C. H. J. DILG.

MOTOR FAN.

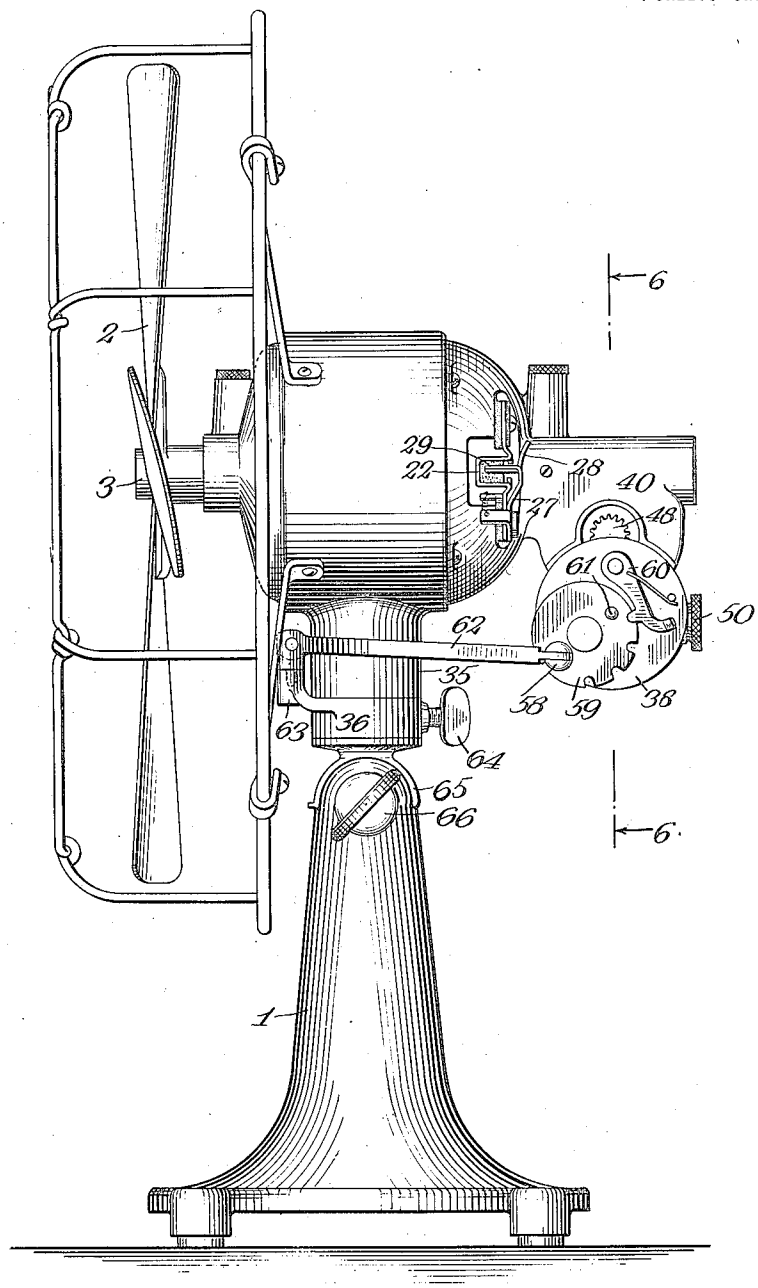
APPLICATION FILED JAN. 7, 1913.

1,289,412.

Patented Dec. 31, 1918.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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4 SHEETS—SHEET 2.

Fig. 2.

