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FAN.

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1,316,907. Patented Sept. 23, 1919.

Fig. 1.

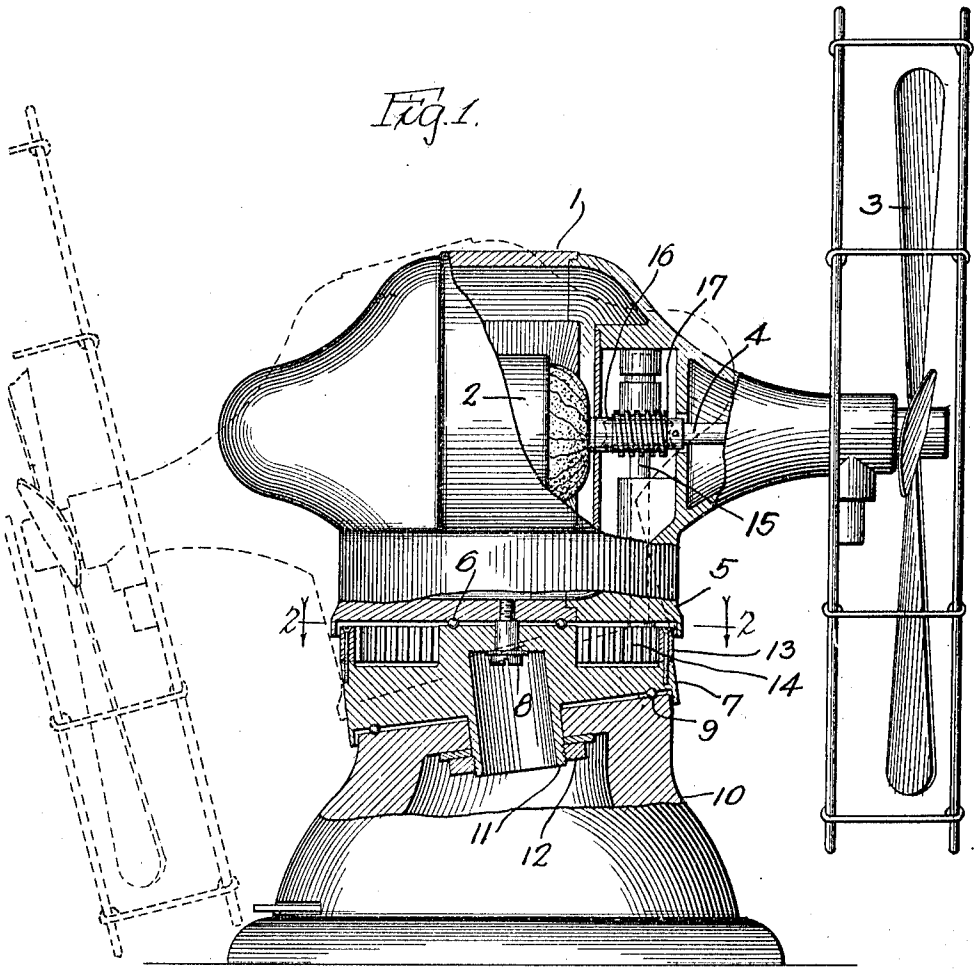
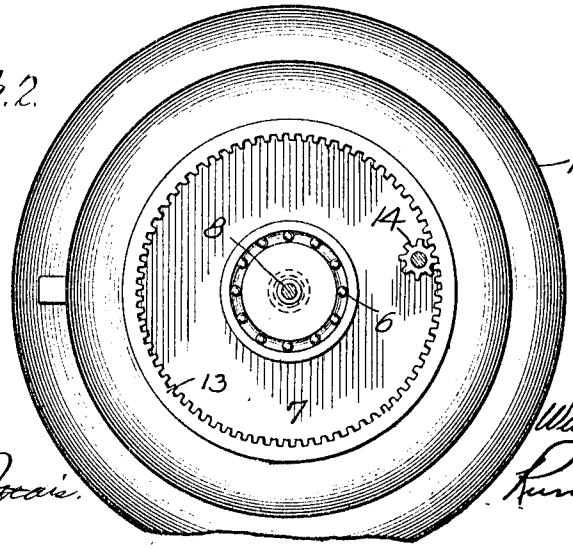


Fig. 2.



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UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, WILLARD M. McEWEN, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Fans, of which the following is a specification.

This invention relates to mechanism for utilizing gyratory forces set up through the tilting of the axis of a rotating member and thereby causing movement about a transverse axis, and has particular reference to electric fans wherein it is desirable to periodically change the direction of the air currents produced by said fan.

The main objects of this invention are to provide improved mechanism for causing an electric fan to sweep from side to side with a wavelike motion; and to provide improved, simple, and inexpensive means for utilizing in the operation of an electric fan the gyratory principles described in my Patent No. 1,214,198 of January 30, 1917.

