(Model.)

J. T. & L. J. HOPE & L. C. ALEXANDER.

ROTARY FAN FOR VENTILATION.

No. 420,156. Patented Jan. 28, 1890.

Fig. 1.

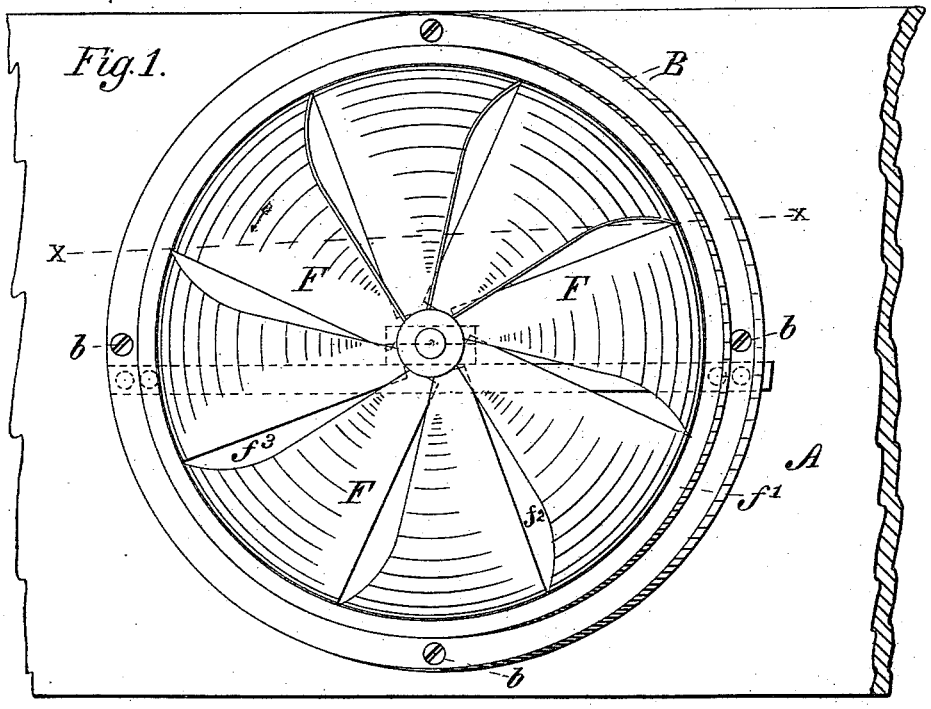
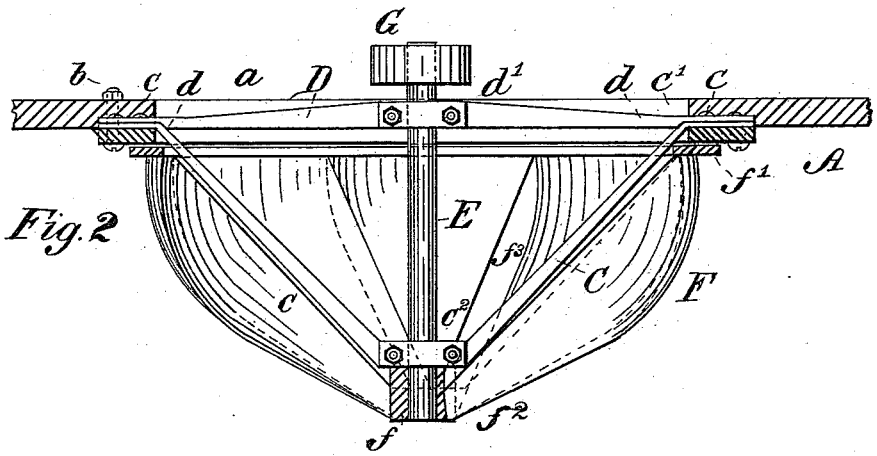


Fig. 2



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ROTARY FAN FOR VENTILATION.

SPECIFICATION forming part of Letters Patent No. 420,156, dated January 28, 1890.

Application filed September 24, 1886. Serial No. 214,473. (Model.)

To all whom it may concern:

Be it known that we, JOHN T. HOPE, LUKE J. HOPE, and LINDEN C. ALEXANDER, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Rotary Ventilating-Fans; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

Our invention has for its object to push against the air in the immediate reach of the vanes of a ventilating-fan and create a vacuum in the rear of the said vanes, so as to increase the air-flow; and it consists in the novel construction and combination of parts, which will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a front elevation of the fan shown attached to the wall and covering an opening therein. Fig. 2 is a transverse sectional view of the fan, taken on the line *x x* of Fig. 1.

