April 29, 1930. F. CHARAVAY 1,756,343

MEANS FOR MOVING AIR AGAINST PRESSURE

Filed Oct. 10, 1927

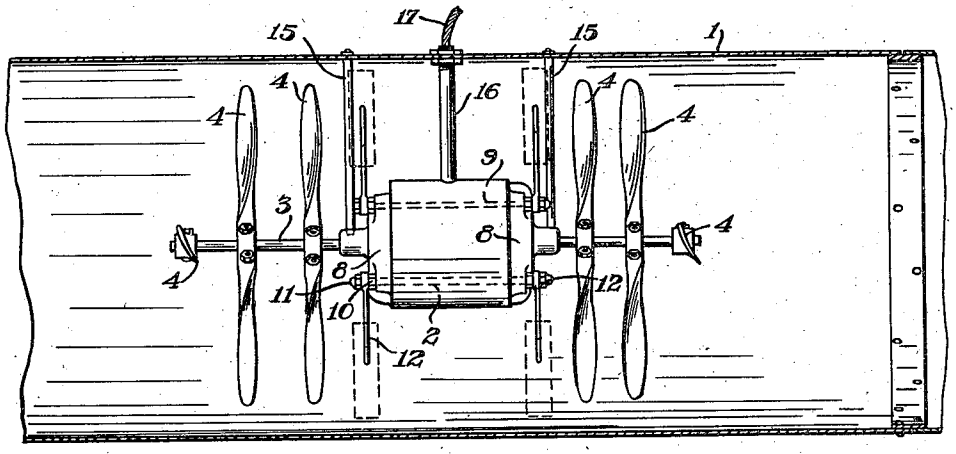


Fig. 1.

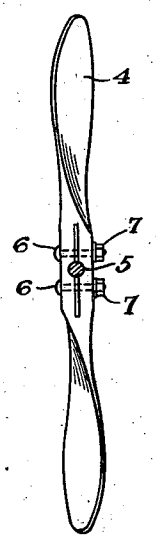


Fig. 3.

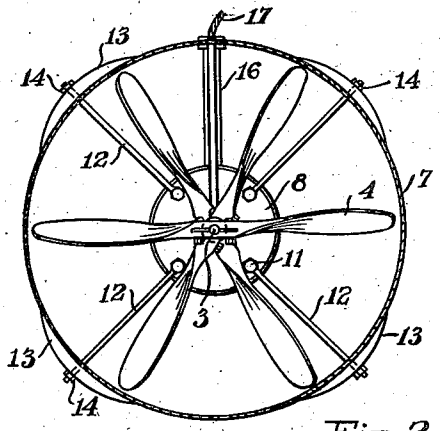


Fig. 2.

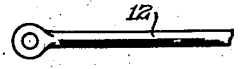


Fig. 4.

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Patented Apr. 29, 1930 1,756,343

UNITED STATES PATENT OFFICE

FREDERICK CHARAVAY, OF PIQUA, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO HARTZELL INDUSTRIES, INC., OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

MEANS FOR MOVING AIR AGAINST PRESSURE

Application filed October 10, 1927. Serial No. 225,137.

This invention relates to new and useful improvements in means for moving air against pressure.

It is the principal object of my invention to provide for mine, building and other duct service, where it is necessary to move air against pressure, a motor unit upon whose shaft there is mounted a multiplicity of blower blades, one behind the other. In this assembly each blade adds its work to the others, with the result that substantially 11000 cubic feet of air a minute may be moved by a one and a half horse power motor against a one and a half inch of water pressure.

It is another object of my invention to provide suitable means for securing the blower unit within a metal tube or shell through which air is to be moved against pressure.

Other important and incidental objects will be brought out in the following specification and particularly set forth in the subjoined claims.

In the accompanying drawings illustrating my invention, Figure 1 is a longitudinal, sectional view taken through a metal tube showing my air moving unit secured therein. Figure 2 is an end view of said tube, showing said blower unit mounted therein. Figure 3 is an elevational view of one of the air moving blades. And Figure 4 is a detail view of a portion of one of the eye bolts for securing the motor unit within the tube.

Referring to the accompanying drawings for a detailed description of my invention, the numeral 1 designates a metal tube or shell through which air is to be moved. For the purpose of moving air through this tube against pressure, I axially secure therein by means to be described an electric motor 2 whose armature shaft 3 projects from both ends of it. Upon each end of the armature shaft 3 a series of blades 4, preferably of aerofoil action, are mounted. These blades may be staggered as shown in the drawings, but are disposed one behind the other, so that each blade may add its power to that of the others. This is the only type of blower unit that can be constructed the same size as the tube conveying the air, for relay purposes.

In order that each blade may fit the shaft 3 snugly, it is split on each side of its central hole 5, as shown in Figure 3. On each side of the hole 5, the blade is formed with a bolt hole to receive a bolt 6. Nuts 7 are applied to the threaded ends of these bolts to draw the split portions of the blade snugly against the shaft 3 to which it is applied. In order to true the blade properly to the shaft 3, it is only necessary to ream the hole 5 to the desired angle.

For the purpose of securing the motor 2 firmly within the tube 1, I provide the following means. Projecting through the end plates 8, 8 of the motor are studs 9. Upon each end of the studs 9 is a washer 10, and between this washer and a nut 11 the eye portion of an eye bolt 12 is secured to the stud. These eye bolts 12 project radially from the studs 9 through holes in the metal shell, and also through holes in crescent-shaped clamping members 13, whose inner surfaces conform to the periphery of the shell. To the outer threaded ends of the bolts 12, nuts 14 are applied, the crescent-shaped members 13 serving to prevent the shell being pressed out of shape or distorted when the nuts 14 are tightened. The bearings of the motor 2 receive oil through radial tubes 15 which project to them from the exterior of the shell.

A radial tube 16 is provided for the cable 17, which conducts the electric current to the motor 2, as shown in Figures 1 and 2. When the motor is rotated by this current, it will turn the shaft 3 to rotate the blades 4. These blades being in multiple and disposed one behind the other, will move a larger amount of air through the tube than would be possible with one blade, since each blade adds its power to that of the others. There is thus maintained a uniform pressure, so that a large amount of air may be moved through the shell for mine, building or like service. This pressure is in proportion to the number of blades used.

Having described my invention, I claim:

1. An axial flow fan comprising a circular casing, a motor having an armature, mounted axially thereof, the shaft of said armature

projecting from both ends of said motor, a plurality of airfoil propellers mounted in balanced staggered relation on each end of said shaft.

2. An axial flow fan comprising a circular casing, a source of power mounted in said casing, having a power shaft, a set of airfoil propellers mounted on said shaft at each end in balanced staggered relation, and bearings for said shaft intermediate said sets of propellers.

In testimony whereof I have hereunto set my hand this 7th day of October, 1927.

FREDERICK CHARAVAY.