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R. E. BRESSLER  
BLOWER FAN IMPELLER  
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Fig. 1.

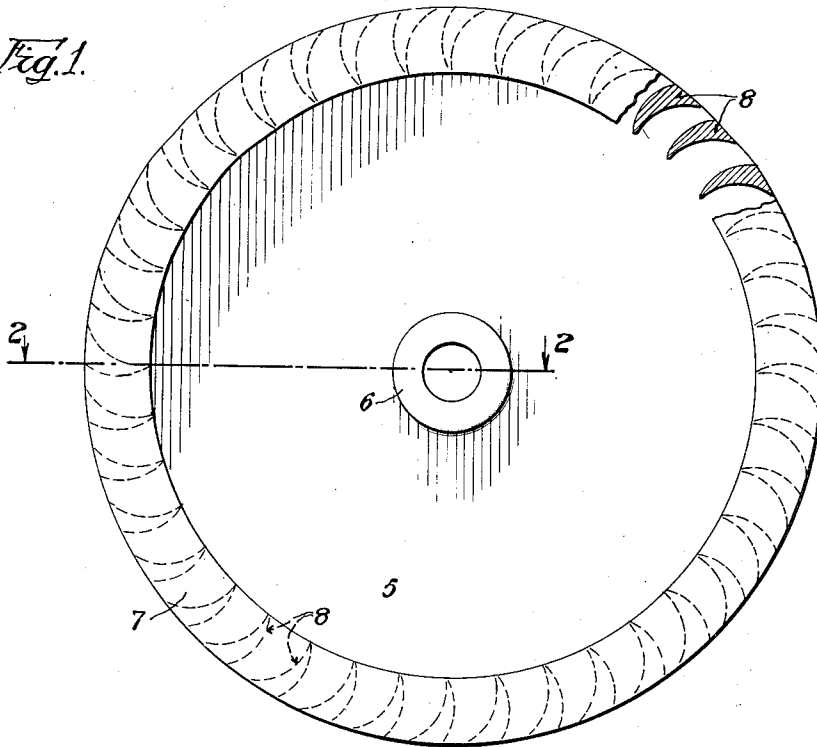


Fig. 2.

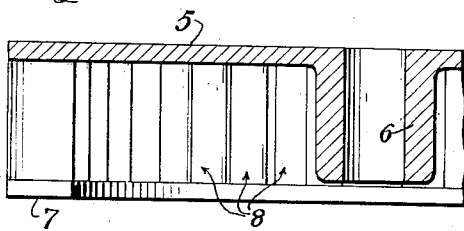


Fig. 3.

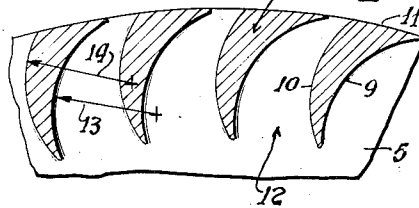
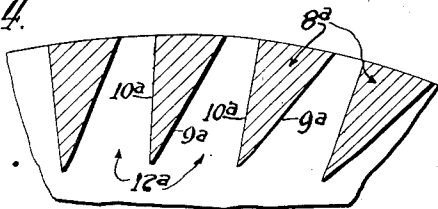


Fig. 4.



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# UNITED STATES PATENT OFFICE

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## BLOWER FAN IMPELLER

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8 Claims. (Cl. 230-127)

This invention relates to improvements in blower fan impellers and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

In impellers of this kind, air is moved by being accelerated within the passages between the blades and is moved in the direction of the periphery of the impeller in the rapid rotation of the latter. In the conventional impellers of this kind, wherein the blade surfaces defining the passages are parallel or diverge toward the periphery of the impeller, certain resistances are offered to the issue or discharge of air at the outlet end of the passages. These resistances are certain eddy currents, partial vacuums and the like, which cause a jamming and shock in the air issuing from the passage so that such impellers are not as efficient or as quiet in operation as it is desired to have them.

One of the objects of the present invention is to provide an impeller of the kind which is more quiet and efficient in operation than the conventional type of impeller for the same purpose.

A further object of the invention is to provide an impeller of this kind which is practical to make as a cast integral structure, thus materially reducing the cost thereof.

Another object of the invention is to provide an impeller of this kind wherein the air passages between the blades taper toward their discharge ends to compensate for the progressively smaller space required because of increase in velocity, so as to minimize shocks, voids and impact losses.

The above mentioned objects of the invention, as well as others, together with the several advantages thereof, will more fully appear as I proceed with my specification.

In the drawing:—

Fig. 1 is a view in front elevation of a blower fan impeller embodying the preferred form of the invention, parts of the shroud or front ring being omitted better to show the structure of the blades.

Fig. 2 is a sectional view through a part of the impeller shown in Fig. 1 as taken on the line 2-2 thereof.

Fig. 3 is a fragmentary detail view on an enlarged scale through certain of the blades of the impeller, showing their sectional formation and the relation of the opposed surfaces of adjacent blades forming the air passages and which will be more fully referred to later.

Fig. 4 is a view similar to Fig. 3 showing a modified form of opposed surfaces for the blades.

The conventional impeller has either a radial or

paddle wheel type of blade, a forward curvature blade, a rearward curvature blade or a radial tip or reverse curve blade, all of which are well known and while the invention is herein shown and described as embodied in an impeller wherein the blades have a forward curvature, it is to be understood that this is only by way of illustration and not by way of limitation.

