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2,582,532

ELECTRIC FAN

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Fig. 1.

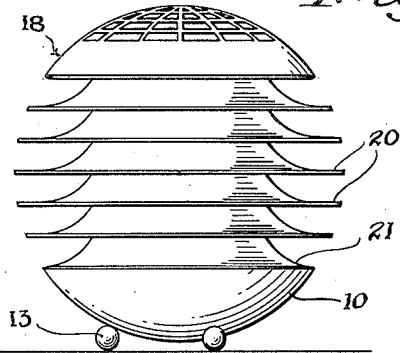


Fig. 2.

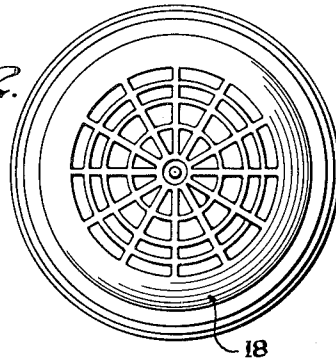


Fig. 3.

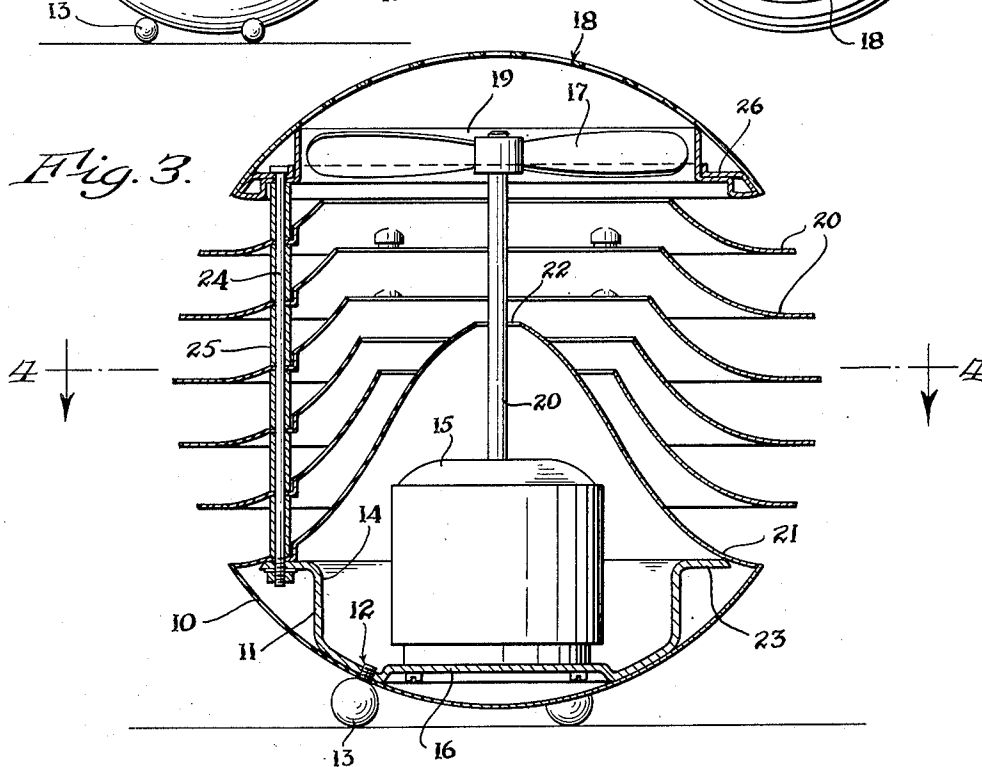
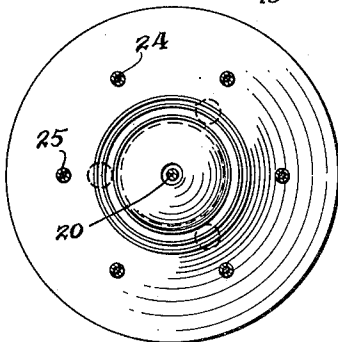


Fig. 4.



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UNITED STATES PATENT OFFICE

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ELECTRIC FAN

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4 Claims. (Cl. 230-259)

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This invention relates to electric fans of the kind wherein the impeller and motor are enclosed in a casing which serves as a diffuser.

One object of the invention is to provide a fan of the character generally described which is adapted to cause the circulation, at low velocity, of large volumes of air.

A further object is to provide a fan which is quiet in operation and which is adapted to effect the uniform diffusion of air in all directions.

A still further object is to provide a fan which is pleasing and attractive in appearance, which is simple and of low cost in design and wherein the parts may be fabricated and assembled with facility.

The invention is illustrated in the accompanying drawing, in which

Figure 1 is a side elevational view of a fan embodying the features of the invention;

Figure 2 is a top plan view;

Figure 3 is an enlarged vertical sectional view through the fan; and

Figure 4 is a horizontal section to reduced scale and is taken along line 4-4 of Figure 3.

