

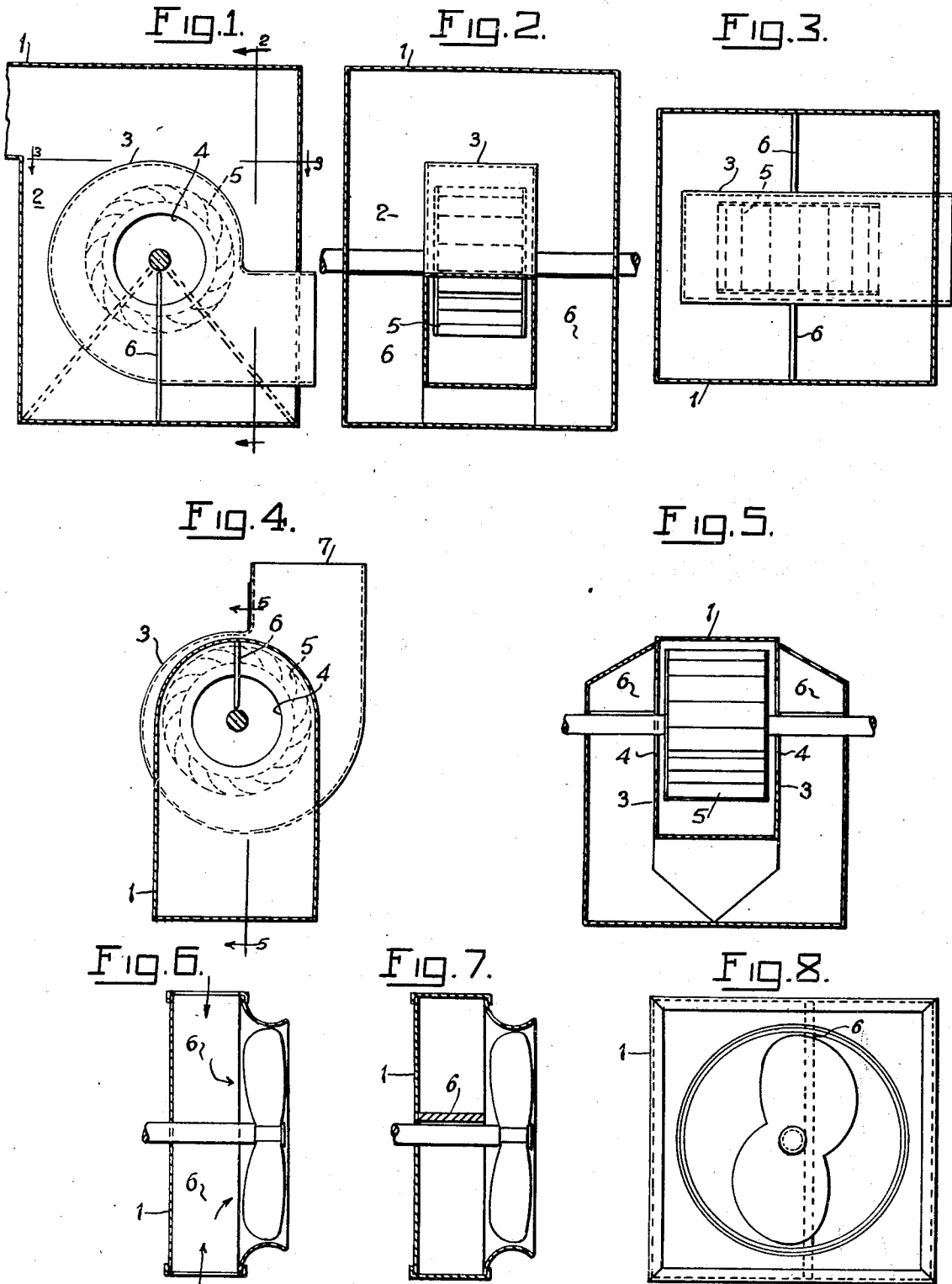
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VORTEX ELIMINATOR IN AIR HANDLING APPARATUS

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VORTEX ELIMINATOR IN AIR HANDLING APPARATUS

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5 Claims. (Cl. 230-114)

My invention relates to fans and in particular to the elimination of the vortex whirl at the fan inlet.

It has been a problem in connection with the inlet ducts and passageways to fans to prevent the revolution of air in the inlet passageways or chambers so that rotating air does not enter into the eye of the fan. The problem has been to prevent whirl in the air entering the eye of the fan without causing undue air resistance in doing so, and at the same time to not only maintain but increase the efficiency of the fan. It will be understood that the air, if not so controlled, has a tendency to continue whirling in the inlet passageway or duct and without proper entrance into the eye of the fan, which reduces the efficiency of the fan. As the efficiency of the fan is increased, there is a marked saving in power in the operation of the fan.

