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FAN HAVING A GREAT AXIAL LENGTH AND COMPRISING AN AIR INLET AT BOTH ENDS

Filed Nov. 17, 1958

FIG.1

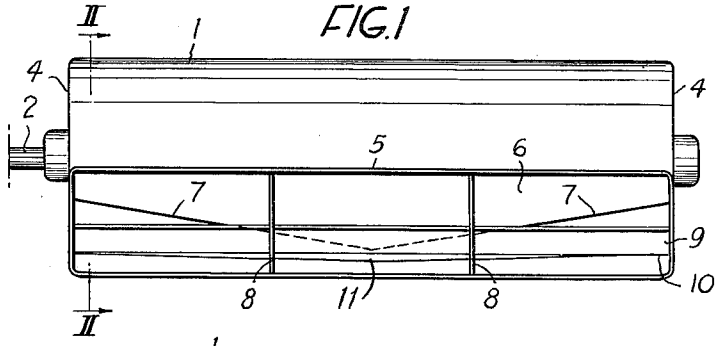


FIG.2

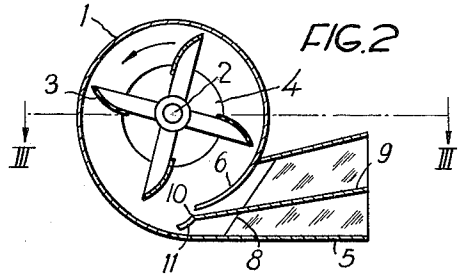
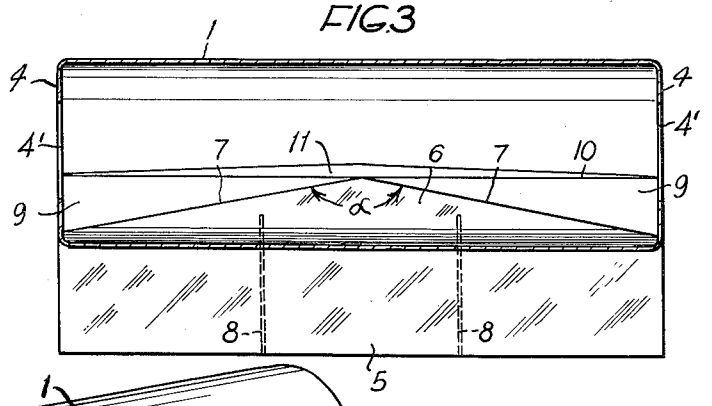


FIG.3



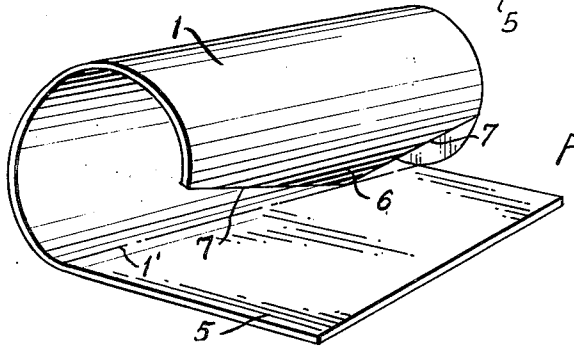


FIG.4

INVENTORS
Lars Larsson
BY John Thenander

Pierce Scheffler & Parker
Attorneys

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FAN HAVING A GREAT AXIAL LENGTH AND COMPRISING AN AIR INLET AT BOTH ENDS

Lars Larsson and John Thenander, Morgongava, Sweden, assignors to Aktiebolaget Westerasmaskiner, Morgongava, Sweden, a corporation of Sweden

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2 Claims. (Cl. 230—128)

This invention relates to a fan having a great axial length and comprising an air inlet at both ends and a discharge opening extending substantially throughout the entire length of the fan. The length of such a fan is often more than twice the diameter of the casing of the fan. Such fans are used when it is desired to distribute the discharged air current over a great width. They are used, for instance, in cleaners for grain where an air current is to be blown over riddles. In order to obtain an effective separation of impurities, the air current should be distributed as evenly as possible over the width of the riddle. It has proved that such fans having axial air inlets and long blades at the required speed are likely to propel the major part of the air towards the central part of the fan such that a considerably stronger air current will occur at the central part of the discharge opening than at the ends thereof. It has also been found that this inconvenience can be avoided by restricting the central part of the discharge opening and increasing the discharge area towards the ends of the opening. In accordance therewith, the invention is characterized in that the height of the discharge opening decreases from the ends towards the central part of said opening, whereby to obtain a resistance to flow gradually increasing towards the central parts and resulting in a more uniform discharge.

