O. S. JENNINGS.

REVOLVING FAN.

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1,270,833.

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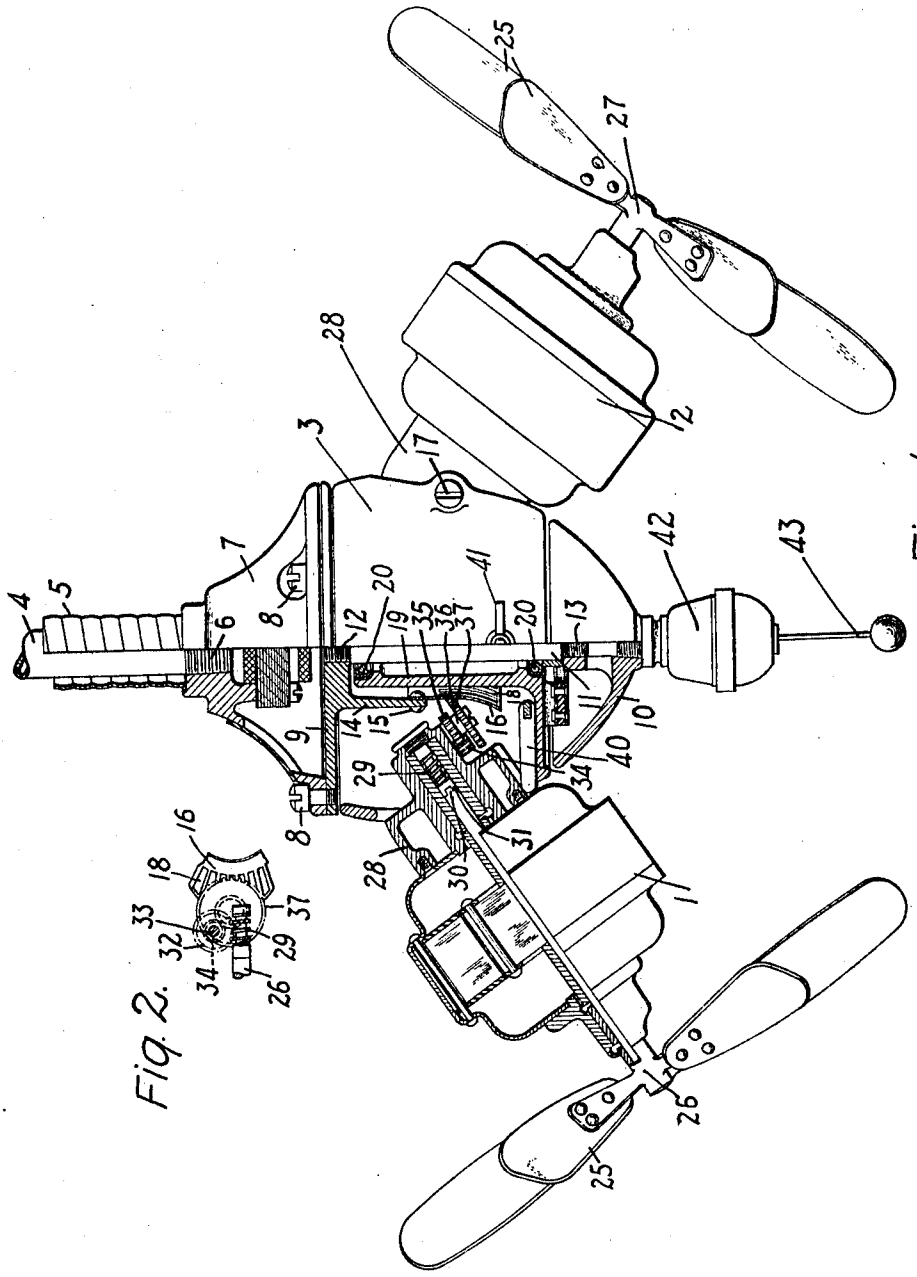


Fig. 1.

Fig. 2.

WITNESSES:

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OLIVER S. JENNINGS, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

REVOLVING FAN.

1,270,833. Specification of Letters Patent. **Patented July 2, 1918.**

Application filed January 6, 1915. Serial No. 790.

To all whom it may concern:

Be it known that I, OLIVER S. JENNINGS, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Revolving Fans, of which the following is a specification.

My invention relates to revolving fans, and it has special reference to gyratory electric fans that are adapted to turn on an axis of rotation while simultaneously and automatically turning around an external axis of revolution.

One object of my invention is to provide a gyratory fan of simple, compact and durable construction which shall be provided with positively actuated mechanical means for effecting the rotation of the fan support by power derived from the rotating shaft that carries the fan blades.

Another object of my invention is to provide a fan of the above-indicated character which may be readily adjusted to deliver air, either horizontally or at various angles of inclination, without disengaging the gearing which causes the revolution of the fan structure.

In the accompanying drawings, Figure 1 is a side view, partially in elevation and partially in section, of a fan structure constructed in accordance with my invention, and Fig. 2 is a plan view, with parts omitted, of the train of gearing which transmits power to revolve the fan structure.

