H. L. ZABRISKIE.

OSCILLATING MOTOR.

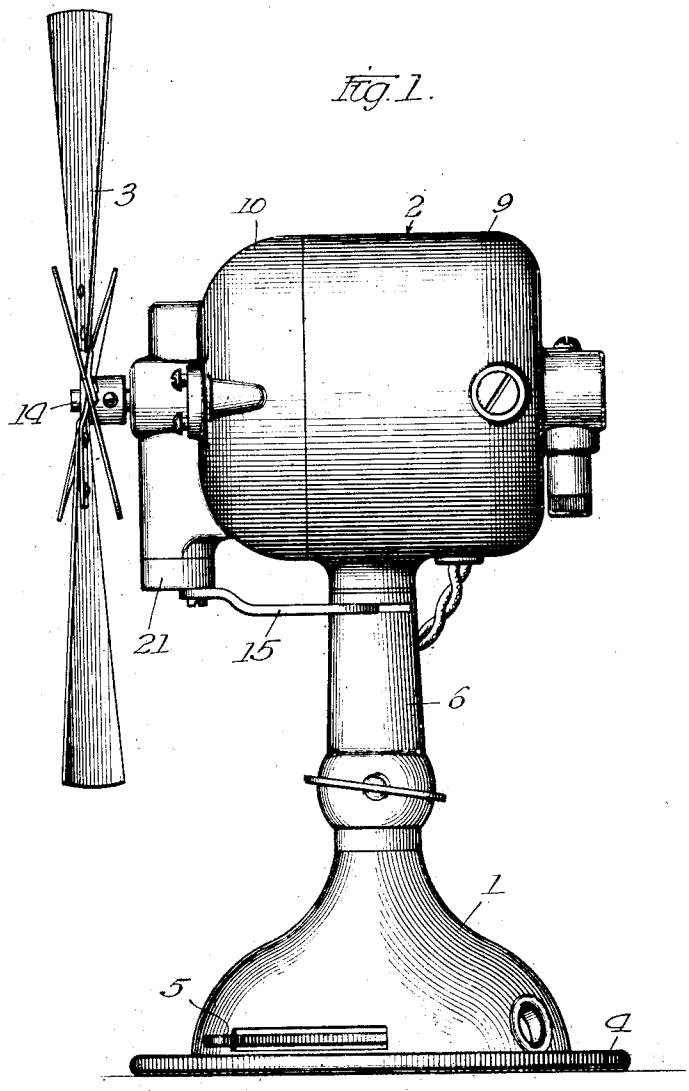
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1,253,199.

Patented Jan. 8, 1918.

3 SHEETS—SHEET 1.

Fig. 1.



