Aug. 5, 1930. J. D. STROBELL 1,772,296

FAN CONSTRUCTION

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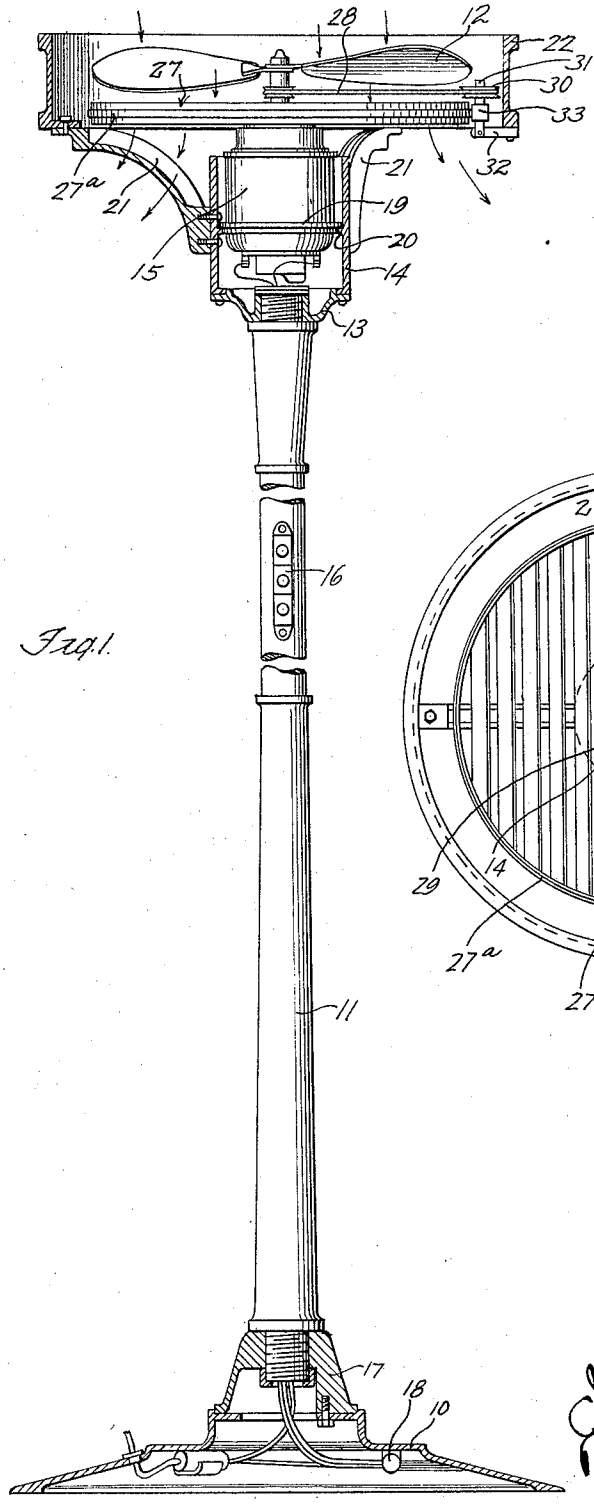
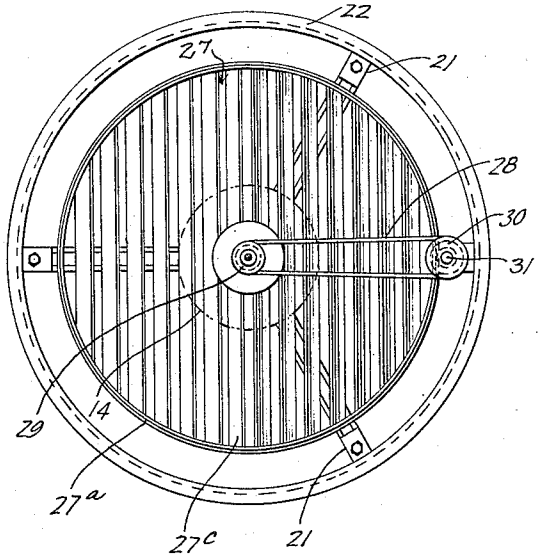


Fig. 1.

Fig. 2.