Referring now in detail to that embodiment of the invention illustrated in Figs. 1, 2 and 3 of the accompanying drawing: 5 indicates the circular backing plate of the impeller, having a central hub 6 whereby the impeller may be mounted upon and secured to an associated driving shaft, not shown. 7 indicates the shroud or front ring of the impeller which is spaced axially from the backing plate and has an outside diameter approximating that of the backing plate.

8 indicates the blades of the impeller which are disposed between the marginal part of the backing plate and the shroud and are fixed at their ends thereto. As herein shown, the backing plate, the shroud and the blades are made as an integral casting.

Each blade is substantially of a triangular cross-section in that it has two sides or surfaces 9 and 10 respectively and a base 11, the base being at the outer end of the blade and the apex being at the inner end of the blade. As shown in Figs. 1 and 3, one side surface of each blade is convex and the other is made concave. The said convex and concave surfaces coact to provide an air passage 12 between adjacent blades and said passage is of a greater cross sectional area at its inner or inlet end than it is at its outer or outlet end. The curvature of said surfaces is such that the passages each decrease in cross sectional area toward the outlet end and this decrease is in substantial accordance with the increase in the velocity of the air passing through the passages.

It is preferred that these curved surfaces each be an arc of a circle of the same radius, but on different centers, as best appears by the two comparison lines 13 and 14 in Fig. 3. While the blades are herein shown as of solid cross section, they may be made hollow, if so desired.

In Fig. 4 I have illustrated a modified form of the invention wherein the side surfaces 9a and 10a respectively of the blades 8a are flat instead of curved. These surfaces thus define straight sided passages 12a which converge toward the outlet end of the passage to restrict the same so that the area of said passage decreases from the

outlet to the inlet end of the passage as in the form first described.

In the rotation of the impeller, the air is accelerated within that area of the impeller inwardly of the blades and moves in the direction of the inlet ends of the passages. As each passage is restricted towards its outlet end, this compensates for the progressively smaller space required because of the increase in velocity and thus voids are reduced and shock and impact upon the blade surfaces is greatly minimized. Also, as the air passes through the outlet end of the passages, eddy currents and vacuous conditions are avoided at the outlet, which in the conventional fan impeller manifest themselves as noise and drag that impair impeller efficiency. Thus, the flow of the air through the passages is uniform and the air is discharged as a continuous blast or jet all around the periphery of the impeller without noise or appreciable loss in operating efficiency.

While in describing my invention I have referred in detail to the form, arrangement and construction of the various parts thereof, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereto, except as may be specifically set forth in the appended claims.

I claim as my invention:

1. A blower fan impeller embodying therein a plurality of blades arranged in spaced relation about the periphery of the impeller, the opposed surfaces of adjacent blades defining air passages, which decrease in area from the inlet end to the outlet end to compensate for the progressively smaller space required because of the increase in velocity of the air passing therethrough.

2. A blower fan impeller embodying therein a plurality of blades arranged in spaced relation about the periphery of the impeller, the opposed surfaces of adjacent blades defining air passages which decrease in width from the inlet end to the outlet end of each passage to compensate for the progressively smaller space required because of the increase in the velocity of air passing therethrough.

3. A blower fan impeller embodying therein a plurality of blades arranged in spaced relation about the periphery of the impeller, each blade having an active convexed surface and an active concaved surface, the convexed surface of one blade and the concaved surface of the adjacent blade defining an air passageway between said blades and which air passage decreases in area from the inlet end to the outlet end to compensate for the progressively smaller space required because of the increase in velocity of the air passing therethrough.

4. A blower fan impeller embodying therein a

plurality of blades arranged in spaced relation about the periphery of the impeller, each blade being of substantially triangular cross section with the apex at the inner end and the base at the outer end, the opposed surfaces of adjacent blades defining air passages which gradually decrease in cross sectional area from the inlet end to the outlet end.

5. A blower fan impeller embodying therein a backing plate and a plurality of blades arranged in spaced relation about and integral at one end with the backing plate, a shroud connecting the other ends of said blades together, the opposed surfaces of adjacent blades defining air passages which decrease in area from the inlet end to the outlet end to compensate for the progressively smaller space required because of the increase in velocity of the air passing therethrough.

6. A blower fan impeller comprising an integrally cast structure embodying therein a backing plate, a shroud spaced axially therefrom and a plurality of blades arranged in arcuately spaced relation between the marginal part of the backing plate and said shroud, the opposed surfaces of adjacent blades defining air passages of progressively reducing area from the inlet end to the outlet end to compensate for the progressively smaller space required because of the increase in velocity of the air passing therethrough.

7. A blower fan comprising an integrally cast structure embodying therein a backing plate, a shroud spaced axially therefrom and a plurality of blades arranged in arcuately spaced relation between the marginal part of the backing plate and said shroud, each blade having a convexed surface and a concaved surface, the convexed surface of said blades coacting with the concaved surfaces of the adjacent blades in forming air passage between said blades, and which air passages decrease in area from the inlet end to the outlet end to compensate for the progressively smaller space required because of the increase in velocity of the air passing therethrough.

8. A blower fan impeller embodying therein a plurality of blades arranged in spaced relation about the periphery of the impeller, each blade having an active convexed surface and an active concaved surface, the convexed and the concave surfaces of each blade being made on a curve of substantially the same radius but on different centers, the opposed surfaces of adjacent blades defining air passages which decrease in area from the inlet to the outlet end to compensate for the progressively smaller space required because of the increase in velocity of air passing therethrough.

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