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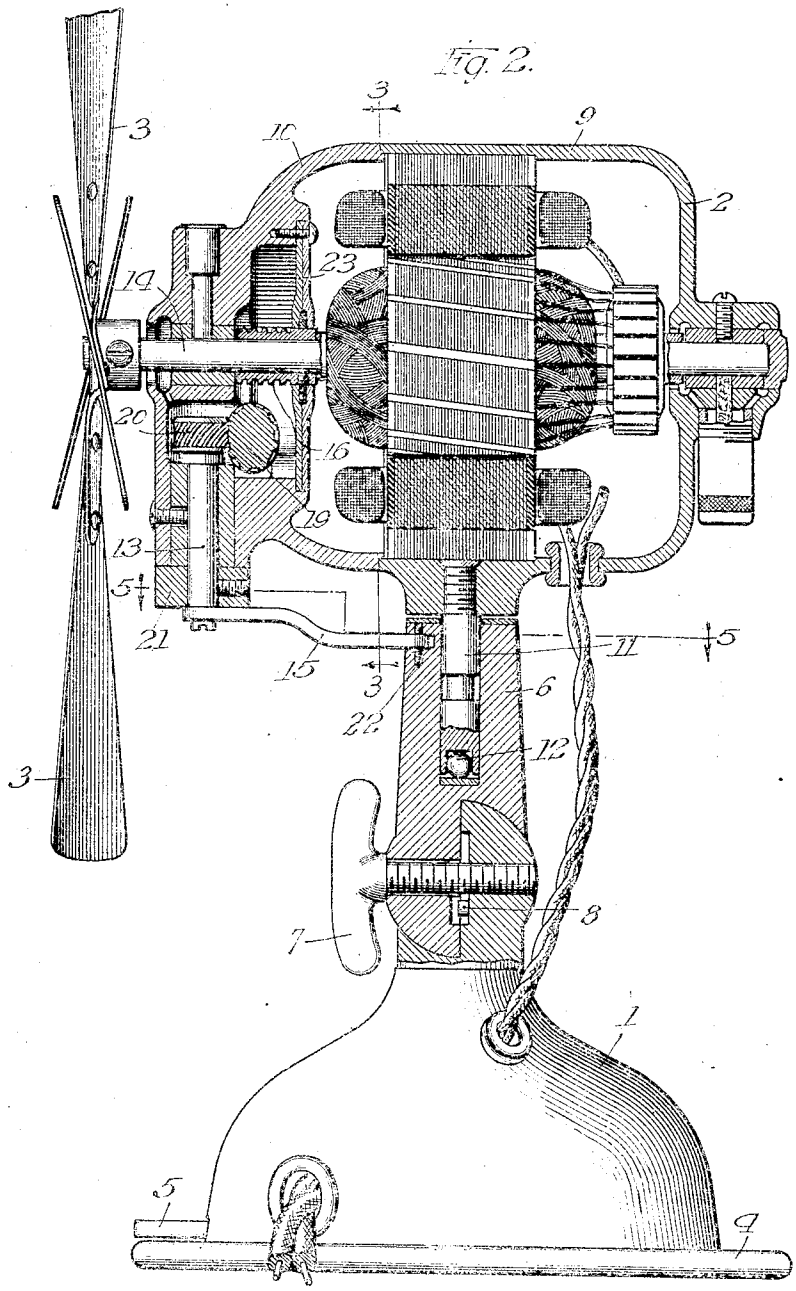
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

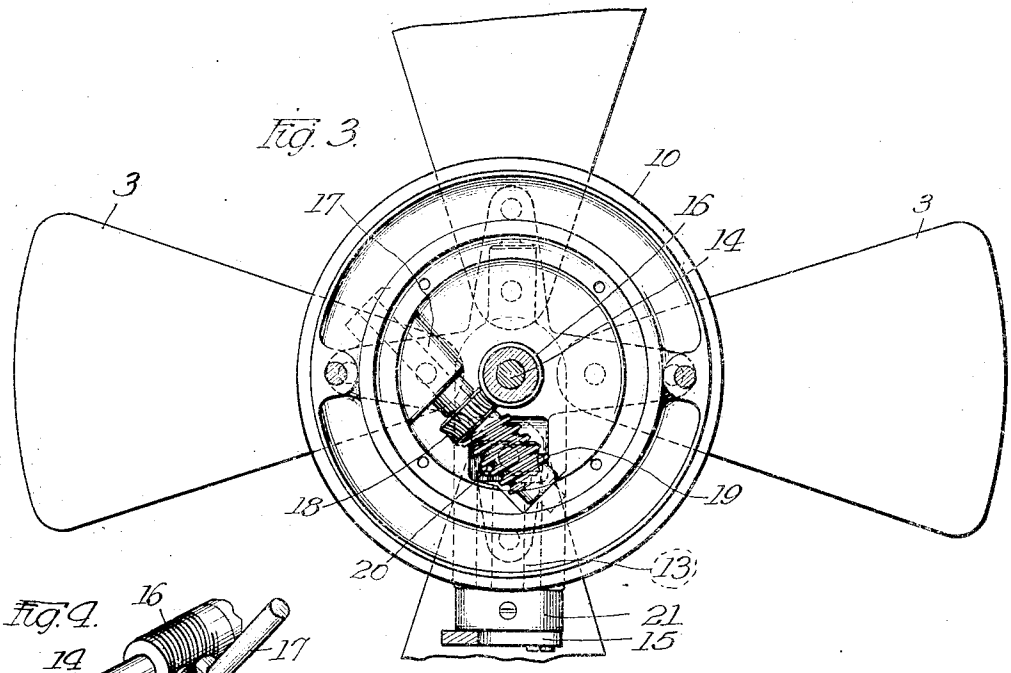


Fig. 4.