The invention is described more closely hereinbelow with reference to the annexed drawing which illustrates an embodiment of the invention.

FIG. 1 is a front elevation of a fan device in accordance with the invention, FIG. 2 a cross-sectional view of the fan on line II—II of FIG. 1, FIG. 3 a sectional view of the casing of the fan taken on the line III—III in FIG. 2, and FIG. 4 is a view in perspective of the fan casing and showing the discharge opening from the scroll wall.

Referring now to the drawings, it will be seen that the fan comprises an elongated casing defined by an elongated scroll wall **1** and axially opposite end walls **4**. Mounted in the casing is the shaft **2** which is connected with the blades **3** of the fan rotor. The blades may have any suitable shape and may have a length preferably equal to the length of the casing. Air inlet openings are provided in the end walls of the casing, said openings being indicated at **4'**. A funnel-shaped discharge duct **5** is connected to the discharge opening from the scroll wall **1**. This discharge opening which is co-extensive in length with the scroll wall, is defined by spaced, longitudinally extending, inner and outer edges of the wall. The outer edge of the scroll wall is coincident with the line **1'** drawn in FIG. 4 and is rectilinear and parallel with the longitudinal axis of the rotor. The inner edge of the scroll wall has a V-shaped configuration, being constituted by two rectilinear edges **7** which extend at an angle to each other from opposite end walls **4** and meet at the center, equidistant from the end walls at a very large obtuse apex angle α. This part of the scroll wall indicated generally by numeral **6** which projects toward the periphery of the rotor thus, in effect, establishes a broad V-shaped baffle edge at the discharge opening such that the height of the opening as measured between the inner and outer edges of the scroll wall progressively

decreases from a maximum at the opposite end walls 4 to a minimum at the center. Due to this particularly advantageous arrangement, upon rotation of the rotor blades **3**, the flow of air outwardly through the discharge opening in the scroll wall into discharge duct **5** will be rendered substantially uniform throughout the total cross section of the opening.

In the discharge duct there are provided a few partitions **8** extending at right angles to the axis of the fan and dividing the duct into separate discharge passages. There is further provided a partition **9** which divides the discharge duct into an upper and a lower duct section. At the front end **10** of the partition **9** there may be provided a baffle **11** having substantially the same shape as the baffle **6** to obtain a predetermined distribution of the air current entering the duct section below the partition **9**. Such division of the discharge duct **5** into an upper and a lower duct section is useful in grain cleaners which are divided into an upper and a lower riddle or screen plate.

The ratio of the length of the fan to the diameter of the fan rotor may vary between 1.5:1 and 5:1 or 6:1, for instance between 2:1 and 4:1. Such a fan can be said to have a moderate length. In very long fans there arrive other problems.

What we claim is:

1. A fan comprising an elongated casing having axially spaced end walls provided with air inlet openings and a scroll wall extending between said end walls, a bladed fan rotor mounted for rotation within said scroll wall and being substantially co-extensive in length with said scroll wall, the length of said scroll wall being at least 1.5 times greater than the diameter of said rotor, said scroll wall terminating in spaced inner and outer edges extending longitudinally between said end walls to thereby define therebetween a discharge opening from the scroll, said inner longitudinal edge of said scroll wall having a V-shaped configuration the apex of which defines a large obtuse angle and said apex being located centrally between said end walls and projecting towards the periphery of said rotor, and said outer longitudinal edge of said scroll wall being rectilinear and parallel with the axis of said rotor whereby the distance between said longitudinal inner and outer edges of said scroll wall is a maximum at said end walls and progressively decreases to a minimum at the apex of said inner edge and whereby upon rotation of said rotor the flow of air outwardly through said discharge opening is substantially uniform throughout the total cross section of said discharge opening.

2. A fan as defined in claim 1 and which further includes an intermediate baffle located between said inner and outer longitudinal edges of said scroll wall and extending longitudinally between said end walls, one longitudinal edge of said intermediate baffle having a V-shaped configuration the apex of which defines a large obtuse angle and said apex being located centrally between said end walls and projecting toward said outer longitudinal edge of said scroll wall, and the other longitudinal edge of said intermediate baffle being rectilinear and parallel with the axis of said rotor.

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