A specific embodiment of this invention is shown in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of an electric fan constructed in accordance with my new design.

Fig. 2 is a section of the same taken on the line 2—2 of Fig. 1.

In the form shown in the drawings, the fan comprises the usual electric motor frame 1 with a rotor 2 journaled therein on a horizontal axis and with a fan 3 of the impeller type mounted directly upon the motor shaft 4. The base 5 of the motor frame is mounted by means of a ball-bearing 6 upon a carrier 7 for rotation about a vertical axis relative to said carrier, and is secured against accidental dislodgment by means of a central stud 8.

The carrier 7 may be described as a truncated segment of a cylinder or collar, having its upper and lower faces inclined with respect to each other. The lower face of the collar 7 is carried by ball-bearings 9 upon the top of the stationary base 10, and is prevented from being dislodged therefrom by means of a central tubular stud 11 and nut 12.

In order that the motor frame may be tilted relative to the base to cause the fan to sweep up and down, the carrier 7 is rotated relatively to the motor frame by means of an internal gear 13 which meshes with a pinion 14 mounted on a vertical shaft 15 and driven by a worm wheel 16 indicated in dotted outline in Fig. 1, behind the worm 17 with which it meshes, said worm being mounted directly upon the fan motor shaft 4.

The electrical connections are not illustrated, because they do not form a part of the present invention, which is directed to the mechanism for producing a wave motion of the fan, and said connections may be any of the well-known devices for conducting an electric current between relatively rotatable parts.

The operation of the device shown is as follows: When the motor is in operation, the gear causes the carrier 7 to rotate with respect to the motor frame and inasmuch as the end surfaces of the carrier are disposed at an angle to each other, this rotation causes the motor frame to tilt with respect to the base 10, thereby causing the fan to oscillate in a vertical plane. In accordance with a well-known principle of physics, when a heavy rotating mass, such as the rotor of the motor and the fan, is caused to tilt so as to change the angular disposition of the axis thereof in space, gyroscopic forces are set up, which tend to cause the axis to simultaneously shift to one side or the other, according to the direction in which the fan is tilted. For example, when the fan is tilted upward, the gyroscopic forces cause the motor frame to swing toward one side, and when the fan is tilted downward, the gyroscopic forces cause the fan to swing toward the opposite side, the sidewise swinging in one direction continuing a short time after the fan has begun to tilt back and until the gyratory forces due to the reversed tilting have overcome the momentum of the movement of the mass in the first direction. Thus, it will be seen that the angular disposition of the upper and lower faces of the carrier 7 and the speed at which said carrier is driven by the gearing may be so proportioned in the design of the apparatus as to cause any desired degree of sidewise rotation of the motor frame, and that it may be more or less than 360°. In other words, the sidewise sweep of the fan in one direction before it is reversed may be less than a complete revolution or may be several complete revolutions, according to the choice of the

designer for any particular speed of rotation of the fan.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A mechanism for causing oscillation in one plane through tilting a rotating member in a different plane, comprising a motor-driven member, a carrier supporting said member for rotation on an axis at an angle to the axis of rotation of said member, a base supporting said carrier for rotation on an axis inclined to the axis of rotation of said member on said carrier, and mechanism for rotating said carrier about one of its said axes.

2. A motor-driven fan, a relatively stationary base supporting said fan, a second base supporting said first-named base, a rotatable carrier interposed between said bases and connected therewith respectively on axes inclined to each other, and mechanism for rotating said carrier relative to one of said bases whereby the rotation of said carrier will tilt one of said bases relative to the other.

3. A fan having a rotatable motor and a frame supporting said motor, a carrier supporting said frame for rotation on an axis transverse to the axis of said motor, a base supporting said carrier, said carrier being rotatable on said base on an axis inclined to the axis of said frame, and gearing interposed between said motor and carrier for rotating said carrier relative to said frame whereby said fan will be tilted relative to said base and will oscillate about the axis of said carrier through the action of gyratory forces set up by the tilting of said motor.

4. An electric fan, comprising a motor frame, a motor mounted therein, a supporting base separate from said motor frame, a truncated carrier interposed between said motor frame and base and having its relatively inclined end faces rotatably mounted with respect to said frame and base respectively, and mechanism housed within said frame and carrier and connecting said carrier with said motor whereby said carrier is caused to rotate relative to said frame.

5. An electric fan, comprising a motor frame, a motor mounted therein, a supporting base separate from said motor frame, a truncated carrier interposed between said motor frame and base and having its relatively inclined end faces rotatably mounted with respect to said frame and base respectively, an internal gear on said carrier, and a pinion meshing therewith and having worm and wheel connection with the shaft of said motor for rotating said carrier relative to said frame.

Signed at Chicago this 20th day of February, 1919.

WILLARD M. McEWEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."