mechanism.

Referring to the modification shown in Fig. 2, I indicate at 30 a converging-diverging blower casing divided into two parts, in a similar manner as shown in Figure 1. A converging portion 31 of the casing 30 has integrally cast therewith a cast motor casing member 32. The motor casing 32 and its cooperating rim portion forms the converging inlet portion to the blower casing 30. A diverging sheet metal casing member 33 is secured to the rim of the motor casing 31 in any suitable manner, as for example, by suitable screws 34. The motor casing 32 carries a propeller 35 which operates in the throat of the converging-diverging casing blower 30. The motor casing is provided with an electric motor 36 which is directly connected to the propeller 35 by a shaft 37 provided with adequate bearings 38. The arrangement is such that the motor casing 32 forms with the sheet metal casing member 33 a smoothly curved fluid passage so designed as to enable the blower to handle large quantities of fluid.

Arranged within the discharge portion of the blower casing 30 is a damper mechanism 39. The damper comprises essentially two arcuate plate members 40 and 41 arranged to conform to the interior of the casing member 33 so as to prevent the passage of fluid through the blower when the plates assume a closed position, as indicated. The damper members are pivotally mounted in such a manner that they are readily opened by fluid pressure exerted by the propeller. As shown, the members 38 and 39 are pivoted in the casing member 33 at axes 42 and 43. The axes 42 and 43 are within the projection of the hub of the propeller 35, thus enabling the maximum surface of the plate members 40 and 41 to be subject to the fluid pressure exerted by the fluid being drawn through the propeller. The damper members are retained in a closed position in any suitable manner, as for example, by a spring device 42. By pivoting the members 40 and 41 to contact with the casing member 33 at an oblique angle, a reverse flow of fluid through the blower is automatically prevented when the blower is not in operation.

The invention above described contemplates the same general blower construction as that set forth in Fig. 1, embodying the blower casing 30, the cast motor casing 32 and the damper mechanism 39. The spring device 42 holding the damper members 40 and 41 is so adjusted that a small amount of fluid delivered by the propeller will cause the vanes 40 and 41 to open and allow the fluid to be discharged from the blower and should the blower be stopped, the vanes will close and prevent any reverse flow of fluid through the blower. The above feature is particularly desirable in blowers for furnaces or bulkhead compartments where it is essential that the flow of air be maintained in one direction.

It is apparent that an apparatus constructed in accordance with my invention as illustrated in Fig. 1 is particularly adapted to circulate air through a bulkhead compartment where it is necessary to handle large quantities of air by an efficient blower which occupies a minimum amount of space. To secure the compactness desired, the motor casing is formed in a single casing with an outer annular portion adapted to cooperate with the blower casing to assist in directing fluid through the blower. A blower of the type illustrated in Figure 3 finds great utility in supplying forced draft through the ordinary house furnace where the prevention of the escape of gas is more important than delivering air effectively. In each of the above applications of a blower, the damper feature is desirable, for the reason that it is necessary to prevent a reverse flow of air through the blower and should the blower be shut down or it be necessary that the blower elements be dismounted for purposes of cleaning and repair, the damper members may be closed and eliminate any danger of back draft through the blower.

A blower constructed in accordance with my invention possesses many desirable features. Simplicity of construction is accomplished by making the blower casing in two portions, the inlet portion accommodating the driving and driven blower elements and the sheet metal discharge portion accommodating the damper mechanism which also performs the function of fairing cone and guide vanes commonly employed in blower construction. By making the discharge portion of suitable sheet metal and mounting the damper mechanism therein the manufacturing costs are considerably reduced. I have found that the sheet metal casing gives ample rigidity to the blower when mounted in a vertical or horizontal position. The above features enables the manufacture of an efficient blower having rugged construction, the desired light weight, and compactness adapts it to a range of usage heretofore unattained.

While I have shown my invention in but two 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 having a diverging casing portion, a propeller operating in the casing and movable fluid-directing vanes in the casing, said vanes being contiguous to the propeller and adapted to be moved to close the blower casing.

2. In a blower of the character designated having a diverging casing portion, a propeller operating in the casing, movable vanes contiguous to the propeller and arranged to function as a damper, and means associated therewith to regulate the extent of movement of the vanes.

3. In a propeller blower having a casing formed of converging and diverging members detachably secured together, a motor casing cast integrally with the converging portion and adapted to carry a motor and a propeller, movable vanes mounted in the diverging portion and means associated therewith to regulate the extent of movement of the vanes.

4. In combination in a blower, a converging blower casing member, a motor casing formed integrally with the converging member, a sheet metal diverging casing member, damper vanes movably mounted in the diverging member and arranged to prevent eddy currents, and means for detachably securing the converging and diverging casing members.

5. A blower casing comprising a converging casing member, a motor casing integrally formed with the converging casing member and arranged to form therewith a smoothly curved fluid inlet passage, a diverging casing member secured to the converging member, fluid directing damper means movably mounted in the diverging member and means associated therewith to regulate the movement thereof.

6. A blower casing comprising a converging casing member, a motor casing integrally formed with the converging casing member and arranged to form therewith a smoothly curved fluid inlet passage, a diverging casing member secured to the converging member, pivotally mounted guide vanes in the diverging member arranged to perform the function of a damper, and means associated therewith to regulate the movement thereof.

7. In combination in a blower of the propeller type, a converging blower casing member, a motor casing member cast integrally with the converging member to form a smoothly curved fluid inlet passage, a sheet metal diverging blower casing and movable damper vanes mounted in the diverging portion.

8. In combination in a blower, converging blower casing member, a motor casing formed integrally with the converging member, a sheet metal diverging casing member, guide vanes pivotally mounted in the diverging casing, and spring means associated with the vanes to control the extent of opening.

9. A blower of the propeller type comprising a blower casing, a motor casing mounted on the inlet portion of the blower casing and arranged to form with the blower casing a smoothly curved fluid inlet passage, motor and propeller parts carried by the motor casing and movable guide vanes mounted in the discharge portion of the blower casing arranged to perform the function of a damper.

10. A propeller pump comprising a casing, a propeller operatively mounted in the casing and movable fluid-directing vanes in the casing, said vanes being constructed and mounted in the casing so that they may be moved to close against the flow of fluid through the casing.

11. A propeller pump comprising a casing, a propeller operatively mounted in the casing, and means mounted in the casing serving the dual functions of directing means to guide the fluid flow through the casing and of a damper to close against the flow of fluid through the casing.

In testimony whereof, I have hereunto subscribed my name this 27th day of May, 1921.

HENRY F. SCHMIDT.