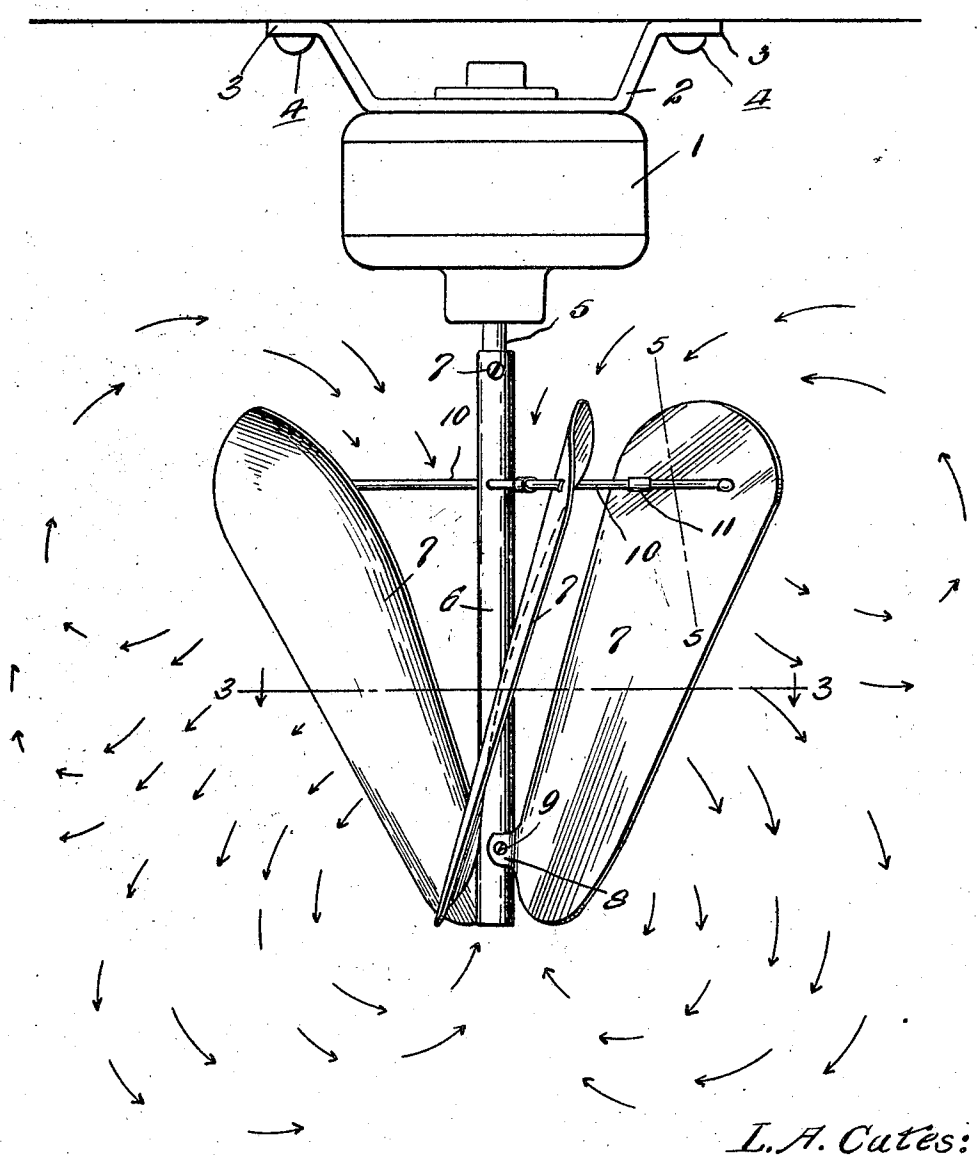
July 15, 1924. 1,501,201

L. A. CATES

VENTILATING FAN

Filed Dec. 8, 1922 3 Sheets-Sheet 1

Fig. 1.