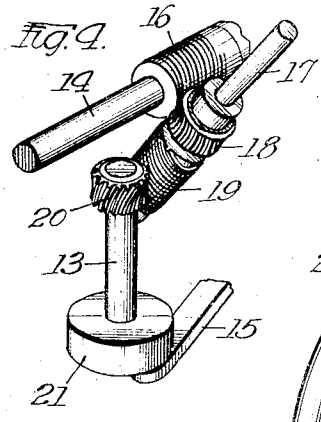
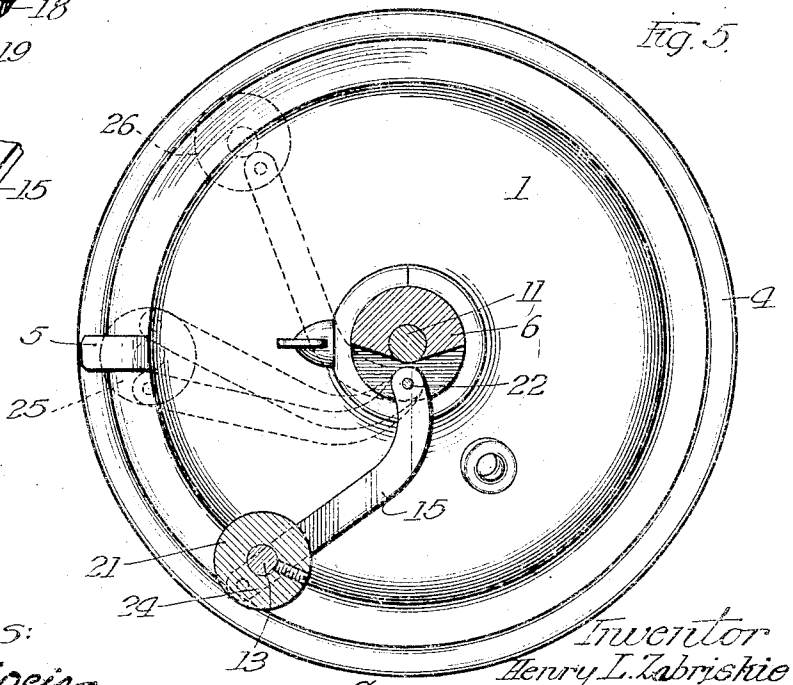


Fig. 5.



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UNITED STATES PATENT OFFICE.

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OSCILLATING MOTOR.

1,253,199. Specification of Letters Patent. Patented Jan. 8, 1918.

Application filed July 13, 1916. Serial No. 109,075.

To all whom it may concern:

Be it known that I, HENRY L. ZABRISKIE, a citizen of the United States, residing at Westfield, in the county of Union and State of New Jersey, have invented new and useful Improvements in Oscillating Motors, of which the following is a specification.

This invention relates to oscillating motors. It relates particularly to oscillating electric fan motors.

Electric motors for driving fans are often provided with a mechanism for causing them to slowly oscillate or rotate so as to distribute a current of air therefrom. It is important that these mechanisms be simple so that they may be inexpensively manufactured and so that they will not readily get out of order. It is further important that they be compact so that they will occupy little space and present an artistic appearance. They should also operate positively and efficiently upon a very small power consumption in order that the cost of operation shall be a minimum.

One of the objects of the present invention is to provide an improved oscillating means for a motor.

Another object is to provide a simple, compact, efficient oscillating means for an electric motor which is contained within the motor housing.

Another object is to provide a compact artistic electric fan having an improved oscillating means.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate an embodiment of the invention.

The views of the drawings are as follows:

Figure 1 is a side elevation of an electric fan equipped with the improved oscillating means, said view showing the neat, compact, artistic appearance of the fan.

Fig. 2 is a cross section view.

Fig. 3 is a cross section view on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of the gearing by means of which the fan is oscillated.

Fig. 5 is a view on the line 5—5 of Fig. 2, showing in dotted lines the different positions of the oscillating arm.

The general structure of the electric fan to which the invention is applied will first be described. It is shown in Figs. 1 and 2.

The fan comprises in general a base 1, an electric motor 2, and a rotary fanning element 3. The mechanism for oscillating the motor is carried by the motor housing at the end thereof adjacent the fanning element. This oscillating mechanism will be hereinafter described.

