

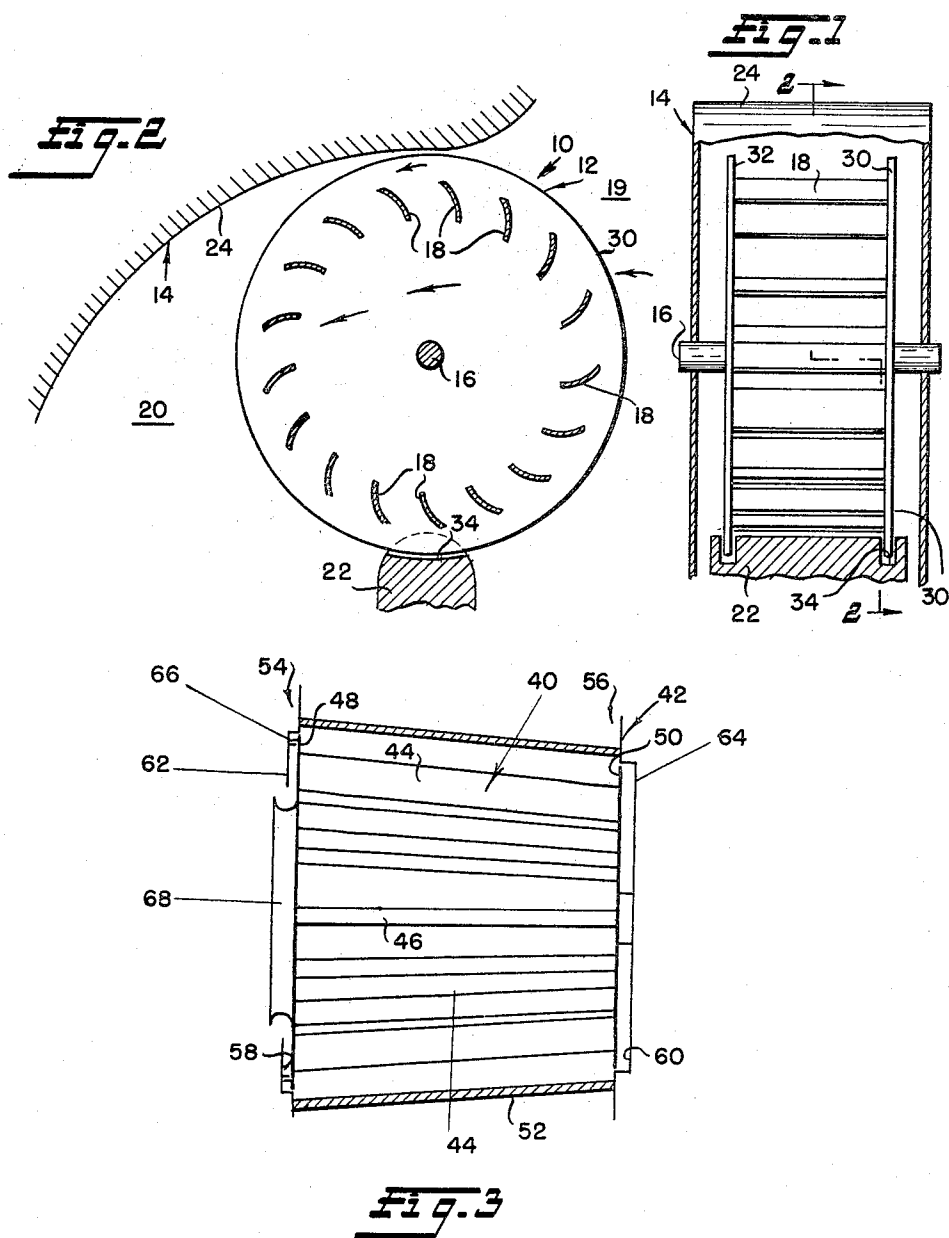
Aug. 25, 1964

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3,145,911

BLOWERS

Filed July 30, 1962



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3,145,911
BLOWERS

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Filed July 30, 1962, Ser. No. 213,320

Claims priority, application Germany Sept. 11, 1961
3 Claims. (Cl. 230-125)

The present invention relates to blowers and more particularly to blowers of the type having bladed drum shaped rotors in which the blades are bounded by blade mounting end plates.