The structure shown in the drawings embodies two fan motors 1 and 2 that are pivotally secured to a bracket member 3 which is rotatably suspended from a hanger rod 4. The hanger 4 may be surrounded by the usual ornamental tube 5 and to its screw-threaded lower end 6 is attached a stationary supporting structure which comprises an upper member 7, to which is attached, by means of screws 8, a horizontal plate 9. A lower member 10, which also forms a part of the stationary supporting structure, is connected to the plate 9 by means of a rod 11 provided with screw threaded ends 12 and 13 that engage correspondingly screw-threaded openings in the plate 9 and the member 10, respectively. To the plate 9 is rigidly secured an annular downwardly-extending member 14 to which is rigidly secured, by means of rivets 15, a toothed, hollow track 16, of generally frusto-conical shape, having concave sides. The curvature of the sides of the track is of such magnitude that, when the parts of the structure are assembled, all points on the outer surface of the track are equidistant from the axes of the pivots on which the motors 1 and 2 are supported. One of these pivots is indicated at 17. The track 16 is provided with perforations 18 which extend lengthwise of the sides of the shell for forming the teeth of the annular track which, it will be observed, remains stationary during the operation of the device.

The bracket 3 is rotatably mounted on the stationary supporting structure by means of a sleeve 19 formed integral with, or rigidly attached to, the bracket 3 and adapted to surround the rod 11. Ball bearings 20 are disposed in suitable ball races between the sleeve 19 and the rod 11.

The fan motors 1 and 2 may be of any usual construction, and are provided with sets of fan blades 25 at the outer ends of their respective armature shafts 26 and 27. To the inner end bell of each of the motors is secured a gear box 28 which contains the mechanism for rotating the bracket 3, which will now be described.

A worm 29 is axially secured to the armature shaft 26 of the fan motor 1 in any convenient manner, as by means of coöperating clutch teeth 30 and 31 formed on the armature shaft 26 and the worm 29, respectively. The worm 29 meshes with a worm wheel 32 that is mounted on the upper end of a short vertical shaft 33, to the lower end of which is secured a pinion 34 that meshes with a spur gear wheel 35. The gear wheel 35 is supported on a short shaft 36 which carries also a larger spur gear wheel 37 that is adapted to mesh with the perforations 18 in the stationary track 16. The spur gear wheel 37 may, if desired, be replaced by a pin gear wheel.

It will be observed that the rapid rotation of the armature shaft 26 is transmitted, through the train of reduction gearing just described, to the gear wheel 37 which engages the stationary track 16 and travels around it. Since the bracket 3 is rigidly secured to the fan motors, the bracket and all of the parts associated with it are likewise revolved.

The inclination of the fan motors may

be varied in any suitable maner, and such variation in the tilt of the fans will not affect the meshing of the gear wheel 37 with the track 16, inasmuch as the sides of the track are curved upon a radius equal to the distance of the track from the axes of the pivots of the fan motors. This variation in the tilt of the fans may conveniently be effected by the linkage mechanism shown and described in my copending application Serial No. 791, filed January 6, 1915, and assigned to Westinghouse Electric and Manufacturing Company. In the drawings accompanying the present application, a portion of this mechanism is shown comprising a reciprocable member 40 adapted to engage the fan motor 1 and maintain it in adjustable tilted positions. The linkage for effecting the reciprocation of the member 40 is controlled by means of a wing nut 41 associated with the rotating bracket 3.

The electrical connections for energizing the fan motors may be of any suitable and usual construction and are therefore not described in detail. The motors may be started and stopped by means of a switch 42 controlled by a depending chain or cord 43. The gear wheel 37, which engages the stationary metal track 16, may suitably be made of rawhide, bakelite or some other substance which will mesh with the track without undue noise.

Either one or both of the fan motors may be provided with gearing, such as that described for effecting revolution of the fan bracket, and numerous other structural modifications may be effected in the apparatus shown and described without departing from the spirit of my invention. It is therefore to be understood that my invention comprehends all such modifications as fall within the scope of the appended claims.

I claim as my invention:

1. The combination with a rotatable support, of a motor pivotally mounted on the said support, a stationary annular track having a concave exterior surface symmetrically curved with respect to the pivotal axis of the said motor and disposed adjacent to the said support, and a gear wheel adapted to be driven by the said motor and meshing with the said track for rotating the said support.

2. The combination with a rotatable support, of a motor pivotally mounted on the said support, a stationary annular track of generally frusto-conical shape having a concave exterior surface that is circularly curved in cross section and disposed adjacent to the said support, and a gear wheel adapted to be driven by the said motor and meshing with the said track for rotating the said support.

3. The combination with a rotatable support, of a motor pivotally mounted on the said support, a stationary annular track having a regularly curved exterior surface, and a gear wheel meshing with the said track and adapted to be driven by the said motor and to be pivotally moved therewith, the said track and the said gear wheel being adapted to mesh in a plurality of positions of the said motor and of the said gear wheel.

4. The combination with a rotatable support, of a motor pivotally mounted upon the said support, a stationary track disposed adjacent to the said support and having a curved exterior surface, a gear wheel adapted to be driven by the said motor and meshing with the said track for rotating the said support, and means for adjusting the said motor around a pivot that is maintained concentric with the center of curvature of the surface of the said track.

5. In a mechanism of the class described, a supporting pedestal, a frame mounted thereon for rotation thereabout, a fan-actuating motor adjustably supported on the rotatable frame so that the inclination of the fan's axis may be varied, a shaft actuated by and adjustable with the fan motor, and a transmission mechanism supported on the frame and embodying means having intermeshing engagement with portions on the pedestal and the first-mentioned shaft, respectively, a portion of said intermeshing means being curved in concentric relation to the pivot of said frame on said pedestal, whereby the frame is operated by the operation of the motor in different angular positions of the frame with respect to the pedestal.

In testimony whereof, I have hereunto subscribed my name this 30th day of Dec. 1914.

OLIVER S. JENNINGS.

Witnesses:
R. D. BROWN,
B. B. HINES.

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