Feb. 10, 1948. C. O. BERGSTROM 2,435,645

AXIAL FLOW FAN

Filed Aug. 23, 1945

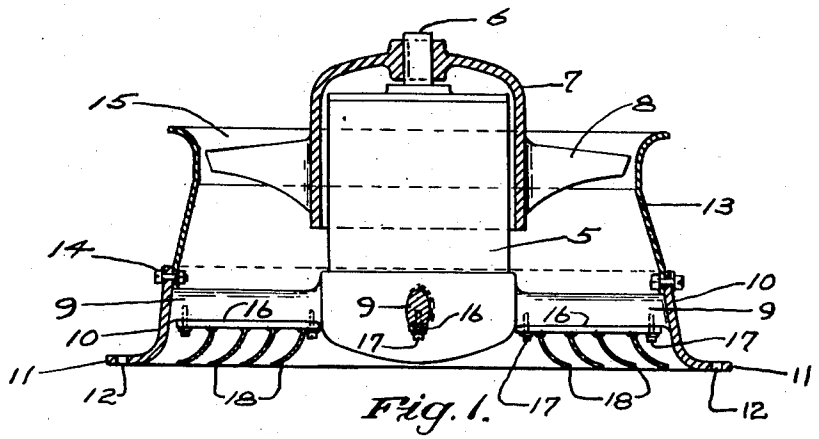

Fig. 1.

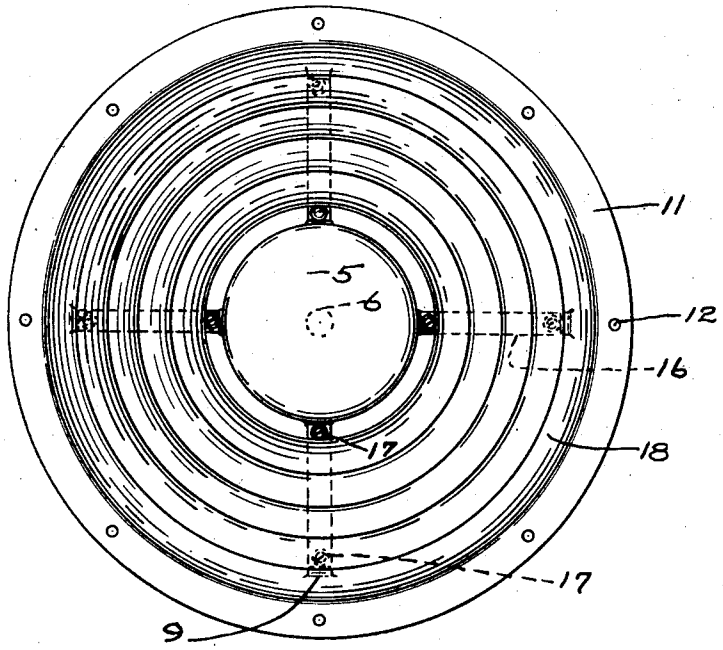

Fig. 2.

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AXIAL FLOW FAN

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1 Claim. (Cl. 230—259)

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This invention relates to fans and relates more particularly to axial flow fans for providing pressure ventilation.

In passenger vehicles such as subway cars, street cars and railway passenger coaches, it has been found possible to provide comfortable temperatures in summer by blowing large volumes of outdoor air into the passenger space with fans located in the ceilings of the vehicles. Examples of such installations are disclosed in my Patents Nos. 2,142,834; 2,148,254; 2,197,740 and 2,292,192.

Such prior systems utilized centrifugal fans. Axial flow fans while they have many advantages for pressure ventilation, have not been thought suitable for pressure ventilation in passenger vehicles because of the space they would require, and because of the straight downflow of air if mounted in ceilings.

This invention provides an axial flow fan especially adapted for pressure ventilation, and having the features of occupying less space than prior axial flow fans, and of discharging the air outwardly instead of axially.

Objects of the invention are to reduce the axial depths of axial flow fans, and to direct the air delivered by same, outwardly away from their axes.

The invention will now be described with reference to the drawing, of which:

Fig. 1 is a side elevation, partially in section, of an axial flow fan embodying this invention, and

Fig. 2 is a plan view looking upwardly at the bottom of the fan.

The electric motor 5 has a shaft 6 extending vertically upward and to which is keyed the hub 7. The hub 7 has a cylindrical portion around the upper portion of the motor, and the blades 8 which may be eight in number are attached to the cylindrical portion of the hub and are so located that the space they sweep is located well below the top of the motor.

The lower portion of the motor 5 has attached thereto the four radially extending arms 9 to the outer ends of which is attached the casing member 10. The member 10 has the outwardly turned annular portion 11 containing the apertures 12 for receiving bolts (not shown) for attaching the fan around a circular opening in the ceiling of a vehicle or other enclosure.

The scroll portion 13 of the casing is attached to the member 10 by the bolts 14, and extends upwardly from the member 10 and around the fan blades 8, and forms the axial inlet passage 15 around the upper end of the motor 5.

The plates 16 are attached by the machine screws 17 to the undersides of the arms 9, and the upper ends of the curved deflector vanes 18 are attached as by welding, to the undersides of the plates 16. The vanes 18 are spaced apart

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and curve downwardly below the plates 16, their lower ends terminating in the plane of the lower surface of the annular portion 11 of the casing member 10. The vanes 18 act to deflect the air from the blades 8 outwardly as it leaves the fan whereby too strong currents of air will not be discharged onto persons standing immediately below the fan when same is mounted for pressure ventilation in a ceiling, and whereby the space below and on all sides of the fan will be supplied with ample air volumes.

By enclosing the upper portion of the motor 5 in the hub of the fan wheel, and by locating the air directing vanes 18 above the lower edge of the fan outlet, the axial depth of the fan is so reduced over perior constructions that it has been found possible to locate it easily in the limited overhead space in passenger vehicles which were not designed with the use of such fans in mind.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact construction illustrated, as modifications thereof may be suggested by those skilled in the art without departure from the essence of the invention.

What is claimed is:

An axial flow fan having an upright casing with an upper axial inlet and a lower axial outlet, said casing at a said outlet having a flange extending perpendicular to the axis of the fan and having apertures therethrough for receiving bolts for supporting said flange to a ceiling around a circular opening therein, a motor for driving said fan having its rotary shaft extending axially within said casing, a plurality of arms extending radially from the lower portion of said motor and attached to said casing adjacent said outlet for supporting said motor therefrom, a plurality of spaced deflector vanes attached to the lower surfaces of said arms, said vanes curving outwardly from said arms towards said flange and terminating substantially flush with the plane of the lower surface of same, a hub attached to said shaft and encircling the upper portion of said motor, and a plurality of axial flow fan blades attached to said hub within said inlet.

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REFERENCES CITED

The following references are of record in the file of this patent:

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1,725,085	Johnson	Aug. 20, 1929

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