Witnesses:
H. L. Fox.
N. Berman

L. A. Cates:
INVENTOR.
BY Clarence O'Brien
ATTORNEY.

July 15, 1924. 1,501,201

L. A. CATES

VENTILATING FAN

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Fig. 2.

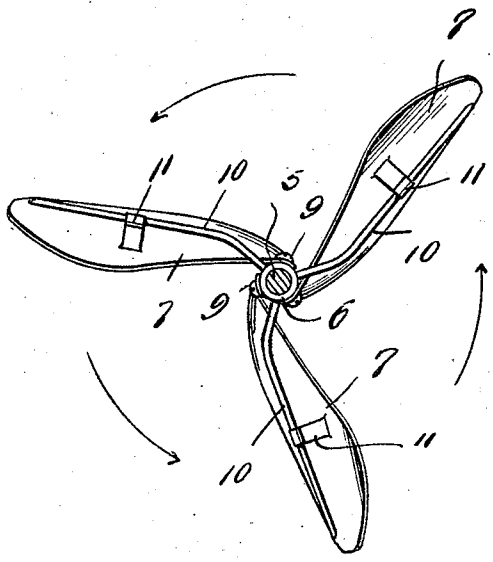
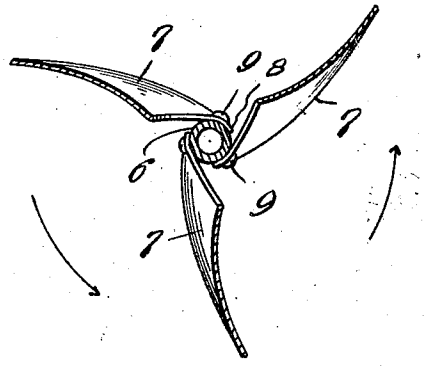


Fig. 3.



Witnesses:
F. L. Fox
N. Berman

L. A. Cates:
INVENTOR.
BY Clarence O'Brien
ATTORNEY.

July 15, 1924. 1,501,201

L. A. CATES

VENTILATING FAN

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Fig. 4.

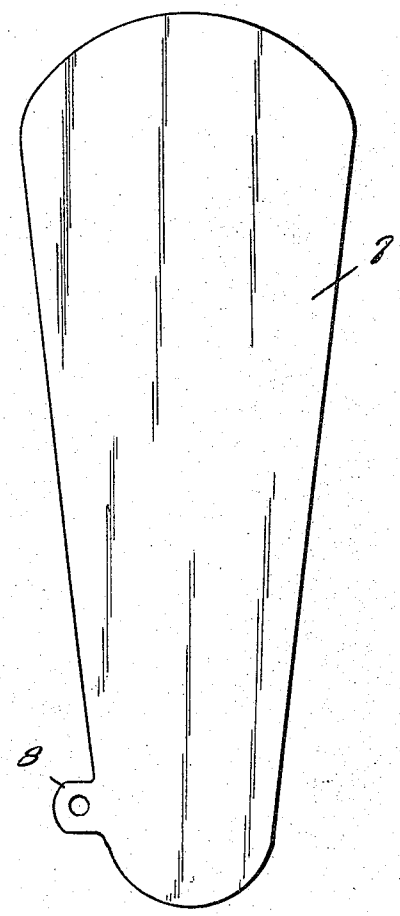


Fig. 5.

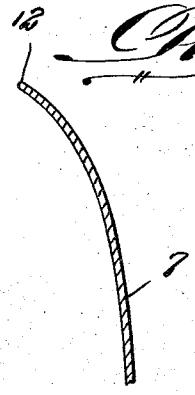
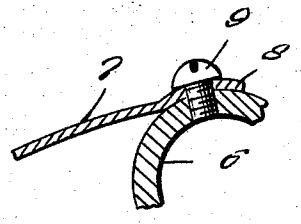


Fig. 6.



Witnesses:
F. L. Fox.
N. Berman

L. A. Cates:
INVENTOR.
BY Clarence O'Brien
ATTORNEY.

Patented July 15, 1924. 1,501,201

UNITED STATES PATENT OFFICE.