In transverse flow type blowers, the blower rotor is usually provided with disc shaped end plates between which the rotor blades are mounted longitudinally with respect to the rotor rotational axis. With prior blower rotor constructions, the blade mounting end plates do not extend radially beyond blades. This blade mounting end plate construction has been found to promote a lateral flow of fluid in the region of the blade ends such that the fluid is directed back toward the inlet side of the blades. As a result of this lateral flow of fluid, the capacity and efficiency of the blower is reduced and the noise level is increased.

The primary object of the present invention is to overcome the foregoing shortcomings of the prior blower constructions. This is essentially accomplished by extending the blade mounting end plates radially inwardly and/or outwardly beyond the rotor blade ring. This blading mounting end plate construction, according to the present invention, effectively prevents the equalization of fluid pressure in the region of the blade ends to establish a uniform and high density fluid delivery across the entire axial length of the rotor. As a result, the capacity of the blower is materially improved and the noise level is appreciably reduced in comparison to the prior art blower constructions.

According to the invention, the blower casing in the region of the blade mounting end plates of the blower rotor may have recesses for receiving the end plates so that laterally an undisturbed flow passing over the end plates can take place. These end plate receiving recesses are required to be just so large in their circumference as to provide only a narrow gap between the peripheral edge of the end plates and the casing wall forming the recesses and surrounding the end plates. In the axial direction, however, a larger gap may be formed between the outwardly directed faces of the end plates and the casing, thus forming between the end plates and the casing a free space which is preferably sealed with labyrinth packing.

The casing part (i.e., the partition for the inlet and outlet channels) adjacent to the rotor blower in the radial direction may extend into the vicinity of the blower blades and may be provided with slots for receiving the end plates projecting radially beyond the blades. These casing parts may also extend into the vicinity of the periphery of the blade mounting plates. The shape of the blower rotor itself may be cylindrical or truncated conical.

Further objects of the invention will appear as the description proceeds in connection with the appended claims and the annexed drawings wherein:

FIGURE 1 is a side elevational view of a transverse blower according to one embodiment of the present invention with the exterior casing partially broken away to show details of the blower rotor;

FIGURE 2 is a cross sectional view taken along lines 2-2 of FIGURE 1; and

FIGURE 3 is a longitudinal cross sectional view of a blower according to another embodiment of the present invention.

Referring now to FIGURES 1 and 2, the reference

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numeral 10 generally designates a transverse flow type blower having a peripherally bladed rotor 12 received in a casing 14. Rotor 12 is mounted for rotation about the axis of shaft 16 and is provided with a circumferential row of blades 18 extending longitudinally with respect to the axis of shaft 16. Rotor 12 is positioned between and in the region of a fluid inlet channel 19 and a fluid outlet channel 20 formed by casing 10. Channels 19 and 20 are separated from each other by a stationary partition 22 disposed externally of and adjacent to rotor 12. Channels 19 and 20 are suitably delimited at their sides opposite from partition 22 by means of a wall 24 forming a part of casing 10.

Power to drive rotor 12 is furnished by any suitable prime mover such as a motor (not shown) operatively connected to shaft 16 by a belt and pulley drive (not shown).

By rotating rotor 12 in the direction indicated by the arrow adjacent to the periphery of the rotor, fluid medium in inlet channel 19 is drawn transversely through rotor 12 and is propelled into outlet channel 20 in the manner indicated by the arrows.

In accordance with the present invention, the opposite ends of blades 18 are fixed to opposed parallel disc shaped blade mounting end plates 30 and 32 which receive shaft 16 and which extend at right angles to the rotational axis of rotor 12. End plates 30 and 32, forming a part of rotor 12, thus mount blades 18 in fixed relation to each other and extend radially outwardly beyond the outwardly directed edges of the blades by a predetermined distance.