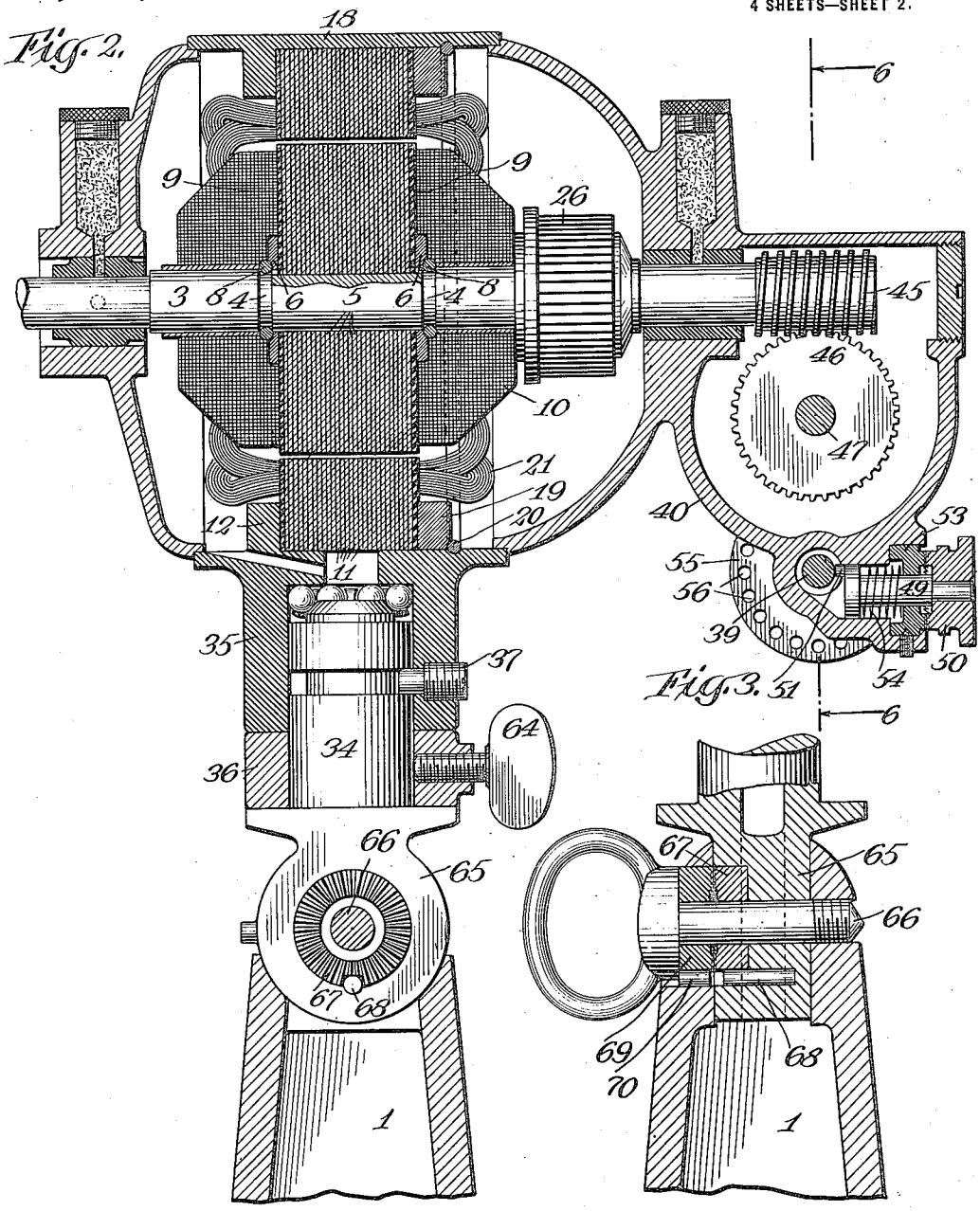


Fig. 3.

WITNESSES.

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4 SHEETS—SHEET 3.

Fig. 4.