John D. Strobell INVENTOR

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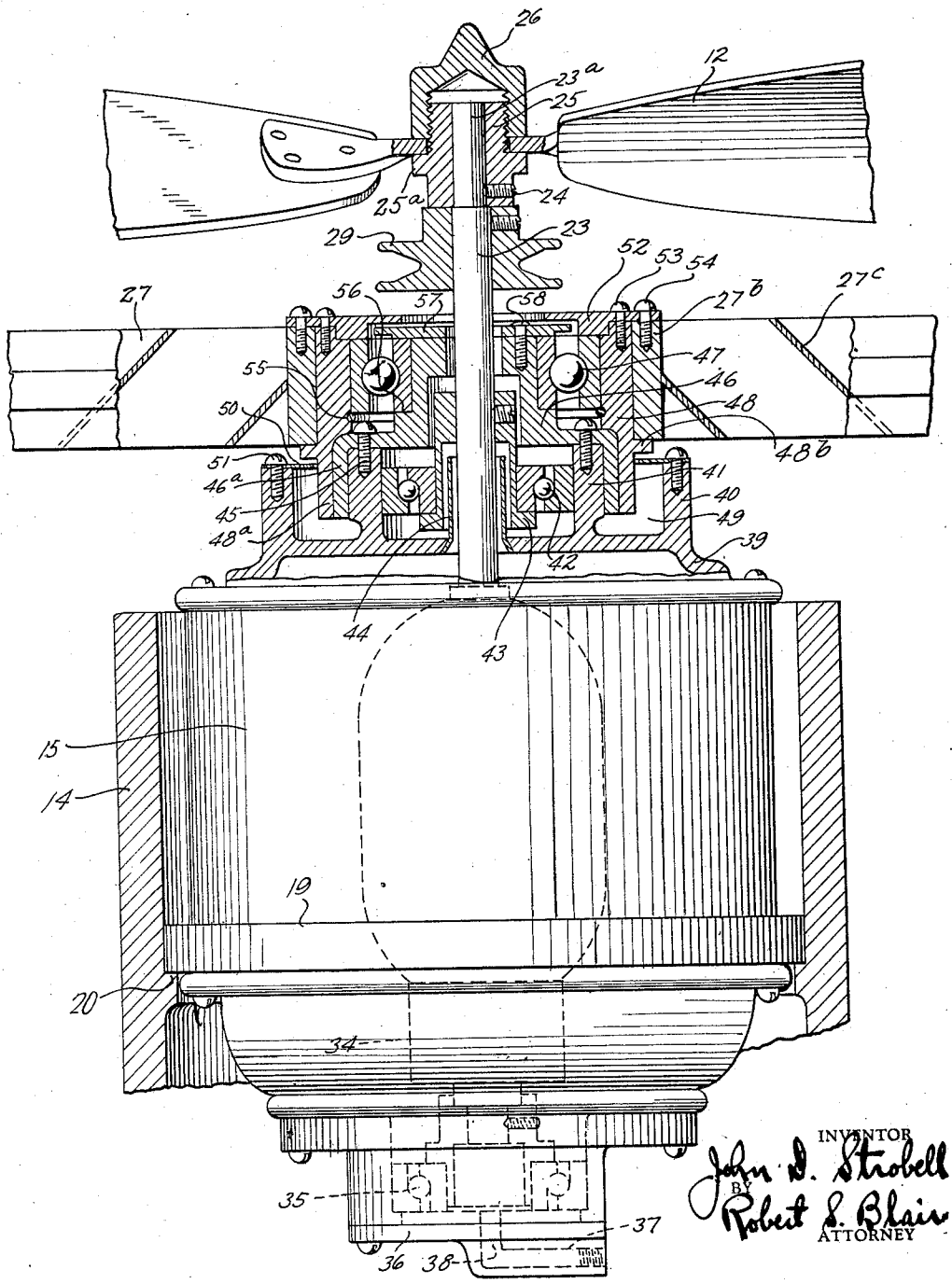
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Fig. 3.



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UNITED STATES PATENT OFFICE

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FAN CONSTRUCTION

Application filed February 26, 1927. Serial No. 171,089.

