

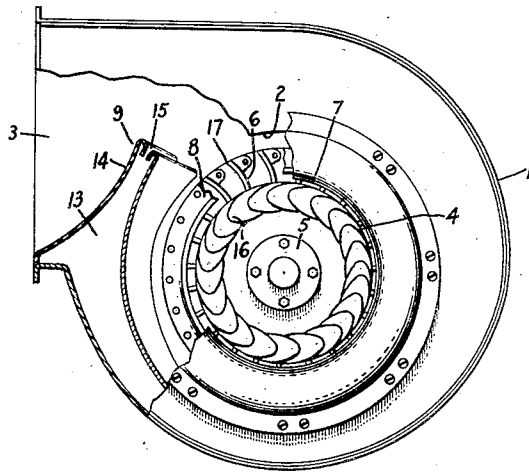
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FAN CASING

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2,171,342

FAN CASING

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Original application April 1, 1938, Serial No. 199,462, which is a division of application Serial No. 82,780, June 1, 1936. Divided and this application March 1, 1939, Serial No. 259,188

2 Claims. (Cl. 230-132)

This application is a division of my application Serial No. 199,462, filed April 1, 1938, which in turn is a division of my application Serial No. 82,780, filed June 1, 1936.

5 The present invention relates to casings for centrifugal fans of the type having a passage around the fan to which air is discharged and a cut-off directing the air to a discharge opening.

10 The object of my invention is to provide an improved construction in fan casings having a cut-off decreasing the noise.

In the accompanying drawing, the single figure is an end view of my improved fan casing.

15 Referring to the drawing, there is shown a fan casing or scroll 1 having an intake opening 2 and an exhaust opening 3. Mounted within the casing is a fan wheel 4 consisting of a hub 5 to which is secured a plurality of blades 6 of the type described and claimed in my application Serial No. 20 82,780, filed June 1, 1936, extending axially therefrom. Mounted in intake opening 2 is a curved orifice ring 7 which serves to provide a smooth curved surface to the entering air to prevent any noise by the impinging of moving air 25 against a sharp edge. Cooperating with orifice 7 to provide a smooth path within the fan casing is a shroud ring 8, which is secured to blades 6. Orifice and shroud rings 7 and 8 are of the construction clearly disclosed in my above applica- 30 tion. Shroud ring 8 is formed as a substantial continuation of orifice 7 and curves inwardly and outwardly in the direction in which air moves over this part of the fan but of necessity is spaced from the orifice 7 a sufficient distance to provide 35 the necessary clearance between a stationary and a moving part. In the exhaust opening 3 a cut-off 9 is provided which extends a sufficient distance within the opening 3 to prevent any eddies or reverse flow within the exhaust opening. 40 The shape of the cut-off is, of course, subject to a great deal of modification. Cut-off 9 is formed of a plate 14 separated from the wall of the casing providing space 13 between the plate 14 and 45 the wall of the casing with an opening 15 at the inner end forming an air column acting as a cushion. The air column also acts as a sound filter of the air column type. I have found that the location of sound deadening material or an 50 air cushion, or a sound filter, or any combination thereof, at the cut-off can more effectually eliminate this noise than by any means located at a different point.

55 The fan wheel 4 is connected to a source of power, not shown, such as an electric motor. The operation of the fan is described fully in my

application Serial No. 82,780, filed June 1, 1936.

For the purpose of the present invention it is sufficient to state that upon rotation of the fan, air is drawn axially into the intake opening 2 by the suction of the fan and by the forwardly 5 curved front ends 16 of the fan blades and is discharged in a radial direction between the fan blades. For the purposes of the present invention, the construction of the fan is not important, that is, any centrifugal fan could be substituted 10 for the fan illustrated.

The air, in passing between two adjacent blades, is acted upon as though the blades were a nozzle taking air in at the intake edges and discharging it at the exhaust edges 17. The discharge from each nozzle formed by adjacent 15 blades is in the form of a jet of air which may vary in velocity throughout the nozzle discharge area. These successive jets impinging against the walls and cut-off of the casing produce a vibration having a frequency equal to the number 20 of blades times the number of revolutions of the fan wheel per unit of time. The vibration may have one or more harmonics of this frequency. This vibration produces a noise the intensity of which depends upon the variation in the magnitude of the air velocity between successive jets. 25

The location at the cut-off of sound deadening material or an air cushion or other sound reducing means reduces any noise which may be produced by an uneven discharge from the fan. I 30 find that the noise reduction by locating the sound deadening material or sound reducing means at the cut-off is disproportionately greater than the noise reduction obtained by sound 35 deadening material or sound reducing means located elsewhere.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In combination, a centrifugal fan casing 40 having an inlet opening and an outlet opening, a centrifugal fan mounted in said casing, means to rotate said fan, and a cut-off formed by a plate spaced from the wall of said casing having an opening at the inner end whereby the cut-off provides a column of air acting as a cushion and reduces the noise of operation of the fan. 45

2. In combination, a centrifugal fan casing having an inlet opening and an outlet opening, a centrifugal fan mounted in said casing, a cut-off 50 located in said outlet, and means adjacent the cut-off including walls having an opening presented to the air stream moved by the fan and providing an air column which serves as a sound filter. 55

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