

Nov. 21, 1961

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3,009,630

AXIAL FLOW FANS

Filed May 5, 1958

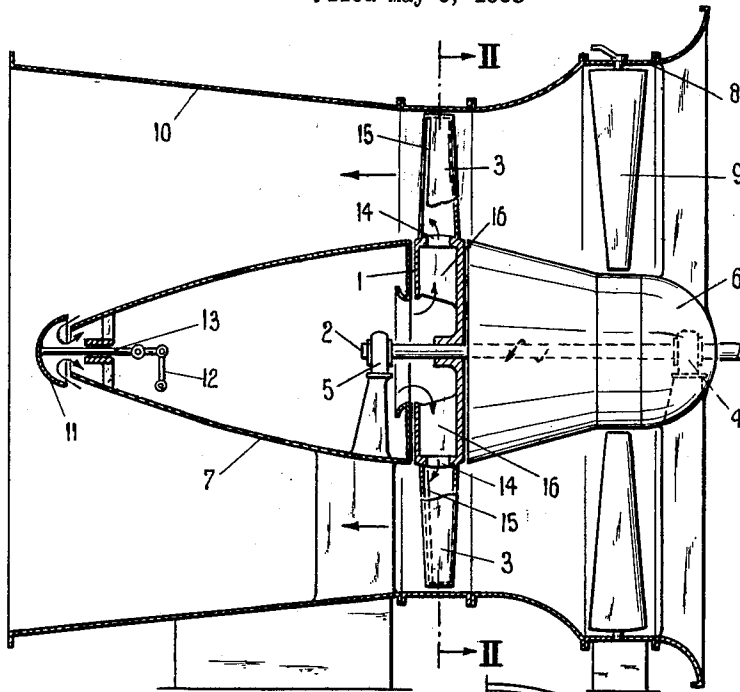


FIG. 1

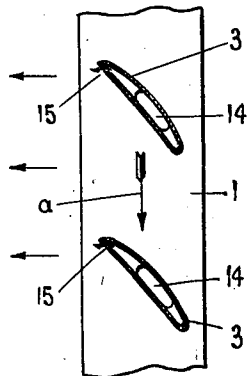


FIG. 3

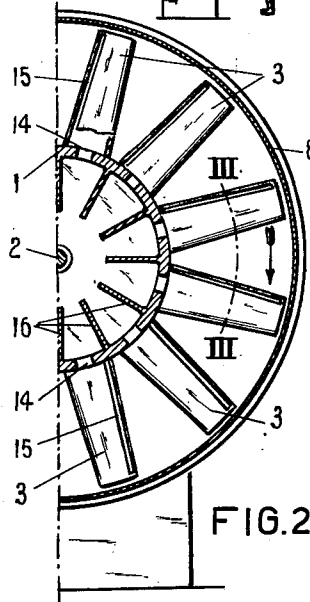


FIG. 2

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**AXIAL FLOW FANS**

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Filed May 5, 1958, Ser. No. 733,066

Claims priority, application Netherlands May 10, 1957  
2 Claims. (Cl. 230-114)

This invention relates to an axial flow fan, the impeller of which is provided with hollow blades and the invention has for its object to increase the output of the fan and to vary the output, if required.

According to the invention the wall of the hollow blades near the outflow side of the impeller is provided with at least one discharge opening for a pressure fluid entering the interior of the blade and having a pressure exceeding that at the outflow side of the impeller and said discharge openings being located at the front face of the blades as viewed in the direction of rotation. With a fan the casing of which is widened behind the impeller to constitute a diffuser the fluid to be introduced into the cavity of the impeller blades may be withdrawn from said diffuser.

It appeared that by the discharge of said pressure fluid through the openings in the blade wall the output of the fan for unchanged dimensions of the impeller is considerably increased. Moreover the output of the fan may be varied by adjusting the supply of the pressure fluid entering the hollow blades. It appeared namely that at the pressure side of the blade, where the pressure fluid flows out through the holes in the blade wall a more uniform pressure is built up whereas at the low pressure side of the blade the pressure is not increased. The pressure fluid flowing out of the opening or openings in the blade wall forms a shield, which apparently prevents the flow of fluid from the pressure side at the rear end of the blade to the low pressure side of the blade. The outflowing pressure fluid thereby performs the function of a pivotal blade part of adjustable blades, so that when varying the supply of pressure fluid entering in the interior of the blades also the output of the impeller is varied. In order to still increase the range of outputs of the fan adjustable guide vanes may be arranged at the inflow side of the fan casing.

In the accompanying drawing, which illustrates an embodiment of the fan according to the invention, FIG. 1 is a longitudinal sectional view of the fan.

FIG. 2 is a cross-section taken on the line II-II of FIG. 1 and FIG. 3 is a section of two adjacent blades taken on the line III-III of FIG. 2, the direction of rotation of the impeller being indicated by the arrow *a*.

The shaft 2 of the impeller 1 having a series of hollow blades 3 at its circumference, is supported at the suction side in a bearing 4 and at the pressure side in a bearing 5. The bearing 4 is located in a stationary more or less conical body 6 of sheet metal mounted adjacent the impeller hub and also the bearing 5 is mounted in a stationary hollow conical body 7.

Adjustable guide vanes 9 are arranged at the inflow side of the casing 8 and the casing is conically widened to constitute a diffuser 10 behind the impeller 1.

At the apex of the conical body 7 an adjustable valve 11 is mounted, which has its rod 13 connected to an arm of a bell crank lever 12 by means of which the valve may be adjusted. When valve 11 is in open position air from the diffuser 10 will flow into the hollow body 7 and through the hollow impeller hub enter the interior of the

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hollow blades 3 by means of holes 14 provided in the circumferential wall of the hub in order to flow out through a slot 15 at the rear end of each blade. By adjusting the valve 11 the quantity of air flowing out through the slots 15 and, therefore, the output of the fan may be varied. As shown in FIG. 3 the air flows out through the slot 15 in a direction substantially perpendicular to the front face of the blade.

In order to further increase the pressure of the air entering the hollow blades 3 auxiliary blades 16 are provided in the hollow impeller hub.

What I claim is:

1. An axial flow fan comprising an impeller having a hollow hub with a circumferential wall carrying hollow blades, a casing surrounding said impeller and being widened at the discharge side of the impeller to constitute a diffuser, a stationary hollow conical body within said diffuser and adjacent the impeller, said body having an inlet opening and at its end facing the impeller an outlet opening, said hollow impeller hub having an inlet opening in communication with said outlet opening and at least one opening in its circumferential wall and in communication with each hollow blade, each blade having at least one discharge opening for the fluid flowing from the interior of said conical hollow body into the interior of the blade, said discharge opening being located in the front wall of the blade immediately upstream of the trailing edge of the blade as viewed in the direction of rotation to discharge the fluid which defines a shield disposed at an angle with said front wall.

2. An axial flow fan comprising an impeller having a hollow hub with a circumferential wall carrying hollow blades, a casing surrounding said impeller and being widened at the discharge side of the impeller to constitute a diffuser, a stationary hollow conical body within said diffuser and adjacent the impeller, said body having an inlet opening and at its end facing the impeller an outlet opening, said hollow impeller hub having an inlet opening in communication with said outlet opening and at least one opening in its circumferential wall and in communication with each hollow blade, and an adjustable valve arranged at the inlet opening of said hollow conical body, each blade having at least one discharge opening for the fluid flowing from the interior of said conical hollow body into the interior of the blade, said discharge opening being located in the front wall of the blade immediately upstream of the trailing edge of the blade as viewed in the direction of rotation to discharge the fluid which defines a shield disposed at an angle with said front wall.

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