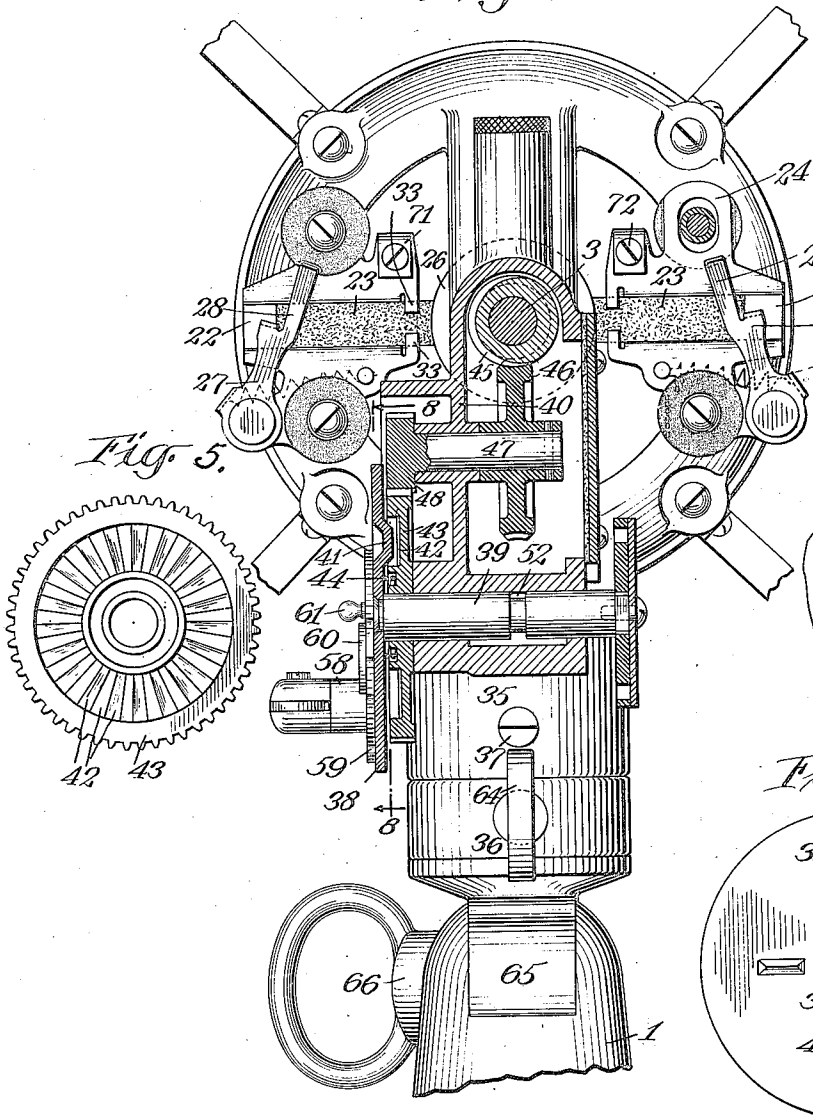


Fig. 5.

Fig. 7.

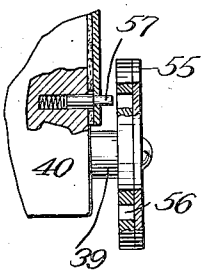
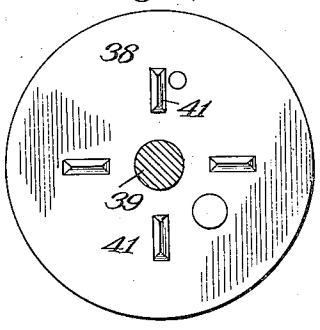


Fig. 6.



WITNESSES

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1,289,412.

Patented Dec. 31, 1918.

4 SHEETS—SHEET 4.

Fig. 8.

