No. 681,389. Patented Aug. 27, 1901.

S. C. DAVIDSON.

CENTRIFUGAL FAN.

(Application filed Dec. 19, 1899.)

(No Model.)

FIG. 2.

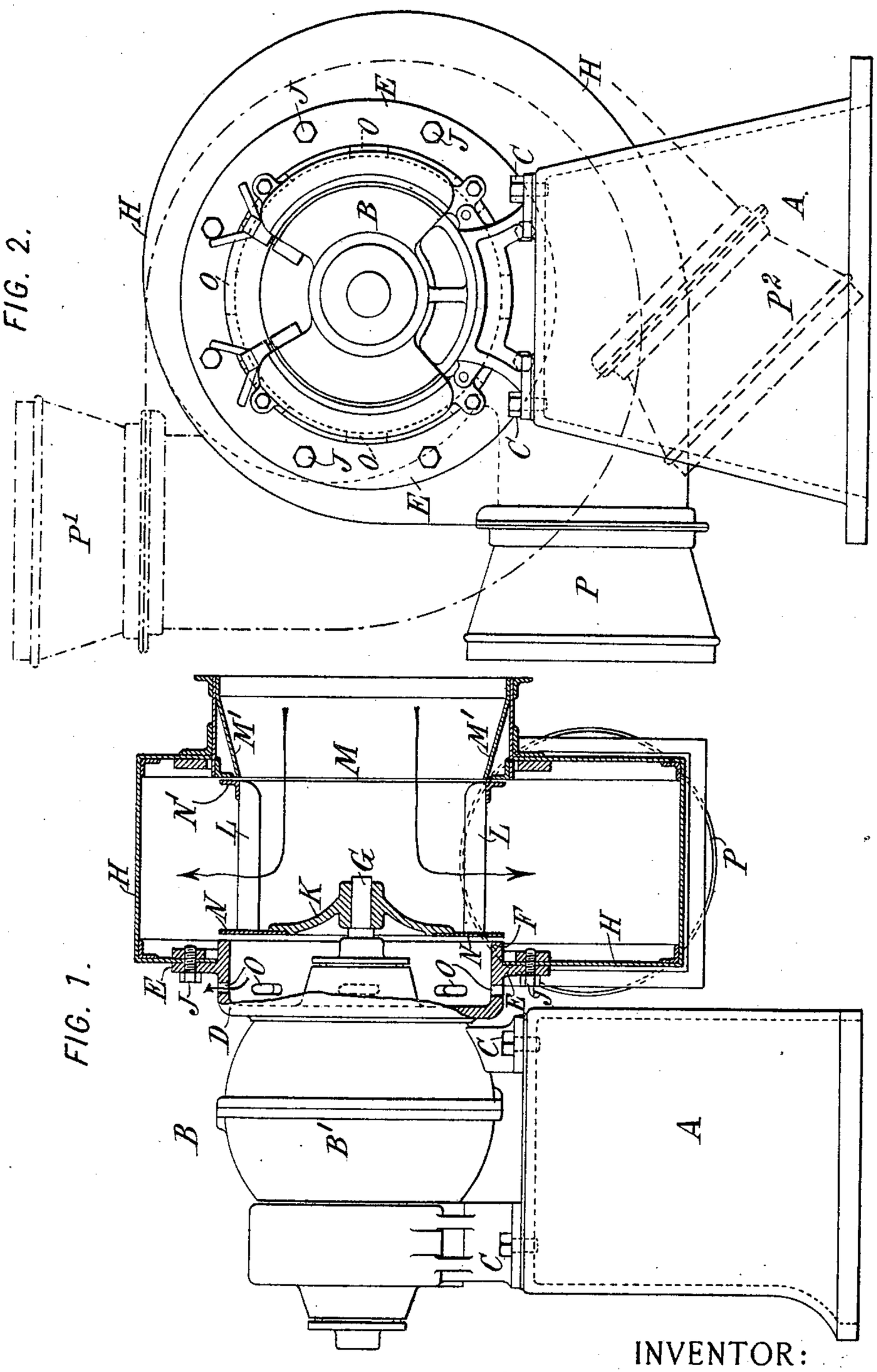

FIG. 1.

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CENTRIFUGAL FAN.

SPECIFICATION forming part of Letters Patent No. 681,389, dated August 27, 1901.

Application filed December 19, 1899. Serial No. 740,874. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL CLELAND DAVIDSON, a subject of the Queen of Great Britain, residing in Belfast, Ireland, have invented certain new and useful Improvements in Centrifugal Fans, of which the following is a specification.

