

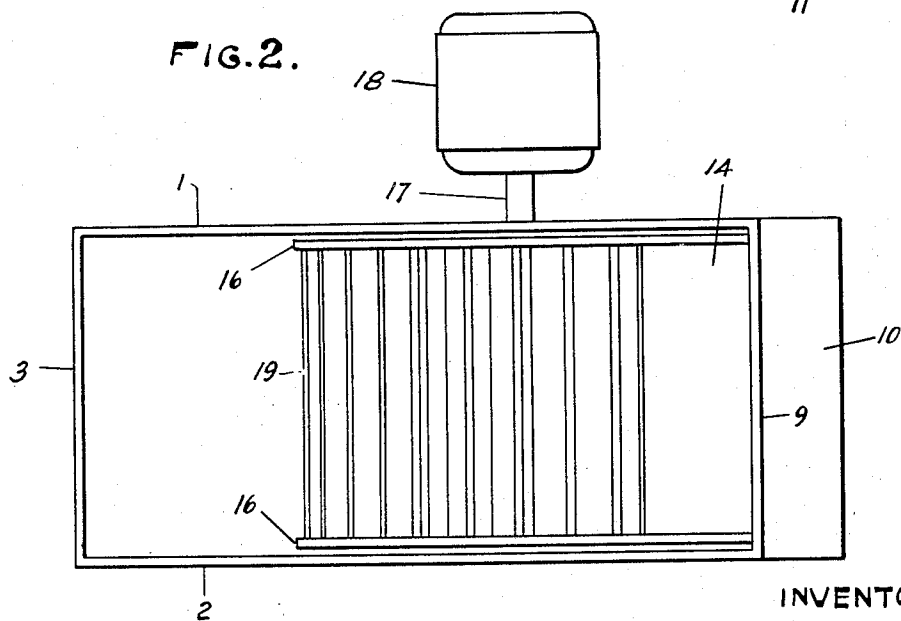
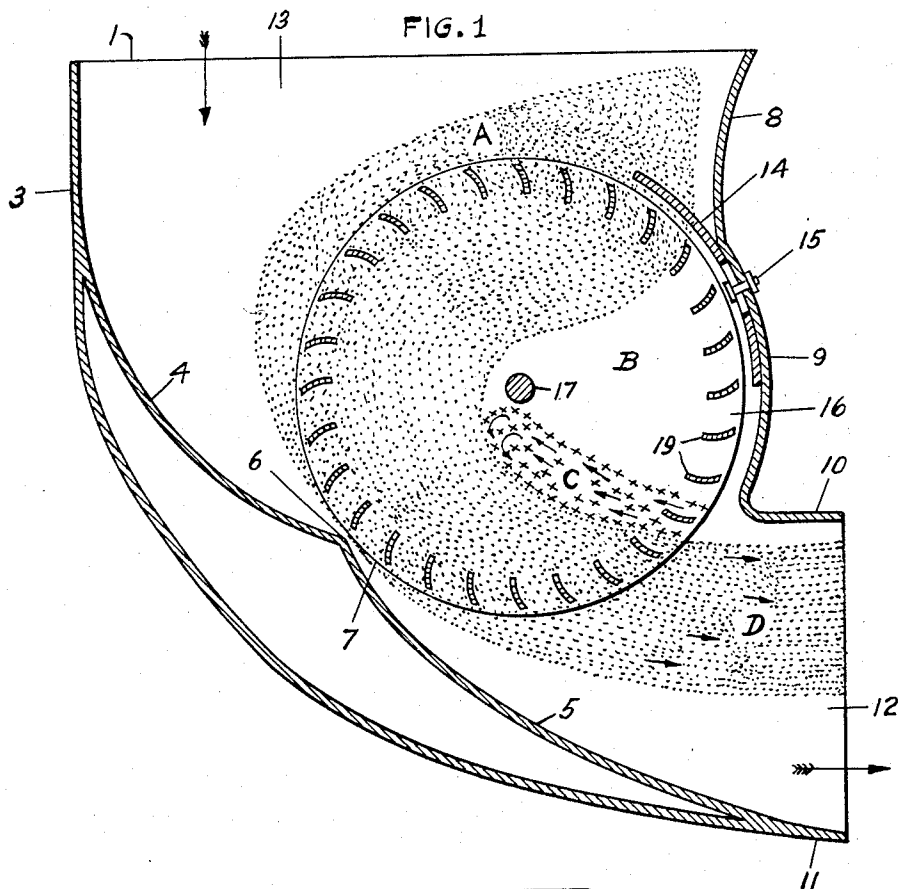
Aug. 8, 1933.