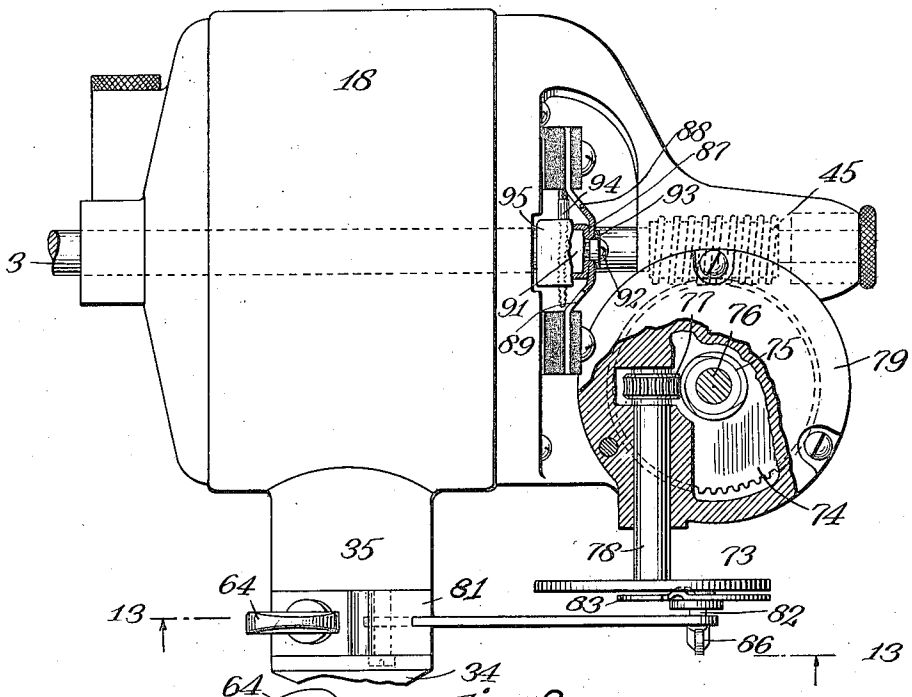


Fig. 9.

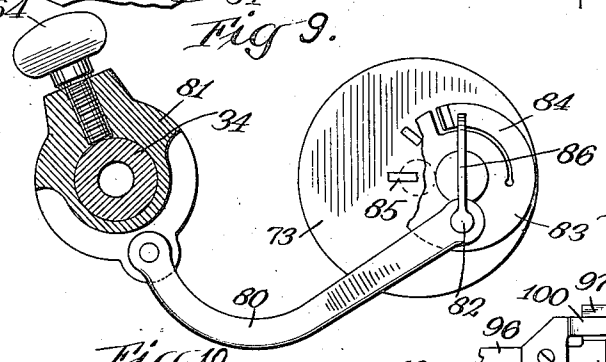


Fig. 11.

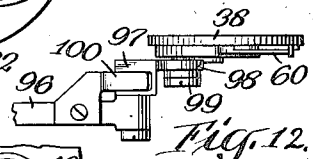


Fig. 10.

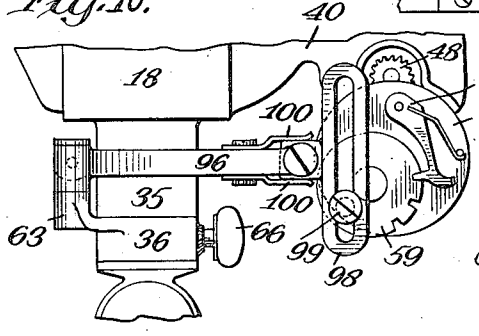
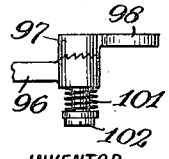


Fig. 12.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES H. J. DILG, OF NEW YORK, N. Y.

MOTOR-FAN.

1,289,412. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed January 7, 1913. Serial No. 740,641.

To all whom it may concern:

Be it known that I, CHARLES H. J. DILG, a citizen of the United States, residing in the borough of the Bronx, in the city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Motor-Fans, of which the following is a specification, reference being had therein to the accompanying drawings, forming part thereof.

My invention relates to motor fans and particularly to electric fans of the oscillating type.

One object of my invention is to provide a motor fan which may be easily converted from an oscillating to a non-oscillating fan, and vice versa. Another object is to prevent injuring the motor from overloading when any unusual opposition is offered to the oscillation.

Another object is to provide simple and convenient means for rendering the fan tiltable on an axis parallel to the supporting surface and for securely locking the fan, when adjusted, which means will not interfere with the oscillation of the fan upon an axis normal to the supporting surface.

Another object is to advantageously coorganize means for adjusting the fan relative to the base on an axis normal to the supporting surface, with the oscillating and tilting means.

Still other objects and advantages of my invention will appear from the following description.

To these ends my invention comprehends various details and features of construction, and arrangements and combinations of parts, as will hereinafter more fully appear.

I shall now describe the illustrated embodiments of my invention, and shall thereafter point out my invention in claims.

Figure 1 is a side elevation of a complete fan embodying my invention.

Fig. 2 is a central vertical section of the same on an enlarged scale, with parts omitted.