LAURENCE A. CATES, OF GRAND ISLAND, NEBRASKA.

VENTILATING FAN.

Application filed December 8, 1922. Serial No. 605,562.

To all whom it may concern:

Be it known that I, LAURENCE A. CATES, a citizen of the United States, residing at Grand Island, in the county of Hall and State of Nebraska, have invented certain new and useful Improvements in Ventilating Fans, of which the following is a specification.

My invention relates to improvements in fans, and has for the primary object thereof, the provision of such a device that is adapted to be mounted within a room, and perferably upon the ceiling thereof, the blades of the fan being so shaped and so disposed, as to continuously circulate the air within the room, thereby properly ventilating the room.

A further object of the invention resides in the provision of such a fan, that is comparatively simple of construction, and highly efficient of operation.

The nature and advantages of the invention will be better understood when the following detailed description is read in connection with the accompanying drawings, the invention residing in the construction, combination, and arrangement of parts as claimed.

In the drawings forming part of this application, like numerals of reference indicate similar parts in the several views, and wherein:—

Figure 1— is an elevational view of my improved fan, the same being shown as supported upon the ceiling of a room.

Figure 2— is a cross sectional view of my device taken on a line slightly above the upper end of the fan blades.

Figure 3— is a transverse cross sectional view upon the line 3—3 of Figure 1, and looking downwardly in the direction of the arrows.

Figure 4— is a plan view of a blank form from which my blades are formed.

Figure 5— is a longitudinal cross sectional view taken upon the line 5—5 of Figure 1 and

Figure 6— is a fragmentary cross sectional view, showing an improved manner of connecting the lower ends of the blades to their support.

With particular reference to the drawings, my device contemplates the provision of a motor 1, which may be, and preferably is, of the electric type. This motor is adapted to be supported upon the ceiling of a room through the instrumentality of a bracket 2 secured to the upper end of the motor, and having outwardly bent ends 3, provided with openings for receiving fastening means 4. The power shaft 5 of the motor 1, has the upper end of a pendent tube secured thereto by a set screw or like fastening means 6'. Secured to this tube in a manner hereinafter described, are three equi-distantly spaced fan blades 7. These blades are disposed at an angle with respect to the vertical axis of the tube 6, and are rotated on their axes so that the plane of each blade is at an angle to a radial line from the tube 6, the inner edge of each blade adjacent the lower end thereof having an ear 8, formed thereon, which ear is adapted to be curved or bent around the adjacent portion of the tube 6, and to be secured thereto by a set screw 9, each ear being provided with an opening as more clearly shown in Figure 4, for this purpose.

The blades 7 diverge outwardly from the tube 6, towards their upper ends, and are further secured to the tube by rods 10. The outer end of each of the rods is soldered or riveted to the rear surface of the blades 7, and adjacent the upper end thereof. The opposite ends of the rods are secured in a similar manner to the tube 6, and as a means for further securing the rods to the fan blades, I provide a laterally extending bracket 11 engaging over each rod 10, the blades at this point being distinct from the rods in a manner and for purposes hereinafter described.

Each blade 7 is formed from a sheet metal blank, of a shape substantially as shown in Figure 4. As will be seen, these blades are relatively long, and the side edges thereof are inclined inwardly towards the bottom. In practice, these blanks are concaved, their complete length, as more clearly shown in Figure 3, for forming a longitudinal pocket in the front surfaces of the blades. The upper inner end of each of these blades is

further bent outwardly so as to provide an upper raised end 12 for purposes hereinafter described.

