No. 680,120. Patented Aug. 6, 1901.

E. W. BROWN.

ELECTRIC FAN.

(Application filed Nov. 8, 1900.)

(No Model.) 2 Sheets—Sheet 1.

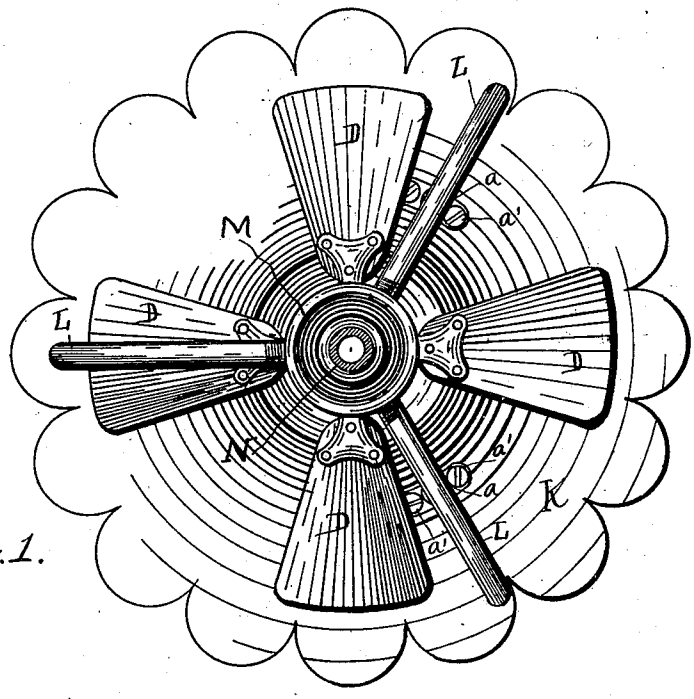


Fig. 1.

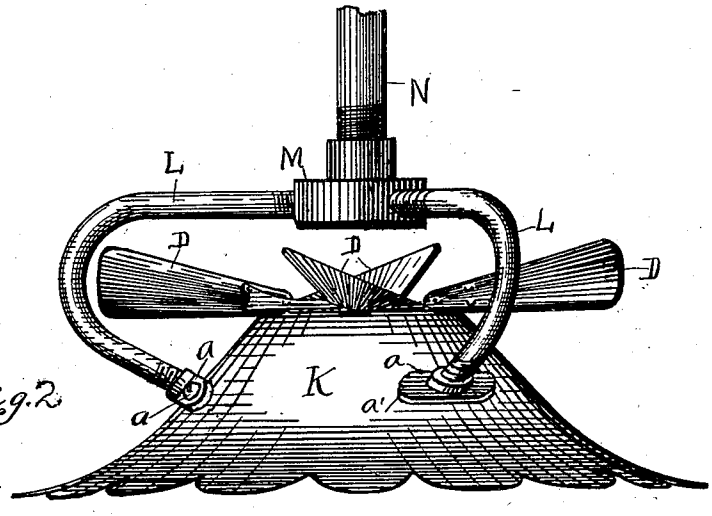


Fig. 2.

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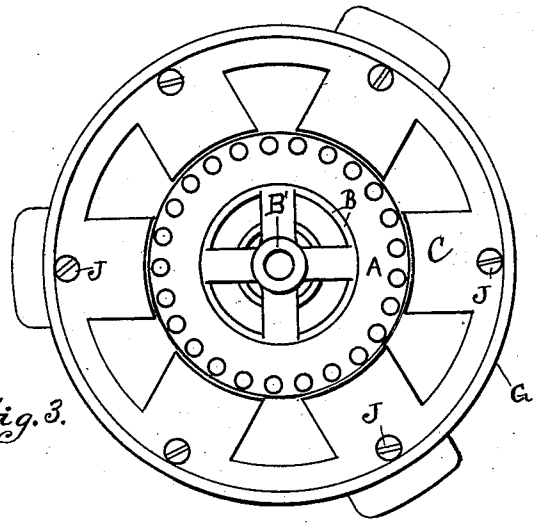


Fig. 3.

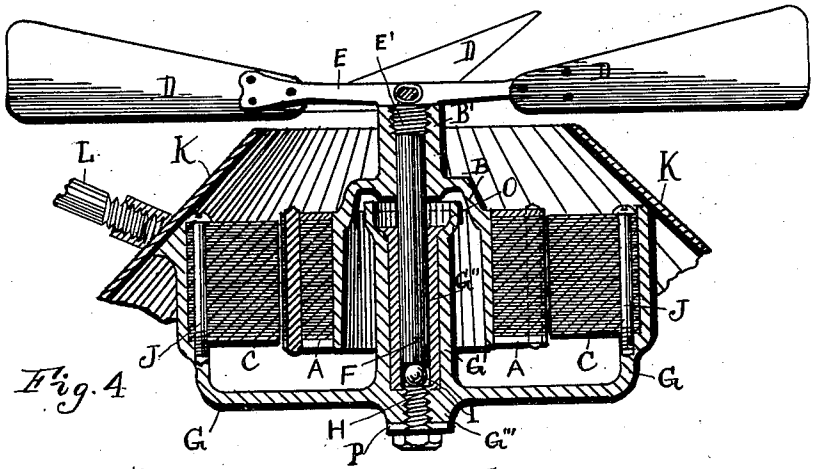


Fig. 4.