E. L. ANDERSON

1,920,952

LINE FLOW FAN

Filed Jan. 2, 1931



INVENTOR

EDWARD L. ANDERSON.

BY *Paulmin & Paulmin*
ATTORNEYS

UNITED STATES PATENT OFFICE

1,920,952

LINE FLOW FAN

Edward L. Anderson, Grosse Ile, Mich., assignor
to American Blower Corporation, Detroit,
Mich., a Corporation of Delaware

Application January 2, 1931. Serial 506,058

9 Claims. (Cl. 230—125)

My invention relates to line-flow fans.

It is the object of my invention to provide a form of line-flow fan in which there is a guide from the wall of the passageway in which the fan is located directed to a point of neutral pressure on the periphery of the fan.

It is a further object of my invention to provide a fan in which the air passes through the fan transversely of its longitudinal axis; and thereby a fan can be utilized of any length, preferably of a length greater than its diameter, so as to deliver a broad stream of air.

It is a further object to provide a fan with an adjustable screen over the fan to vary the air pressure and at the same time to screen out any tendency for air once delivered to return, and to prevent any return air from impeding the flow of air through the fan.

It is a further object to utilize such portion of the return air as may be desired in a return air jet, which acts as a baffle to guide the air flowing through the fan and to keep such air from entering into that portion of the fan that is returning from the outlet to the inlet.

Referring to the drawing, Figure 1 is a section through a typical fan and delivery casing.

Figure 2 is a top plan view thereof.

Referring to the drawing in detail, 1 and 2 indicate the end walls of the casing, 3 indicates the main side wall known as the outer wall. This outer wall is provided with a pair of arcuate guide members 4 and 5 mounted on the inside of the wall 3 and extending to the point 6, which is the neutral point on the periphery of the line-flow fan; that is, a point where there is no appreciable external movement of air exterior of the fan. The periphery 7 of the fan travels closely adjacent to this point.

The rear wall or inner wall of the fan consists of three portions: an arcuate inwardly extending guide portion 8; an arcuate screen 9, which is parallel to and closely adjacent to the periphery 7 of the fan; and an angular discharge portion 10, which turns abruptly at an angle to the arcuate portion 9 and is substantially parallel to that portion 11 of the outer wall 3, to form a discharge opening 12. 13 indicates the inlet opening.

Mounted on this arcuate portion 9 is an adjustable plate 14 adjusted by the bolts 15. The further this plate 14 extends into the inlet passageway 13, the higher pressure will be secured. Of course, instead of having an adjustable plate, this adjustment of pressure may be permanently secured by positioning the part 8 and the part 9 inwardly to form a more acute angle with respect

to one another; but for the purpose of illustration I have shown an adjustable plate.

The line-flow fan itself consists of end members 16 mounted on the shaft 17 suitably driven by a motor 18 or any other source of motive power. Between the end members 16 are arranged arcuate blades 19 between which the air flows.

In operation I have found that the area of substantial pressure and/or substantial air flow in the direction of the arrows is as indicated in the area provided with fine dots. The air enters the inlet 13, but is mainly drawn in from the right-hand side of the area 13, flows through the fan parallel to the shaft 17 and to one side of the shaft 17, leaving an area of reduced pressure in the area B. In the area C indicated by cross marks, as the blade of the fan, such as 19, passes the cut-off which lies between the wall 10 and the wall 9, the air remaining in the blades is given a reversal of flow towards the shaft as indicated by the cross marks. Thus, only a very small proportion of the air is given a reversal and no air re-enters from the outlet proper.

It is observed that the area A of the air flows at the neutral point 6 does not extend out beyond the periphery 7 of the fan.

By careful test I have determined this area of the air flow A. By providing the guide members 4 and 5, by arranging the screen 9 and by adjusting the position of the plate 14, I am enabled to regulate and guide the air flow and to regulate its pressure.