It is the object of my present invention to provide eliminator means or plates known as vortex eliminator plates. These plates are located in inlet chambers and ducts which convey air to the fan. They prevent the continued revolution of the air in these entering passageways, causing the air to enter the fan properly and resulting in a very marked increase in efficiency of the fan and in savings in power necessary to operate it.

Referring to the drawing:

Figure 1 is a side elevation of a fan, the vortex eliminator plates, and the inlet duct to the fan chamber with one side wall removed to disclose the arrangement of the plates with respect to the fan.

Figure 2 is a section on the line 2-2 of Figure 1.

Figure 3 is a section on the line 3-3 of Figure 1.

Figure 4 is a view similar to Figure 1 showing the modified form of inlet box.

Figure 5 is a section on the line 5-5 of Figure 4.

Figure 6 is a vertical section through a modified form of fan and inlet box construction.

Figure 7 is a plan view thereof.

Figure 8 is a front elevation thereof.

Referring to the drawing in detail, 1 is an inlet duct which conveys air into a chamber 2 known as the inlet chamber. This chamber has located within it the volute fan casing 3 which has side entry openings 4 in alignment with which is the rotor 5. On either side of the casing 3 there is located within the chamber one or more plates known as vortex eliminator plates 6 which extend between the fan casing and the side wall of the

inlet chamber. These plates may be located as indicated in full or dotted lines. Ordinarily it would be assumed that such plates would markedly decrease the efficiency of the fan, would obstruct the passage of air into the fan, and would set up back pressure and turbulence within the inlet chamber, which would be disastrous to efficiency.

I have found that none of these expected results occurs, but to the contrary the vortex within the inlet chamber is eliminated and the tendency of the air to continue whirling when entering the eye of the fan at 4 is substantially eliminated. This has resulted in such an increase in efficiency that I have found there is a saving of from three to ten per cent horsepower for centrifugal fans and as much as eighty-two per cent for propeller type fans, in the driving of the fan for an equivalent amount of air handled. After the air enters the eye of the fan without this excessive vortex whirling, it is discharged by the rotor of the fan in the usual manner through the discharge passageway 7.

In Figures 1 to 3, the plates are arranged on either side of the fan, preferably in a vertical position.

In Figures 4 and 5 these plates are arranged either in the full line position or dotted line position as indicated.

In Figures 6 to 8, inclusive, a vertical transverse plate is mounted across the back of the fan within the air inlet chamber of the fan so that the air is guided in its right angle flow through the fan without turbulence and without excessive vortex whirling.

It will be understood that I desire to comprehend within my invention such modifications as may be clearly embraced within the claims and scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In combination, a box having inlet and outlet passageways, a fan casing having a rotor therein, said inlet passageway communicating with the interior of the rotor and said outlet passageway communicating with the periphery of the rotor, and a vortex eliminator plate extending entirely across the inlet passageway between the walls of said box and the walls of said fan casing and in the plane of the axis of the rotor.

2. In combination, a box having an inlet opening, a fan and casing contained within the box having inlet and outlet openings said outlet opening extending so as to discharge air outside of

5 said box and adapted to draw air through the box inlet opening into the fan casing opening and expel air through the fan casing outlet opening and the box outlet opening, and a transverse partition substantially in the plane of the rotor axis extending entirely across the passage between the walls of the box and the fan casing to block this portion of the passage to turbulent fluid but permitting the entry of fluid into the inlet opening of the fan casing, the particles of which move in substantially parallel paths.

10 3. In combination, a box having an inlet opening, a fan casing associated therewith with an inlet opening therein communicating with the interior of the box and an outlet opening through which air is discharged from the box, a partition inside the box in the plane of the axis of the rotor and extending up to the inlet opening of the fan casing whereby air is prevented from rotative movement in the box, the said casing being at least partially within said box.

20 4. In combination, a box having an inlet open-

ing, a fan casing therein with an inlet opening communicating with the box and an outlet opening discharging through the wall of the box, a partition inside the box in the plane of the axis of the rotor and between the side of the box and the casing whereby air is prevented from rotative movement in the box, while permitting its entry into the inlet opening of the fan casing, the said casing being at least partially within said box.

10 5. In combination in a fan casing, having a rotor therein, an opening into the casing communicating with the interior of the rotor, an open inlet box having a transverse partition extending from one wall in the plane of the axis of the rotor and entirely across the passage between the walls of the inlet box and the walls of the fan casing to block this portion of the passage, the remainder of the inlet box being otherwise unobstructed, the casing being at least partially within said box.

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