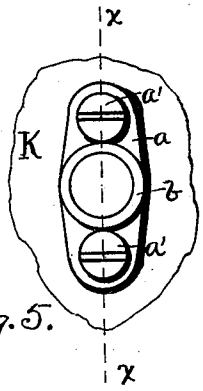


Fig. 5.

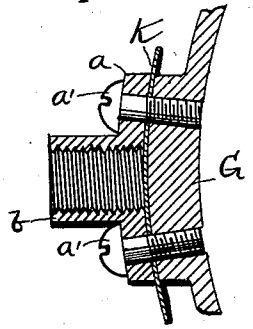


Fig. 6.

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UNITED STATES PATENT OFFICE.

EDGAR W. BROWN, OF DAYTON, OHIO.

ELECTRIC FAN.

SPECIFICATION forming part of Letters Patent No. 680,120, dated August 6, 1901.

Application filed November 8, 1900. Serial No. 35,807. (No model.)

To all whom it may concern:

Be it known that I, EDGAR W. BROWN, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Electric Fans; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in electric fans, and comprises means combined with an electric motor (either an alternating or direct current motor) for distributing the currents of air generated by the fan-blades.

There are two kinds of electric fans in general use for keeping the air of a room in circulation. These are known in the art as "ceiling-fans" and "buzz-fans." Comparing two motors of the above types taking the same amount of current and giving out the same power, one of them—to wit, the ceiling-fan motor—will run at about an average of one hundred and sixty revolutions per minute, and the other—to wit, the buzz-fan motor—will run at about an average of sixteen hundred revolutions per minute. In the high-speed motor the proportion of wire and iron used in its construction will be very small in comparison with that used in the low-speed motor.

It is the object of the present invention to adapt a high-speed motor to the purposes of a ceiling-fan and to enable the use of fan-blades of comparatively small dimensions.

Ceiling-fans of the ordinary type are suspended from the ceiling by a tube at a height of about eight feet from the floor and have usually from two to four fan-blades, which are run at a comparatively low rate of one hundred and sixty revolutions per minute. The fan-blades usually have a sweep varying from forty-eight to seventy-two inches. In other words, this is the distance from the tip of one blade to the tip of the opposite blade. The blades are set so that the air is drawn down from above the fan and is forced directly toward the floor. The air then spreads out over the floor until the walls are reached, when it ascends said walls to the ceiling and is again drawn down by the revolving blades. It will be seen that there is a column of air descending to the floor the diameter of which is equal to the spread of the blades. The following are the principal disadvantages known to exist in the ordinary ceiling-fan, as above described. For example, there are only places where a person can obtain the benefit of the breeze. One is a position directly under the fan, where the breeze will be thrown down on the head of the person, and the other place is close to the wall, where the air ascends to the ceiling. The dirt of the street is carried in on the shoes of persons entering stores, restaurants, and other public places where these fans are used, and where it falls off onto the floor and becomes dust. The ceiling-fan which throws the air to the floor stirs up this dust and diffuses it throughout the room greatly to the detriment of the health of persons who have to breathe such air. By the use of the air-deflector hereinafter described the air may be thrown downwardly and outwardly, according to the extent of curvature given the deflector. For example, the greater the curvature of the deflector the greater will be the spread of radiation of air generated by the fan-blades. In other words, by curving the deflector outward sufficiently the air is spread outwardly to such an extent as to avoid striking the floor, but will be directed against the lower sides of the walls. Therefore persons in all parts of the room may receive the benefit of pure currents of air. Another objection met with in the use of the ordinary ceiling-fan is the liability of the large fan-blades becoming broken by being struck by objects carried through the room—such, for example, as a step-ladder. Striking the blades with such objects not only damages the blades, but often throws the fan out of balance and makes it liable to jump off the hook by which it is suspended. In the present invention the deflector is projected out beyond the ends of the fan-blades, and thus affords a protection to them.

The means for obtaining the advantages hereinbefore described, as well as other new and useful features of the invention, will appear from a detailed description of the inven-

tion, in connection with the accompanying drawings, of which—

Figure 1 is a top plan view of an electric fan constructed in accordance with my invention. Fig. 2 is an elevation of the same. Fig. 3 is a top plan view of the motor with the fan-blades and reflector removed; Fig. 4, a cross-sectional view of the motor with the reflector broken away and one of the fan-blades removed. Figs. 5 and 6 are detail views showing the manner of securing the curved arms to the motor and the manner of securing the deflector in position.