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

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

1. In combination, a line-flow fan, means to encase said fan so arranged as to guide air through one portion of said fan and means on said first means to redirect a portion of said air substantially radially into the fan to form a baffle to prevent the guided air from returning into that area within the fan through which it has not yet passed.

2. In combination, a casing having an inlet and outlet opening, a line-flow fan, means of guiding said air through a portion of said line-flow fan where it is under pressure, means for fitting around the fan between the inlet and the outlet for screening that portion of the fan where it returns from the outlet to the inlet of

the casing to prevent the outgoing air from returning substantially wholly into the screened portion but allowing enough air to return to form a baffle to aid in directing the other air.

3. In combination, a casing having an inlet and an outlet opening, a line-flow fan interposed therebetween located closely adjacent one wall of said casing where the blades of the fan pass from the outlet to the inlet opening, means on the other wall of said casing proceeding from the inlet opening to the periphery of the fan to the neutral point thereon and from said neutral point back to the casing adjacent the outlet opening, said casing being so arranged as to redirect a jet of returned air from approximately the top of the outlet opening to the center of the fan whereby the outgoing air will be prevented and baffled from entering the area of the fan where the blades are moved from the outlet opening back to the inlet opening.

4. In combination, a casing having an inlet and an outlet opening, a line-flow fan interposed therebetween located closely adjacent one wall of said casing where the blades of the fan pass from the outlet to the inlet opening, means on the other wall of said casing proceeding from the inlet opening to the periphery of the fan to the neutral point thereon and from said neutral point back to the casing adjacent the outlet opening, said casing being so arranged as to redirect a jet of returned air from approximately the top of the outlet opening to the center of the fan whereby the outgoing air will be prevented and baffled from entering the area of the fan where the blades are moved from the outlet opening back to the inlet opening, and a screen over the top of said fan between it and the inlet opening.

5. In combination, a casing having an inlet and an outlet opening, a line-flow fan interposed therebetween located closely adjacent one wall of said casing where the blades of the fan pass from the outlet to the inlet opening, means on the other wall of said casing proceeding from the inlet opening to the periphery of the fan to the neutral point thereon and from said neutral point back to the casing adjacent the outlet opening, said casing being so arranged as to redirect a jet of returned air from approximately the top of the outlet opening to the center of the fan whereby the outgoing air will be prevented and baffled from entering the area of the fan where the blades are moved from the outlet opening

back to the inlet opening, and a screen over the top of said fan between it and the inlet opening, said screen being adjustable.

6. In combination, a casing having a relatively large inlet opening and a relatively small outlet opening, a line-flow fan mounted therein eccentrically thereof, closely adjacent to one wall of the casing and that portion of the fan where the blades thereof are returning from the outlet opening to the inlet opening, arcuate means extending from the other wall of said casing to the neutral point on the fan and from the neutral point back to the casing, and means for controlling the pressure of the air by screening the blades of the fan from the incoming air.

7. In combination, a casing having a relatively large inlet opening and a relatively small outlet opening, a line-flow fan mounted therein eccentrically thereof, closely adjacent to one wall of the casing and that portion of the fan where the blades thereof are returning from the outlet opening to the inlet opening, arcuate means extending from the other wall of said casing to the neutral point on the fan and from the neutral point back to the casing, and means for controlling the pressure of the air by screening the blades of the fan from the incoming air, said inlet and outlet openings being arranged at right angles to one another.

8. In a method of handling air, introducing air into a casing of progressively decreasing diameter, engaging the air by air moving means which directs the air through the casing, restricting the flow of air through the air moving means, creating an area of air pressure, creating an area within the air moving means of reduced pressure and utilizing return air to form a baffle between the area of pressure of outgoing air and the area of reduced pressure.

9. In a method of handling air through a line-flow fan, progressively confining the air to an area within the fan from the inlet opening to a neutral point on the periphery of the fan and from the neutral point to an exit of the fan, re-introducing a portion of the air making its exit from the fan into the fan, using re-entry air as a baffle between the outgoing air impelled by the outgoing blades of the fan from the area of reduced pressure where the returning blades of the fan are located.

EDWARD L. ANDERSON.

55

130

60

135

65

140

70

145

75

150