My invention relates to rotary fans, especially of the centrifugal type, and aims to provide an improved connection between the fan and the motor by which it is rotated. In this type of fans it is common to couple the rotary member directly to an electric motor and to fix the stationary member or casing directly to the motor-shell, so that the casing is supported from the motor. This has usually been done by a connecting-casing which is fixed between the fan-casing and the motor-shell. It has been found that in operation the fan tends to either drive or suck the oil from the motor-bearings, due to back pressure or exhaust, according to the condition under which the fan is operating. My invention aims to avoid this disadvantage by providing ventilating-passages between the space inclosed by the connecting-casing and the outer air, whereby the pressure within the casing is maintained at approximately normal atmospheric pressure.

My invention also provides a means by which the direction of delivery from the fan-casing may be changed as desired, thus permitting the adjustment of a single fan to varying conditions of use.

Referring to the drawings, in which I have shown my invention as applied to a fan coupled to an electric motor, Figure 1 is a sectional elevation of the preferred form of my invention, and Fig. 2 is a rear elevation.

In the drawings, A designates a suitable base or support for the motor B, which latter is here shown as an electric motor of common type, inclosed in a protecting-shell B′, which is fixed to the base A by bolts C, passing through suitable flanges formed in the shell.

To the front of the shell B′ is fixed a casing D, which is preferably formed as an integral part of the motor-shell and which forms an intermediate connecting-casing between the latter and the fan-casing H. The casing D is formed on its exterior with an annular vertical flange E, to which the fan-casing H is fixed by suitable bolts J, passing through the flange and casing. The holes through which the bolts J pass are spaced apart equidistantly around the flange E and casing H, so that the latter may be turned in any direction to bring the delivery-nozzle P to the position best suited to the individual requirements, whereupon the casing may be bolted in its adjusted position. This permits a delivery of the fluid operated on in any direction, two of the many positions being shown in dotted lines at P′ and P^2 in Fig. 2 and a third in full lines at P. The base A should be of sufficient height to permit the nozzle P to pass to its lowest position (shown in dotted lines at P^2) without striking the floor. The fan-casing is supported temporarily during its adjustment by the connecting-casing D, which is shown as extending a short distance into the fan-casing.

The shaft G of the motor B preferably extends through a suitable gland or stuffing-box into the casing H, and preferably, as in the construction shown, the rotary member of the fan is mounted directly upon the shaft. The type of fan shown comprises numerous thin elongated blades L, which are arranged in drum form and are fixed at their inner ends to a disk N, which is fixed to a suitable hub K, mounted upon the shaft G. At the opposite or intake end of the fan the blades L are fixed to an annular support N′, which encircles the blades at their outer edges. The intake end of the fan faces a suction-eye or inlet-opening M, formed in the casing, which latter is preferably provided with a suitable mouthpiece or funnel M′ for directing the fluid into the eye. The fluid operated on is taken axially into the intake-chamber of the fan and is discharged circumferentially into the casing through the spaces or ports between the blades L, as shown by the arrows in Fig. 1, whence it escapes through the nozzle P. When operating as an exhaust, with a free discharge through the delivery nozzle, the rapidly-moving fluid tends to cause a suction from the interior of the casing D into the fan-casing around the edges of the disk N. This suction tends to draw the oil from the motor-bearings through the stuffing-box of the shaft G, so that the bearings heat.

When the fan is operating as a pressure-pump, the fluid tends to pass around the disk N into the casing D, thus tending to force the oil from the motor-bearings in a direction opposite that just described. By my present invention I obviate both these difficulties by forming one or more ventilating-openings O in the casing D, so that a communication is established between the interior of the casing and the outside air, whereby the pressure in the casing and motor-shell is maintained substantially equal. Thus an increase of pressure in the casing D will cause an outflow through the openings O, as shown by the arrow, while suction from the fan-casing will cause flow in the opposite direction.

It is not essential to the present invention that an electric motor should be used or that the rotary member of the fan should be directly mounted upon the motor-shaft, as my invention may be advantageously used with other motors and wherever the proximity of the fan to the motor is such as to produce any undesirable pressure in the intermediate connecting-casing.

What I claim is—

1. The combination of a rotating fan, a motor for driving it, and a connecting-casing between said fan and said motor supporting one of said members from the other, said casing having ventilating-openings to permit the circulation of air through said casing.

2. The combination of a motor, a rotating fan, a casing for the fan, a driving-shaft for the fan connected to said motor, and an intermediate connecting-casing between said motor and said fan-casing and supporting one of said members from the other, having ventilating-openings to permit the circulation of air therethrough.

3. The combination of a motor, a shell inclosing said motor, a rotating fan, a casing for said fan, and an intermediate connecting-casing between said motor-shell and said fan-casing and supporting one of said members from the other having ventilating-openings to permit the circulation of air therethrough.

4. The combination of a motor, a shell inclosing said motor, a centrifugal fan rotated by said motor and having its inner end closed, a casing for said fan, and an intermediate casing connecting said fan-casing to said shell and supporting said casing from said shell and having ventilating-openings to permit circulation of air therethrough.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SAMUEL CLELAND DAVIDSON.

Witnesses:

THOMAS F. WALLACE,

FRED WHITE.