The fan, as illustrated, has a housing in the form of a sphere. The base of the fan is provided by a shallow shell 10 which forms the lower portion of the spherical housing and which encases an annular mounting member 11. The latter and the shell are secured together by threaded elements 12, the heads 13 of which are in the form of balls and which serve as feet for the fan. The mounting member 11 is formed to provide a well 14 in which an electric motor 15 is accommodated, the motor being suitably secured to a horizontal bottom wall 16 of the mounting member.

The impeller 17 of the fan is located under a grill member 18 which forms the top portion of the spherical housing and within an annular shroud member 19, the impeller being supported in the position described by a shaft 20 which connects it to the motor 15 and by which it is driven.

The motor 15 and impeller 17 are designed to draw air in through the openings in the grill 18 at high velocity and to direct it downwardly and outwardly. Cooperating with the impeller are a series of truncated, bell-shaped members 20, vertically arranged, and a lower cone 21, the upper end of the latter being formed with an opening 22 through which the shaft 20 passes. The lower flaring end of the cone 21 seats up a flange 23 on the mounting member 11 and fits

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within the open end of the shell 10 to thereby provide an enclosure for the motor 15.

The lower ends of the bell-shaped members are preferably of such a diameter and so arranged that their marginal edges complete the spherical portion of the fan housing between the cap or grill member 18 and the base shell 10, the bell-shaped members being supported in the manner described by a circular series of pins 24 and spacing sleeves 25. The upper ends of the pins 24 are connected to a flange 26 on the shroud member 19 while the lower ends of the pins are connected to the flange 23 on the mounting member 11.

Referring particularly to Figure 3, it will be noted that from the impeller 17 in the direction of the apex of the cone 21 the bell-shaped members 21 are progressively of greater height and that in the same direction the openings defined by their upper edges decrease progressively in diameter. The form of the bell-shaped members and their arrangement in the manner described has the advantage that the air which is drawn in through the openings in the grill 18 at high velocity is directed outwardly uniformly in all directions at a velocity level below that of a draft.

As shown, and preferred, the opening 22 in the apex of the cone 21 is sufficiently larger than the diameter of the shaft 20 to permit the entry into the cone of air for cooling the motor 15, it being noted that the upper portion of the cone 21 extends up into the openings in the upper ends of the two lower bell-shaped members 20.

From the foregoing, it will be apparent that the motor, shaft and impeller are completely encased, this being accomplished without impairing the efficiency of the fan to any material degree. The fan is pleasing and attractive in appearance, highly effective and quiet in operation and has the further advantage that the parts thereof may be fabricated and assembled with facility.

It will be appreciated that the features of the invention may be employed in connection with various forms of fans, the fan specifically illustrated and described being intended by way of example only.

I claim as my invention:

1. A portable fan including an impeller, a motor for driving said impeller and toward which a current of air is directed by said impeller, and a spherical housing for enclosing said impeller and motor, said housing having

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upper and lower cap members which provide the upper and lower portions of said housing, said upper cap member being arranged over said impeller and being formed with air inlet openings and the lower of said cap members supporting said motor, and a vertical series of spaced-apart, truncated, bell-shaped diffusing members located between said upper and lower caps for forming the central portion of said housing and for directing said air outwardly, said bell-shaped members having lower rims varying in diameter so that said rims and said caps have the same spherical radius.

2. A portable electric fan including a spherical housing, the central portion of which is formed by a vertical series of truncated, bell-shaped diffusing members, said bell-shaped diffusing members having lower rims varying in diameter so that said rims and said caps have the same spherical radius, a motor in the lower part of said housing, an impeller in the upper part of said housing and means connecting said impeller to said motor, said diffusing members having throats which, as a series, provide an air passage which decreases in transverse cross-section from said impeller in the direction of said motor.

3. A portable electric fan including a spherical housing, the central portion of which is formed by a vertical series of truncated, bell-shaped diffusing members, said bell-shaped diffusing members having lower rims varying in diameter so that said rims and said caps have the same spherical radius, a motor in the lower part of said housing, an impeller in the upper part of said housing, a shaft connecting said impeller to said motor, said diffusing members having throats which, as a series, provide an air passage which decreases in transverse cross-section from said impeller in the direction of said motor and along which said shaft extends, the diameter of the throat of the lowermost of said diffusing members being reduced so that only enough

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air is permitted to pass through it as will be adequate to cool said motor.

4. A portable fan comprising a housing having top and base caps, an impeller located in the upper part of said housing, a motor located in the lower part of said housing, a shaft connecting said impeller and motor, and a vertical series of spaced-apart truncated bell-shaped diffusers which cooperate with said caps to complete said housing and which are located between said impeller and motor for directing said air outwardly in all directions, said top cap being provided with openings for the intake of air and forming a shroud member for said impeller, said base cap having a motor mount secured to it, said base cap and the lowermost of said bell-shaped diffusers substantially containing said motor, said diffusers having throats which, as a series, provide a passage which decreases in cross-section from said impeller in the direction of said motor, sleeves for mounting said diffusers in spaced relation, pins extending through said sleeves and connecting said bottom cap with said top cap to secure said caps and diffusers together as an assembly, and threaded elements for securing the lower base cap to said motor mount, said threaded elements having heads which serve as feet for the fan.

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