In view of the exact positioning of the spaced blades 7, with respect to the supporting tube 6, and the longitudinal concavity in each of the blades, together with the outwardly extending lipped ends 12, I have found in actual practice that when my fan is rotated, the air will pursue a course within a room substantially as shown by the arrows in Figure 1. As shown in this figure, the air will be sucked by the blades, both upwardly and downwardly therebetween to be forced outwardly at a point substantially midway the opposite ends of the blades. From the angular arrangement of the blades as clearly illustrated in the drawings, particularly Figure 1, it will be noted that in the rotation of the same, the air will be forced outwardly circumferentially of the fan and also downwardly relative thereto, so that a direct circulation of air will result below the same and over a substantially large area by reason of the direction which the air takes due to the inclination of the fan blade 7 in the rotation thereof. The main portion of the air forced outwardly by the fan will be taken in over the upper ends of the blade from the upper portion or ceiling of the room in which the fan is located, while a small portion of the air will be taken in at the lower end of the tube 6, which is clearly indicated by the arrows in Figure 1.

It will be noted that a fan of this type is well suited for use in restaurants and the like for obtaining a circulation of air over a large area. With the types of fans now used in restaurants, the air is either forced axially with respect to the axis of rotation of the fan of a belt which is suspended from the ceiling, or horizontally from the type which is mounted on the side wall, giving a circulation of air in a substantially small area directly in line with the axis of rotation of the blade. Fans of this type serve to ventilate or circulate the air about one or two tables in the restaurant, but the air about other or adjacent tables receive practically no circulation at all, so that there is an unequal circulation of the air in a substantially small area. With the types of fans above described, this unequal circulation is counteracted, and if the fan is used in a restaurant over one table, it will not only circulate the air over that table but will also circulate the air outwardly relative to the fan to provide an equal circulation over adjacent tables, and thereby cause a more equal circulation over the whole restaurant.

I have shown and described my fan as comprising three equi-distantly spaced blades, but it is nevertheless to be understood that any desired number may be provided, and it is also to be understood that other minor changes may be made in the invention without departing from the spirit and scope of the invention as claimed.

What I claim as new is:—

1. In a fan of the type described, a rotating supporting member, a plurality of equi-distantly spaced fan blades secured to said supporting member, the said blades diverging outwardly away from the supporting member towards their upper ends, and the longitudinal axis of the blades extending at an angle to the similar axis of the supporting member.

2. In a fan of the type described, a supporting member, a plurality of equi-distantly spaced fan blades secured to the supporting member and diverging outwardly away from the supporting member towards their upper ends, a forwardly extending lip at the upper inner end of each blade, and means for rotating said supporting member.

3. In a fan of the type described, a supporting member, a plurality of equi-distantly spaced fan blades secured to said supporting member and having their longitudinal axis extending at an angle with respect to the similar axis of the supporting member, and being so disposed upon the supporting member as to diverge outwardly therefrom at their upper ends, a forwardly extending lip at the upper end of each blade, each blade being further provided with a longitudinal concavity and means for rotating the said supporting member.

4. An air circulating fan including a rotating supporting member, and a plurality of blades mounted thereon, said blades diverging outwardly toward the upper end from said member arranged at an angle to the axial plane of the supporting member and having the plane of the blades in angular relation to the corresponding radial lines on the supporting member.

5. An air circulating fan including a shaft member extending axially from the shaft of a motor for supporting said member, a plurality of blades having one end secured to said shaft member and diverging outwardly therefrom toward the other end and extending in angular relation relative to the axial plane of the shaft member, and a plurality of arms extending radially from said shaft member having the outer ends secured to the blades for holding them in spaced relation with respect to the shaft member, the plane of the blades being rotated relative to said radial arm.

6. An air circulating fan including a rotating supporting member extending axially from a motor shaft forming a support

therefor, a plurality of tapered blades formed at the smaller end with ears adapted for attachment to the supporting member, said blades diverging outwardly toward the other end thereof and arranged at an angle to the supporting member, and a plurality of radial arms from said supporting member and attached to the last mentioned ends of the blades for holding said blades in their diverging and angular relation to said supporting member, said blades being also arranged at an angle to said radial supporting arm.

In testimony whereof I affix my signature.

LAURENCE A. CATES.