Fig. 3 is a sectional detail of the tilting pivotal connection, taken at right angles to the plane of section of Fig. 2.

Fig. 4 is a transverse sectional elevation on line 6—6 of Fig. 2.

Fig. 5 is a detail face elevation of the striated clutch wheel.

Fig. 6 is a similar view of the coöperating crank disk.

Fig. 7 is a detail, partially in rear elevation and partially in section, of the crank-locking disk and coöperating parts.

Fig. 8 is a side elevation, partly in section, of a motor of modified construction.

Fig. 9 is a horizontal section of the same on line 13—13 of Fig. 8, looking up.

Fig. 10 is a detail in side elevation of a modified construction of oscillating mechanism.

Fig. 11 is a plan of a portion of the same.

Fig. 12 is a detail in plan of a modified form of connection between the crank and connecting rod.

In the embodiment of my invention illustrated in Figs. 1 to 7, inclusive, an electric motor is employed which is mounted upon a base 1, and carries a fan 2 of suitable construction upon the front end of the armature shaft 3 in the usual manner.

The base 1 of the motor is provided with an upwardly extending motor-bearing stem or arbor 34, which is adjustable relative to the base, as will hereinafter appear, and the motor casing 18 is provided on its under side with an integral cylindrical bearing head 35 which has a cylindrical socket fitting upon the upper end of the stem 34 for rotative movement thereon and which bears at its lower end upon an adjustable collar 36, supported upon a shoulder on the stem 34. A locking screw 37 in the bearing head 35 engages in a circumferential groove in the stem 34 and locks the motor against movement longitudinally of the stem. An anti-friction bearing is interposed at the upper end of the stem 34, as shown in Fig. 2. To oscillate the motor upon this bearing, means are provided actuated from the armature shaft 3, as will now be described

A crank member comprising a crank disk 38 is fixed on the end of a horizontal axially slidable shaft 39 mounted below the armature shaft 3 in suitable bearings in a gear casing 40 on the rear of the motor, and on its inner face this crank disk 38 is provided with a plurality of beveled clutch teeth 41 adapted to engage in striations 42 on the adjacent face of a gear clutch wheel 43 which is loosely mounted on the axially slidable shaft 39. A coiled spring 44 is disposed between the clutch wheel and crank

disk and tends to separate them, but with the shaft in the position shown in Fig. 4, the two clutch members are held together against the expansive pressure of the spring 44. The clutch wheel 43 is actuated from the armature shaft 3 through reduction gearing comprising a worm 45 on the rear end of the armature shaft, a worm wheel 46 on one end of the stub shaft 47, and a pinion 48 on the other end of the stub shaft 47 and meshing with the clutch wheel 43. Through these transmitting means the clutch wheel 43 is continuously rotated by the motor, and, when the crank disk 38 is in engagement with the clutch wheel 43, it is also rotated by the motor.

To axially slide the shaft 39 and move the crank disk 38 into and out of engagement with the clutch wheel 43, manually operative means are provided comprising a stud or shaft 49 disposed at right angles to the slidable shaft 39, and having a knurled knob 50 on its outer end, and a crank or eccentric pin 51 on a head on its inner end extending into a circumferential groove 52 in the slidable shaft 39. The shaft 49 bears in a plug 53 and a coiled spring 54 is disposed between the plug 53 and the head on the end of the shaft 49, and holds the pin 51 in the groove 52, while permitting the shaft 49 to yield longitudinally. The engaging faces between the knob 50 and the plug 53 are preferably striated to securely lock the knob in adjusted position. It is now apparent that the turning of the knob 50 serves to adjust the slidable shaft through the engagement of the crank pin 51 in the groove 52, and to thereby throw the crank disk 38 into and out of engagement with the clutch wheel 43.

To lock the crank disk 38 against rotation when out of engagement with the clutch wheel, a lock disk 55 is provided on the opposite end of the shaft 39, which is provided with a plurality of socket holes 56 near its periphery adapted to engage with a spring pressed pin 57 in the casing 40, when the shaft 39 is moved to disengage the crank disk. The spring permits the pin 57 to yield until it drops into one of the socket holes 56.