This invention relates to fan construction. One of the objects thereof is to provide a fan construction which is adapted to meet certain requirements of practical use in a highly satisfactory manner. Another object is to provide a construction of the above nature which is adapted to be supported from the floor. Another object is to provide a construction of the above nature which is capable of efficient and dependable operation. Another object is to provide a construction of the above nature which is compact and sturdy in construction. Another object is to provide such a construction which is inexpensive to build. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingdly consists in the features of construction, combinations of elements, and arrangement of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible embodiments of this invention,

Figure 1 is a side elevation partly in section and partly broken away;

Fig. 2 is a top plan view; and

Fig. 3 is a sectional view showing in enlarged detail an upper portion of the construction.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawing in detail, there is shown in Fig. 1 a base or pedestal 10 from which projects a frame in the form of an upright 11. The base 10 is adapted to rest upon the floor and is of a suitable size and bottom area to afford a firm support for the upright 11 and the parts carried thereby.

Above the upper end of the upright 11 is a fan 12 supported and driven as will be described in detail hereinafter. This fan is adapted to discharge air downwardly about the upright 11 as indicated by the arrows in Fig. 1. The frame or upright 11 is of a sufficient height to position the fan 12 and the mechanism adjacent thereto at a suitable height above the floor, and the fan is adapted to supply for ventilating purposes a current of air covering a substantial area therebeneath.

Considering now more particularly the upright 11, there is secured thereto at its upper end a fixture 13, for example, by the threaded connection shown. Secured to this fixture 13 and projecting upwardly therefrom is a casing or housing 14 in which is supported an electric motor 15. The upright 11 is preferably hollow, and the conductors extend upwardly therethrough for leading current through the motor 15. Suitable switching mechanism, indicated at 16, is provided in the electric circuit and positioned on the upright 11 at a convenient height.

The base 10 is preferably hollow and has secured thereto a fixture 17 into which the lower end of the upright 11 is threaded. There are preferably provided suitable resistance devices by means of which the speed of rotation of the motor 15 may be controlled, and these are preferably located in the hollow base 10 as shown at 18. The switching mechanism 16 is arranged to throw in circuit more or less of the resistance 18 to provide a suitable range of speed for the motor.

A housing 14 in which the motor 15 is contained is open at its upper end. The motor is inserted therein with its axis or its armature shaft vertical and substantially coincident with the vertical center line of the upright 11. The motor casing has formed thereon or secured thereto a projecting annular flange portion 19 which rests upon a shoulder 20 extending about the inner wall of the housing 14. The motor is thus supported in the position shown by the shoulder 20 of the housing and may be removed, if desired, by simply lifting it upwardly.

Secured to the outer sides of the housing 14 are a plurality of upwardly and outwardly extending supporting arms 21, shown herein as three in number. At the outer ends of these arms 21 is supported an annular frame or guard 22 which surrounds the fan 12.

Referring now to Fig. 3, the fan 12 is seen to be mounted directly upon the upper end of

the armature shaft 23 of the motor 15. Secured to the reduced upper end portion 23a of the shaft, as by a set screw 24, is a bushing 25 having a shoulder 25a. The fan is securely clamped against the shoulder 25a by a cap 26 threaded upon the upper end of the bushing 25.

Beneath the fan 12 is a rotatable deflector 27 which is adapted to receive the air discharged downwardly by the fan and direct it in predetermined manner, preferably by spreading the discharge outwardly in all directions. The deflector shown herein comprises an outer annular rim 27a which is of a diameter substantially equal to that of the fan, an inner rim 27b, and a set of suitably inclined blades 27c. It may be here noted, however, that the specific construction of the deflector is not important as relating to the broader features of this invention, and that the term "deflector" is used herein in a broad sense to denote any element adapted upon being exposed to an air blast to tend to discharge the air in a predetermined manner.

The deflector 27 is adapted to be rotated at a considerably lower speed than that of the fan 12, and it is preferably driven from the armature shaft 23 of the motor. This drive may be accomplished by a belt 28 driven by a pulley 29 mounted upon the armature shaft directly beneath the bushing 25. This belt 28 passes to a pulley 30 which is fixed upon an upright shaft 31 positioned adjacent to the outer periphery 27a of the deflector. The shaft 31 is shown in Fig. 1 supported in a bracket 32 on the annular frame or guard 22. The shaft carries a friction roller 33 which engages the periphery of the deflector. By means of this friction drive and through the belt 28 the deflector is rotated from the armature shaft 23 and at greatly reduced speed.