The base 1 is in the form of a hollow pedestal which is adapted to rest on a table, the bottom of the base being covered by a rubber pad 4 which prevents injury to a finished surface and at the same time forms a cover for the hollow interior of the base. A switch mechanism for controlling the motor is located within the base, suitable openings being provided for electrical conductors leading to the switch mechanism and from it to the motor. The switch is governed by a handle 5 which projects through a slot in the base.

The base is also arranged to be attached to a wall or other surface for which purpose it is provided with suitable openings to receive fastening devices. In order that the fan may be properly positioned when the base is attached to a wall, the pedestal post is divided into an upper and lower section, the upper section 6 being pivoted to the lower section. Each of the sections has a hemi-spherical projection thereon coöperating with a complementary slot in the other section as shown in Fig. 2. A clamping screw 7 passes loosely through one of the projections and is screw threaded into the other so that by tightening the clamp the sections of the pedestal post may be clamped together and firmly held in position. To further insure that the sections will not move relative to one another when the clamp is tightened, one of them is provided with a projecting pin 8 which coöperates with openings in the opposite section to lock the parts together. In order to move one section relatively to the other, the clamp 7 must be loosened so that one section can be moved laterally away from the other a sufficient distance to disengage the pin 8 from the recess in which it is seated, after which the sections can be moved about each other, the hemi-spherical projections and the complementary recesses forming bearing surfaces which relieve strain on the shank of clamp 7. This construction provides a very neat joint between the pedestal post sections

by means of which they can be readily adjusted relative to one another and firmly clamped in adjusted position. It is to be understood that he pedestal construction may be varied in its details to meet different requirements.

The fanning element 3 comprises a plurality of blades mounted on a hub, said blades being shaped and arranged so as to form a propeller which delivers a current of air when rotated. The number, shape and construction of the blades may be varied as the conditions require.

The electric motor 2 which is most clearly illustrated in Fig. 2 is provided with a cylindrical casing 9 open at one end and substantially closed at the other. This casing supports the motor field poles and carries a bearing in its closed end for one end of the armature shaft. The armature and commutator are housed within the casing, the end of the armature shaft which projects from the open end of the casing having the fan blade 3 attached thereto. The open end of the casing is closed by a cap piece 10 which supports the oscillating mechanism hereinafter described.

The motor casing 9 is provided with a pivot pin 11 which is adapted to fit within a complementary recess in the top of the pedestal section 6. The lower end of the pivot pin rests on a ball bearing 12 in the bottom of the recess in the pedestal section 6, this construction reducing the friction between the parts to a minimum and permitting the motor to rotate or oscillate freely about the base.

The oscillating mechanism which is housed within the cap piece 10 of the motor will now be described. This mechanism is shown in Figs. 2, 3, 4 and 5.

It comprises in general a rotatable shaft 13 parallel to the motor pivot and operated from the motor armature shaft 14 by means of a reduction gear, and an arm 15 pivoted to the stationary standard 6 and eccentrically connected to the shaft.

The rotation of the fan motor causes the shaft 13 to be rotated at a reduced speed and by means of the arm 15, one end of which is pivoted to the stationary standard, and the other end eccentrically connected to the shaft 13, the motor is caused to slowly oscillate through a described angle. The various positions that the arm 15 assumes as the shaft 13 rotates are shown in Fig. 5. The operation of this mechanism will be described in more detail hereinafter.

The oscillating mechanism contains several important features which contribute to its novelty and usefulness. The reduction gearing which is illustrated in perspective in Fig. 4 is of novel construction and it is mounted on the motor and associated therewith so as to produce an unusually compact efficient fan of artistic appearance. These features will appear from the following description.

The armature shaft 14 carries a worm 16 which is contained within the cap piece 10. Carried by the cap piece is a counter-shaft 17 located at an angle to the armature shaft as is illustrated in Fig. 3. This shaft carries a worm wheel 18 which meshes with the worm 16. The shaft also carries a worm 19 which meshes with a worm wheel 20 carried on the upper end of shaft 13. By means of this gearing the shaft 13 is rotated by the armature shaft 14 at a greatly reduced speed.

The worm 16 which is mounted on the most rapidly revolving shaft is of single thread construction in order to obtain a slow speed of revolution of the gear 18. The worm 19 is of double thread construction which permits the teeth being made more nearly parallel to the axis of shaft 13 than would be possible if the single thread construction were used. This enables the driving force to be applied to the shaft 13 in a more nearly tangential direction than would otherwise be obtained. The end thrust on the shaft 13 is thus reduced and the efficiency of the drive improved. It is to be understood that a triple thread construction may also be used, if desired.