In the drawings I have shown a motor of the alternating-current-induction type, the armature A of which is mounted on a hub B and is surrounded by a field-magnet C. The hub B extends upwardly in the form of a sleeve B′ and provides a support for the fan-blades D. The said blades are attached to a spider E, which has a threaded projection E′ that screws into the sleeve B′ of the hub B.

F designates the motor-shaft, which is forced into the lower part of the sleeve B′, and thus the said sleeve B′ and hub B become a support for the fan-blades and the armature, the armature A being supported on the shaft F through the hub.

G designates a motor-case having a central tubular extension G′, which surrounds a bushing G″ of antifriction metal. This bushing forms a bearing for the shaft F, which it surrounds.

H designates a hardened screw, which penetrates an opening in the center of the motor-case and provides a seat for an antifriction-bearing, consisting of a single ball I, upon which the shaft F has its bearing.

O is a stationary oil-reservoir at the top of the tubular extension G′, which is enlarged for that purpose. This oil-reservoir being in a portion of the casing is therefore stationary. Oil will find its way by gravity down along the motor-shaft F to the bottom of the bearing, and will be confined within the bearing by a leaden washer P, which is tightly pressed against the lower end G‴ of the extension G′ by a screw H, which, as before stated, provides a bearing for the ball.

The field-magnet C is constructed of laminated iron and is attached to the motor-case G by means of bolts J.

K designates an air-deflector of sheet metal or any other suitable material. This deflector may be shaped in any desirable form, having in view the direction or directions in which it is desired to deflect or distribute the air generated by the fan-blades. This deflector is concentric to the shaft of the motor and is placed in any desirable position with reference to the motor. In the drawings I have shown it attached as follows, although there may be other ways of attaching the same:

L designates tubular arms which are connected to the motor-case and hold the deflector in position by means of oblong plates *a*. These plates are attached by screws *a′*, which penetrate the ends thereof and the deflector and screw into the motor-case. Each of said plates has a screw-threaded projection *b*, by which said plates are screwed onto the arms L before said plates are attached to the motor. The other ends of the arms L screw into a circular connection M. To the upper part of said connection M a tubular pipe N is connected or screwed, by which the fan is suspended from the ceiling. The tubular arms L also provide means for connecting the conducting-wires which pass through the suspending-tube N to the motor, the said wires being thus brought out of the way of the fan-blades in connecting them to the motor. It has not been deemed necessary to illustrate these connecting-wires in the drawings, as they are features well known.

It will be readily seen that the deflector may be constructed in a number of ornamental designs, and, further, owing to its forming a cover for the motor much of the expensive and ornamental work usually expended on fan-motors may be dispensed with and the expense of construction of such motors materially lessened.

The present fan is not limited to an attachment to the ceiling. It may be mounted on a column extending from the floor or placed upon a suitable stand or base and used upon a desk or table, thus taking the place of a buzz-fan with the following advantages: The air will radiate from the fan to all sides of the table, thus giving persons the benefit of air in all directions, while the buzz-fan will throw the air in one direction only.

I claim—

1. In an electric fan, the combination with an electric motor, and a suspending-tube, of an air-deflector surrounding said motor, arms connecting the motor with the suspending-tube, and common means for connecting the arms and the deflector to the motor, substantially as specified.

2. In an electric fan, the combination with an electric motor, of an air-deflector secured to said motor below the fan-blades, means for securing said deflector to the motor, arms extending beyond the ends of the fan-blades and by means of which the motor is connected to the depending rod, substantially as specified.

3. In an electric fan, the combination with a motor and fan-blades driven thereby, of a stationary air-deflector inclosing said motor, the smaller part of said deflector being closer to the fan-blades than the larger part thereof, the deflecting-surface of said deflector being curved inwardly so that the air deflected thereby from its original direction will be deflected less abruptly than if the said deflecting-surface was straight, and whereby a greater volume of air is directed from the deflector.

4. In an electric fan, the combination with an electric motor, of an air-deflector inclosing said motor and secured thereto, a series of tubular arms by means of which said deflector and motor are connected to a suspending-tube,

the said tubular arm also providing means whereby the conducting-wires passing through the suspending-tube are enabled to be connected with the motor free from any interference with the fan-blades, substantially as specified.

5. In an electric fan, the combination with a motor and a suspending-tube therefor, of a stationary air-deflector inclosing said motor, the shaft of said motor being projected through an opening in said deflector, fan-blades mounted on said shaft above said deflector, whereby the motor, fan-blades, and deflector are brought into a compact relation, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

EDGAR W. BROWN.

Witnesses:
R. J. McCARTY,
J. A. WORTMAN.