Referring again to Fig 3, the motor commutator, or slip rings as the case may be, is shown in dotted lines at 34. Beneath the part 34 the motor is supported by a combined radial and thrust bearing 35 shown also in dotted lines. The extreme lower end of the motor casing is closed by a cap 36 which is provided with a downward projection 37 having therethrough a passage 38 for introducing lubricant to the bearing 35. A suitable pipe may be threaded into the end of the passage 38 and project therefrom to an accessible point exterior of the housing 14 and be provided at its end with a grease-cup.

The upper end of the motor casing is closed by a cap 39 which has a pair of upwardly projecting concentric flanged portions 40 and 41. The flange 41 supports the outer race of a ball bearing 42. The inner race of this ball bearing is fixed upon a bushing 43 secured to the armature shaft 23. The lower end portion of the bushing 43 has an enlarged inner diameter, and projecting upwardly thereinto is a sleeve 44. The sleeve 44 is secured to the cap 39 about the opening therein through which the shaft 23 passes, and it prevents lubricant supplied to the bearing 42 from gaining access to the interior of the motor. The bearing 42 provides an anti-friction support for the armature shaft 23.

Secured to the flange 41, as by bolts 45, is a fixture 46 which supports the inner race of a ball bearing 47. The outer race of this ball bearing is held by a sleeve 48 which is secured within the part 27b of the deflector. The lower portion 48a of the sleeve 48 fits about the depending skirt portion 46a of the fixture 46. This rotating part 48a prevents lubricant supplied to the bearing 47 from being thrown outwardly. Any lubricant which works downwardly from the bearing 47 passes between the parts 48a and 46a and into the annular space 49 in the top of the cover 39. This space is preferably covered by a ring 50 which is secured to the upper end of the flange 40 as by screws 51.

The part 27b of the deflector rests against a shoulder 48b of the sleeve 48 and, at their upper ends the sleeve and the deflector are fastened together by a plate 52 which is secured to the sleeve by bolts 53 and to the deflector by bolts 54. This plate 52 serves also to clamp the outer race of the ball bearing 47 against an annular shoulder 55 supplied on the inner wall of the sleeve 48. The inner race of the bearing 47 is clamped against a shoulder 56 of the fixture 46 by a plate 57 which is secured to the upper end of the fixture 46 by bolts or screws 58. The deflector 27 is thus supported for rotation by the bearing 47 upon the fixture 46 and about an axis substantially concentric with the axis of rotation of the armature shaft 23 and the fan 12.

It will be seen that this construction is strong and rugged and exceedingly compact. In building the apparatus the motor with the fan, the deflector and the bearings may be completely assembled and then slipped into place by dropping the motor into the housing 14. Also, these parts may be removed and replaced by a new unit if it is found desirable. The bearings may be dependably lubricated without danger of the lubricant finding access to the exterior of the fan construction and marring its appearance. The device is capable of operating smoothly and quietly under all conditions.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiment about set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In construction for fans, in combination, a base adapted to rest upon the floor, an upright extending from said base, a plurality of supporting arms extending outwardly from an upper portion of said upright, a substantially annular frame having an unbroken upright wall supported by said arms, a fan mounted within said frame to rotate within said unbroken wall about a substantially vertical axis, and means for driving said fan.

2. In construction for fans, in combination, a base adapted to rest upon the floor, an upright extending from said base, a plurality of supporting arms extending outwardly from an upper portion of said upright, a substantially annular frame having an unbroken upright wall supported by said arms, a fan mounted within said frame to rotate within said unbroken wall about a substantially vertical axis, a rotatable deflector mounted within said frame beneath said fan and adapted to rotate about an axis substantially coincident with that of said fan, and means for driving said fan and said deflector.

3. In construction for fans, in combination, a base adapted to rest upon the floor, an upright extending from said base, a housing at the upper end of said upright, an electric motor mounted within said housing with its axis substantially vertical, a plurality of supporting arms extending outwardly from the sides of said housing, a substantially annular frame having an unbroken upright wall supported by said arms adjacent their outer ends, and a fan driven from said motor and rotating within said unbroken wall about a substantially vertical axis.

4. In construction for fans, in combination, a base adapted to rest upon the floor, an upright extending from said base, a housing at the upper end of said upright, an electric motor mounted within said housing with its axis substantially vertical, a plurality of supporting arms extending outwardly from the sides of said housing, a substantially annular frame having an unbroken upright wall supported by said arms adjacent their outer ends, a fan mounted upon the armature shaft of said motor above said motor and rotating within said unbroken wall, a deflector rotatably mounted beneath said fan, and means for driving said deflector from said armature shaft and at reduced speed.