The worm 19 drives the gear 20 at an obtuse angle thus permitting the shaft 13 to be located directly under the armature shaft 14 and in the plane of the armature shaft and the motor pivot. The shaft is thus located symmetrically with the result that a balanced and efficient oscillating drive is obtained and a neat, compact structure produced.

Attached to the lower end of shaft 13 is a crank disk 21 to which the connecting rod or arm 15 is attached. The arm 15 is eccentrically connected with the shaft 13 by this construction. The other end of arm 15 is pivoted to the pedestal section 6 in any suitable manner, as for example, by means of a pivot pin 22 shown in Fig. 2.

The reduction gearing connecting the worm 16 on the armature shaft with the rotatable shaft 13 is all contained within the cap piece 10. The interior of the cap piece is closed by a cover 23 which, in this embodiment, comprises two metal plates which completely close the recess and carry suitable packing around the armature shaft so that the recess may be filled with lubricant for keeping the gearing in good condition. The shaft 13 is also carried by the cap piece 10, the only portion of the oscillating mechanism outside of the cap piece being the crank disk 21 and the arm 15. The crank disk is of small size and coincides with the outline of the cap piece without destroying the symmetry of its appearance. The arm 15 is small and located beneath the motor

and close to the motor casing so that it is hardly noticeable.

It will thus be seen that the oscillating mechanism is contained almost wholly within the cap piece 10 of the motor without unduly increasing its size. In fact, the cap piece 10 is no larger than the opposite end of the motor casing which houses the commutator.

It is to be understood that the structure shown is for purposes of illustration only and that other structures may be devised which come within the scope of the appended claims.

What I claim and desire to secure by Letters Patent is:—

1. Means for oscillating a motor which is pivoted to a stationary base, comprising a worm carried by the rotating element of the motor, a rotatable shaft carried by said motor parallel to the axis of the motor pivot, a worm wheel carried by said shaft, a counter shaft having a worm wheel meshing with the worm on said rotating element and a worm meshing with the worm wheel on said rotatable shaft, and means whereby said rotatable shaft oscillates the motor.

2. Means for oscillating a motor which is pivoted to a stationary base, comprising a worm carried by the armature shaft, a rotatable shaft carried by the motor directly beneath the armature shaft and parallel with the axis of the motor pivot, a worm wheel carried by said rotatable shaft, a counter shaft having a worm wheel meshing with the worm on the armature shaft and a worm meshing with the worm wheel on said rotatable shaft, and means whereby said rotatable shaft oscillates the motor.

3. Means for oscillating a motor which is pivoted to a stationary base, comprising a worm carried by the armature shaft, a rotatable shaft carried by the motor parallel with the axis of the motor pivot and in the plane of the motor pivot and the armature shaft, a worm wheel carried by said rotatable shaft, a counter shaft having a worm wheel meshing with the worm on the armature shaft and a worm meshing with the worm wheel on said rotatable shaft, and means whereby said rotatable shaft oscillates the motor.

4. Means for oscillating an electric motor which is pivoted to a stationary base comprising a rotatable shaft carried by the motor parallel with the axis of the motor pivot, a shaft located at an oblique angle to said rotatable shaft carrying gearing operatively connecting the rotatable shaft with the motor armature shaft, and an arm pivoted to the stationary base and eccentrically connected to the rotatable shaft.

5. Means for oscillating an electric motor pivoted to a stationary base comprising a rotatable shaft carried by the motor directly beneath the motor armature shaft and parallel to the axis of the motor pivot, a shaft located at an oblique angle to said rotatable shaft and carrying reduction gearing connecting the armature shaft to the rotatable shaft, and an arm pivoted to the stationary base and eccentrically connected to the rotatable shaft.

6. Means for oscillating an electric motor pivoted to a stationary standard, comprising a rotatable shaft carried by said motor parallel to the axis of the motor pivot and directly beneath the armature shaft, a connecting shaft carrying a worm gear meshing with a single tooth worm on the armature shaft, said connecting shaft also carrying a plural tooth worm meshing with a gear on the rotatable shaft and driving said shaft at an obtuse angle, and an arm pivoted to the standard and eccentrically connected to the rotatable shaft.