The crank pin 58 for the crank disk 38 is mounted on a crank member consisting of a disk 59 pivoted eccentrically upon the crank disk 38 and so arranged that the center of the crank disk 38 is in the path of rotation of the crank pin 58. On the periphery of the eccentric disk 59, suitably spaced locking notches are provided into which a spring pressed locking pawl 60 is arranged to engage. A knob 61 on the eccentric disk 59 affords convenient means for manually rotating the eccentric disk to vary the eccentricity of the crank pin 58 and thereby vary the throw of the crank pin, the locking pawl 60 serving to lock the eccentric disk in adjusted position. It is evident that if the eccentric disk is adjusted to bring the crank pin 58 concentric with the crank disk 38, the throw of the crank pin will be zero.

To mechanically connect the crank pin with a fulcrum or stationary abutment to impart oscillation to the motor as the crank is actuated, a connecting rod 62 is employed, which at one end has a pivotal and swivel connection with the crank pin 58, and at the other end has a similar connection with a lug 63 on the adjustable collar 36. The adjustment of this collar adjusts the fan relative to the base, as is apparent, and permits the breeze to be sent in any direction without altering the position of the base 1 relative to its support. A set screw 64 locks the adjustable collar 36 to the motor-bearing stem 34 in adjusted position.

The striated engaging faces between the crank disk 38 and the clutch wheel 43, being beveled or inclined, coact to spread the two members apart if any excessive load is placed upon them, as occurs, for example, when any unusual opposition is offered to the oscillation, as when an obstruction is placed in the way of the fan guard. If the crank disk is held against rotation, the rotative effort of the clutch wheel 43 causes the striated clutch face to act as a cam on the teeth 41 and force the crank disk and slidable shaft 39 to the left, thereby rotating the shaft 49 and the knob 50, which is permitted by the striated engaging faces between the knob 50 and the plug 53, the shaft 49 yielding longitudinally against the tension of the spring 54. In this way the oscillating mechanism is automatically disengaged and the motor prevented from becoming overloaded and possibly burned out when oscillation is prohibited. When the obstruction has been removed, the knob 50 may again be turned back and the oscillating mechanism thrown into operation. The manual and automatic disabling of the train to render the fan non-oscillatory forms the subject-matter of my divisional application Serial Number 195,497, filed October 9, 1917.

To enable the fan to be tilted backward and forward on an axis parallel with the supporting surface, the motor-bearing stem 34 is pivotally supported in the upper end of the base 1. The base is slotted or bifurcated at its upper end, and on the lower end of the stem 34 is formed a flat hub portion 65 which bears in the bifurcated upper end of the base and pivots upon a thumb screw 66 passing through both members; the end of which opposite the thumb piece is screw threaded and engages in screw threads in the branch of the base in which it bears. To lock the stem in adjusted position, the face of the stem nearer the thumb piece is striated, preferably by inserting a striated

disk 67, which is locked against relative rotation by a key 68, and a coöperative striated locking disk 69 is provided in the adjacent branch of the base 1, which is locked against rotation by a key 70 (see Fig. 3) while being free to move toward and away from its coöperative disk 67. These disks are both mounted concentrically upon the thumb screw 66, and as this thumb screw is tightened up, the locking disk 69 is forced by the head of the thumb screw into locking engagement with the disk 67 on the stem.

In the modified construction shown in Figs. 8 and 9, the crank disk 73 is disposed in a horizontal plane and is driven directly from the worm 45 through the worm wheel 74, worm 75 on the worm wheel shaft 76, and worm wheel 77 on the shaft 78 of the crank disk 73, which shaft has its bearing in a bore in the cap 79 of the gear casing. The connecting rod 80 is pivoted in a slot in the adjustable collar 81 on the motor-bearing stem 34, and is pivoted at its other end to the crank pin 82 on the eccentric disk 83. To lock the eccentric disk in adjusted position a spring arm 84 is cut out of the eccentric disk, the free end of which is bent to form a catch adapted to spring into suitably spaced locking sockets 85 in the face of the crank disk 73. This engagement of the spring arm 84 with the crank disk is sufficient to lock the eccentric disk against relative rotation under normal load, but if the fan guard strikes an obstruction or reciprocation is otherwise opposed, the resiliency of the spring arm 84 will permit the catch to ride out of the notches and the eccentric disk to be rotated until the crank pin 82 comes to the center of the crank disk, and oscillation is thereby stopped while the crank disk 73 continues its rotation without increasing the load on the motor. A hand piece 86 facilitates the manual turning of the eccentric disk 83 to vary the angle of oscillation or to stop it altogether.