5. In construction for fans, in combination, an electric motor, means for supporting said motor with its armature shaft substantially upright, a fan mounted upon said shaft above said motor, a deflector positioned between said fan and said motor, a fixture secured to the motor casing and projecting upwardly therefrom and upon which said deflector is rotatably mounted, and means for driving said deflector from said shaft.

6. In construction for fans, in combination, a base, an upright projecting therefrom, a housing at the upper end of said upright, an electric motor removably supported in said housing, a fan above said motor and driven thereby, a deflector between said fan and said motor, means projecting from the motor casing upon which said deflector is rotatably mounted, and means for driving said deflector.

7. In construction for fans, in combination, a base, an upright projecting therefrom, a housing at the upper end of said upright, an electric motor positioned within said housing with its axis substantially vertical, the shaft of said motor projecting upwardly above said motor and said motor being removable from the upper end of said housing, a fan mounted upon said projecting shaft and adapted to discharge air downwardly, a deflector between said fan and said housing, means connected to the motor casing upon which said deflector is mounted for rotation about the axis of said shaft, said motor and said rotatably mounted deflector being thus removable as a unit by lifting the motor out of said housing, and means for driving said deflector from said shaft.

8. In construction for fans, in combination, a base, an upright projecting therefrom, a housing at the upper end of said upright, an electric motor positioned within said housing with its axis substantially vertical, the shaft of said motor projecting upwardly above said motor and said motor being removable from the upper end of said housing, a fan mounted upon said projecting shaft and adapted to discharge air downwardly, a deflector between said fan and said housing, means connected to the motor casing upon which said deflector is mounted for rotation about the axis of said shaft, said motor and said rotatably mounted deflector being thus removable as a unit by lifting the motor out of said housing, a pulley upon said shaft between said fan and said deflector, and means engaging a peripheral part of said deflector and driven by a belt from said pulley for rotating said deflector.

9. In construction for fans, in combination, a motor, means for supporting said motor with its axis substantially vertical, the shaft of said motor projecting upwardly above said motor, a hollow support projecting outwardly from the motor casing about said projecting shaft, a deflector rotatably mounted upon said support and exterior thereof, a fan mounted upon said shaft, and means for rotating said deflector from said shaft.

10. In construction for fans, in combination, a motor, means for supporting said motor with its axis substantially vertical, the shaft of said motor projecting upwardly above said motor, a hollow support projecting outwardly from the motor casing about

said projecting shaft, a rotatable deflector, a bearing for said shaft within said support, a bearing exterior of said support for rotatably supporting said deflector thereon, a fan mounted upon said shaft, and means for rotating said deflector from said shaft.

11. In construction for fans, in combination, a motor, means for supporting said motor with its axis substantially vertical, the shaft of said motor projecting upwardly above said motor, a hollow support projecting outwardly from the motor casing about said projecting shaft, a deflector, a bearing rotatably supporting said deflector on the outer side of said support, a fan mounted upon said shaft, means for rotating said deflector from said shaft, and cooperating means on said rotating deflector and on said support for preventing oil from said bearing from being thrown outwardly.

12. In construction for fans, in combination, a motor, means for supporting said motor with its axis substantially vertical, the shaft of said motor projecting upwardly above said motor, a hollow support projecting outwardly from the motor casing about said projecting shaft, a rotatable deflector, a bearing for said shaft within said support, a bearing exterior of said support for rotatably supporting said deflector thereon, a fan mounted upon said shaft, means for rotating said deflector from said shaft, an annular flange upon said support for preventing oil from said second bearing from being thrown outwardly, and an annular flange on said support for preventing oil from said first bearing from entering said motor casing.

13. In construction for fans, in combination, a motor having a shaft projecting therefrom, a hollow support projecting away from the motor casing about said projecting shaft, a rotatable deflector, bearing means substantially within said support, bearing means substantially exterior of said support, a fan mounted upon said shaft, said shaft being rotatably supported by one of said bearing means and said deflector being rotatably supported by the other of said bearing means, and means for rotating said deflector.

In testimony whereof, I have signed my name to this specification this 11th day of February, 1927.

JOHN D. STROBELL.