7. An electric motor having a housing pivoted to a stationary standard and closed at one end by a cap piece, a rotatable shaft carried by the cap piece, said shaft being parallel to the axis of the motor pivot and being connected to the armature shaft by worm gearing housed entirely within said cap piece, and an arm pivoted to said standard and eccentrically connected to said rotatable shaft.

8. An electric motor having a housing pivoted to a stationary standard, said housing being closed at one end by a removable cap piece, a rotatable shaft carried by the cap piece, said shaft being located directly beneath the motor armature shaft and parallel to the axis of the motor pivot and being connected to said armature shaft by reduction gearing which is housed within said cap piece, and an arm pivoted to said standard and eccentrically connected to said rotatable shaft.

9. An oscillating electric fan comprising an electric motor pivoted to a stationary standard, said motor having a removable cap piece covering one end of its housing and forming a bearing for the armature shaft, a rotatable fan blade mounted on one end of the armature shaft, said cap piece carrying a rotatable shaft which is located directly beneath the armature shaft and parallel to the axis of the motor pivot, worm reduction gearing housed in said cap piece for connecting the armature shaft to the rotatable shaft, and an arm pivoted to the standard and eccentrically connected to the rotatable shaft.

10. An oscillating electric fan comprising an electric motor pivoted to a stationary standard, the housing for said motor being closed at one end by a removable cap piece which contains a reduction gearing connecting the armature shaft with a shaft carried by the cap piece, said latter shaft being lo-

cated parallel to the axis of the motor pivot and in the plane of the axis of the armature shaft, and an arm pivoted to the standard and eccentrically connected to the shaft carried by the cap piece.

11. An oscillating electric fan comprising an electric motor pivoted to a stationary standard, the housing for said motor being closed at one end by a removable cap piece which forms a bearing for one end of the motor armature shaft and contains a reduction gearing connecting the armature shaft with a shaft carried by the cap piece, said latter shaft being located parallel to the axis of the motor pivot and in the plane of the axis of the armature shaft, and an arm pivoted to the standard and eccentrically connected to the shaft carried by the cap piece.

12. An oscillating electric fan comprising an electric motor pivoted to a stationary standard, the housing for said motor being closed at one end by a removable cap piece which carries a bearing for one end of the motor armature shaft, a worm carried by the armature shaft and contained within the cap piece, a counter shaft carried by the cap piece and located at an angle to the armature shaft, said counter shaft carrying a worm gear meshing with the worm on the armature shaft and also carrying a worm which meshes with a worm wheel carried by another shaft mounted in the cap piece, said latter shaft being parallel to the motor pivot and in the plane of the axis of the armature shaft, a crank head carried by said latter shaft, and an arm pivoted to the stationary standard and connected to the crank head.

13. An electric motor having a housing pivoted to a stationary standard, said housing being closed at one end by a removable cap piece, the said cap piece forming a housing and support for a reduction gearing connecting the armature shaft with a rotatable shaft carried by the cap piece, and an arm pivoted to the standard and eccentrically connected to the rotatable shaft.

14. An oscillating electric fan comprising an electric motor, a stationary standard to which said motor is pivoted the housing for said motor being closed at one end by a cap piece, a rotatable shaft housed within said cap piece and positioned parallel to the axis of the motor pivot, a worm wheel carried by said shaft, a worm carried by the armature shaft at a point within said cap piece, and an intermediate shaft housed within said cap piece and having a worm meshing with the worm wheel on said first named shaft and a worm wheel meshing with the worm on said armature shaft, and means whereby said first named shaft oscillates the motor.

15. Means for actuating an electric motor which is pivoted to a stationary base comprising a rotatable shaft carried by the motor parallel with the axis of the motor pivot, a shaft located at an oblique angle to said rotatable shaft carrying gearing operatively connecting the rotatable shaft with the motor armature shaft, and means whereby said rotatable shaft actuates the motor.

16. An electric motor having a housing pivoted to a stationary standard and closed at one end by a cap piece, a rotatable shaft carried by the cap piece, said shaft being parallel to the axis of the motor pivot and being connected to the armature shaft by worm gearing housed entirely within said cap piece, and means whereby said rotatable shaft actuates the motor.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

HENRY L. ZABRISKIE.

Witnesses:
C. H. MORRELL,
FREDERICK DIEHL.

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