In the construction of our improved fan, B represents an annular plate of the proper dimensions. To one side of the plate B, a slight distance below the line of its axis, in opposite relations and in a horizontal plane, are attached by means of the rivets *c c* one end of the respective braces C C. Said braces C C are bent over the inner edge of the annular plate B and extended through the opening in said plate a suitable distance, and the opposite ends are brought together and secured in any suitable manner, preserving the same horizontal position as the opposite ends. Upon the joined ends of said braces C C is rigidly attached a journal-box c^2, which extends to and is in line of the axis of the annular plate B. Extending directly across the opening in plate B from one end portion of strip C to an opposite end portion, and secured to said ends of strips in a like plane, is a transverse brace D. Upon the brace D, in the line of the axis of the annular plate B, is attached a journal-box d'. Through the journal-box d', and also through the box c^2 on braces C C, is extended a shaft E. Upon the end portion extending through and beyond box c^2 is attached rigidly a thimble *f*. An annular movable flat plate f', to form the periphery of the fan and covering cylindrically a portion of the plate B, is next made, to the outer side of which is attached the vanes F F of the fan. These vanes F F are made in a triangular shape, the base of each being attached flatwise by soldering or any other suitable manner to said plate and a series of vanes placed consecutively around said plate, the relative width of the base of each vane being governed by the size of the plate f', and upon which plate the edges of contiguous plates contact with each other.

The angles of each triangular vane bear such a relation to each other that when the apex of the vane is secured to the thimble in a plane oblique to the axis thereof one free edge of each vane will be straight and inclined as to the fan-shaft while the other free edge curves or arches outwardly. As the width of the vanes decreases in the direction of the thimble so does the degree in which the curve is given to the blades, it being in proportion to the length of the axis of the fan, so as to sustain the impact upon the air and produce the vacuum required.

The narrow end portion f^2 of each of the vanes F are then given a partial twist or turn in the direction of the inner straight edge of said vane, and the said end portion cut in a transverse direction and in the line of direction of thimble *f*, and attached to said thimble by soldering to the longitudinal side of said thimble in a plane oblique to the axis of said thimble and the series of vanes attached thereto in like manner, and a short distance from each other, leaving the curved-shaped openings f^3 between the vanes F F, through which the air-currents flow as the vacuum is increased.

In connecting the fan with a wall A, an opening *a* is made in said wall of the shape conforming to that of the annular plate f' of the fan and slightly less in diameter, and the fan secured to the wall A by the bolts *b b* of the stationary plate B placed around said opening.

In the operation of our improved fan, power

is applied to rotate the shaft E in the direction shown by the arrow in Fig. 1, the outer side portions of the vanes of the fan strike upon the air and force the air away from and in the direction of the rotation of said vanes, and a vacuum is formed in rear and upon the under convex side portion of said vanes, which draws the air-currents through the opening f^3 around the shaft E, and the blast is increased.

In the fans of ordinary construction the vanes scoop the air and throw the air-currents in the rear of the fan, while in the peculiar construction of our fan the impact of the outer side portion of the vanes upon the air in the described rotation of shaft E creates the vacuum which causes the counter-current of air to concentrate the blast, and in this manner, the fans applied to the ventilation of air-conduits of varying lengths, we are enabled to cause the concentrated blast to reach distances not obtainable by means of fans in common use.

We are aware of the Letters Patent of the United States granted to Blackman, No. 261,128, dated July 18, 1882, Kittoe, No. 329,052, October 27, 1885, and Pelzer, No. 223,065, December 30, 1879, the construction of which fans and the mode of operation are for purposes dissimilar to this application, in that the air is scooped up and thrown forward broadcast, while in our improved fan the air-blast is concentrated as described.

Having fully described our invention, what we now claim as new, and desire to obtain by Letters Patent, is—

In a rotary fan, the combination of a shaft, a pulley at one end thereof, a thimble attached to the other end, triangular vanes each attached at its apex to said thimble in a plane oblique to the axis of the fan and extending divergingly toward the pulley in a manner such as to leave one side of the triangular vane straight and inclined as to the fan-shaft and the other side outwardly curved and a ring located in a plane between said thimble and pulley, and to which the bases of the vanes are secured flatwise and consecutively, for the purpose described.

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