By extending end plates 30 and 32 radially beyond the blade ring of rotor 12, the tendency of the fluid to flow laterally back towards inlet channel 19 in the region of the blade ends adjacent plates 30 and 32 is effectively precluded. As a result, a uniform and high density delivery of fluid is achieved across the entire lengths of blades 18 between end plates 30 and 32.

Partition 22 arranged between inlet channel 19 and outlet channel 20 extends into the vicinity of rotor blades 18 and is provided with slots indicated at 34 which receive end plates 30 and 32.

In the embodiment illustrated in FIGURE 3, a peripherally bladed rotor 40 of truncated conical shape is received in a casing generally indicated at 42. Rotor 40 is conventionally provided with a ring of blades 44 extending longitudinally with respect to the axis of a shaft 46 about which rotor 40 is rotatable. Rotor 40 comprises a pair of parallel axially spaced apart disc shaped blade mounting end plates 48 and 50 bounding opposite ends of the rotor blades and extending transversely of the rotor rotational axis. Blades 44 are fixed, at opposite ends, to end plates 48 and 50.

With continued reference to FIGURE 3, end plates 48 and 50, in accordance with the present invention, extend radially beyond blades 44 to provide a uniform delivery of fluid across the entire axially directed length of the blades in the manner as described in connection with the embodiment of FIGURES 1 and 2.

Casing 42 is formed with a body section 52 around rotor 40 and end walls 54 and 56 extending transversely of the rotor rotational axis. End walls 54 and 56 are disposed at opposite ends of rotor 40 and are formed with axially inwardly opening circular recesses 58 and 60 respectively receiving the disk shaped end plates 48 and 50.

As shown in FIGURE 3, end plates 48 and 50 are respectively axially spaced from transverse wall portions 62 and 64 forming a part of end walls 54 and 56 and delimiting recesses 58 and 60. The spaces between end plates 48 and 50 and wall portions 62 and 64 are preferably sealed by labyrinth packing generally indicated at 66.

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End plates 48 and 50 are also spaced in a radial direction from end walls 54 and 56 in the manner shown. The gaps between the radially directed peripheral edges of end plates 48 and 50 and end walls 54 and 56 are appreciably smaller than the spaces axially between wall portions 62 and 64 and end plates 48 and 50.

As seen in FIGURE 3, only the end plates 48 and 50 are received in recesses 58 and 60 respectively. Blades 44 extend, throughout their lengths, beyond recesses 48 and 50.

With the blower construction illustrated in FIGURE 3, the fluid medium is introduced axially into rotor 40 through an inlet port indicated at 68.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A transverse flow blower comprising a casing having an inlet port and an outlet port, a bladed rotor rotationally mounted within said casing between and separating said ports, said rotor including a pair of spaced impervious disc-shaped end plates, and a plurality of elongated blades connected at each end to said end plates, said end plates extending radially beyond said blades a sufficient distance to prevent lateral flow of fluid in the region of the ends of said blades, each of said ports being of a length substantially equal to the spacing of said end

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plates and arranged to direct the fluid to be blown radially inward on one side of said rotor and direct the blown fluid radially outward on the opposite side of said rotor, and partition means between said inlet and outlet ports adjacent the periphery of said rotor on the side of said rotor traveling in a direction from the outlet port toward the inlet port, said partition means extending radially toward said blades in the space between said end plates a sufficient distance to prevent equilization of pressure in the region of said blade ends, whereby to establish a uniform and high density fluid delivery across the entire axial range of said rotor.

2. A transverse flow blower according to claim 1, wherein said partition means is curved in a direction opposite the curvature of the portion of said rotor periphery to which it is adjacent, said partition means extending axially beyond said end plates, and including annular slots for receiving said plates.

3. A transverse flow blower according to claim 1, wherein said rotor is shaped as a truncated cone.

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