The construction illustrated in Figs. 10 and 11 differs from that shown in Figs. 1 to 7, inclusive, only in the connection of the connecting rod with the eccentric disk 59. The connecting rod 96 is pivoted to a square block 97 on the side of a slotted member 98 in which the crank pin 99 engages and which normally extends at right angles to the connecting rod 96, as shown. To maintain this relative position, two flat springs 100 are provided on the connecting rod 96 bearing on opposite sides of the block 97, and under ordinary load this spring pressure is sufficient to prevent the slotted member 98 from turning on its pivot as the crank disk rotates. When unusual resistance is offered, however, these springs will yield and the slotted member will either trip entirely to a horizontal position if the obstruction is so close as to prevent any oscillation of the motor, in which position the crank pin 99 merely slides back and forth in the slot, or, if the obstruction be at such a distance as to permit partial oscillation the slotted member 98 will turn partly on its pivot and enable the motor to oscillate as far as the obstruction will permit.

Instead of flat springs 100 bearing against a square block 97, the engaging faces of the pivoted members may be striated to provide clutch teeth, as shown in Fig. 12, and a coiled thrust spring 101 on the pivot screw 102 serves to hold the two faces together. If the oscillation is interfered with, the spring 101 will yield and permit the slotted member 98 to be turned upon its pivot by the crank pin 99, and the spring will lock the straited faces together when the limit of oscillation is reached.

It is obvious that various modifications may be made in the constructions shown and above particularly described, within the principle and scope of my invention.

I claim:

1. A motor fan comprising a base having a fulcrum member thereon, a motor and casing therefor having pivotal engagement with the base, a rotative crank member carried by the motor casing and arranged to be rotated by the motor, and a connecting rod directly connecting the crank member to the fulcrum member and adapted to impart oscillation to the motor as the crank member is rotated.

2. A motor fan comprising a base, a motor having pivotal engagement with the base, a crank disk carried by the motor, speed-reducing means operatively connecting the motor shaft and the crank disk, a crank adjustably pivoted to the crank disk eccentrically thereof and arranged with the center of the crank disk in the circular path of the crank pin, a connecting rod connecting the crank pin to the base and adapted to impart oscillation to the motor when the crank pin is eccentric of the crank disk, and resilient locking means arranged to yieldingly lock the crank to the crank disk in adjusted position and to permit the crank to yield to non-oscillating position under excessive load.

3. A motor fan comprising a base, a motor having pivotal engagement with the base, a crank disk carried by the motor, speed-reducing means operatively connecting the motor shaft and the crank disk, a crank adjustably pivoted to the crank disk eccentrically thereof and arranged with the center of the crank disk in the circular path of the crank pin, and a connecting rod connecting the crank pin to the base and adapted to impart oscillation to the motor when the crank pin is eccentric of the crank disk.

4. In a motor fan, a base and a motor-bearing stem, one of the two parts having a

bifurcated end and the other part having a flattened hub portion fitting in the bifurcation, the hub portion having a striated locking surface and the branch of the bifurcation adjacent the striated locking surface on the hub portion having an opening therethrough communicating with the striated locking surface, a non-rotative striated locking member in the opening movable to and from locking engagement with the striated surface, and a locking pivot screw passing concentrically through the locking member and having screw threaded engagement with the other branch and shaped to bear against the locking member and force it inwardly into locking position.

5. In a motor fan, a base and a motor-bearing stem, the base having a bifurcated end and the stem having a flattened hub portion fitting into the bifurcation, the hub portion having a striated locking surface, and the branch of the bifurcation adjacent the striated locking surface on the hub portion having an opening therethrough communicating with the striated locking surface, a non-rotative striated locking member in the opening movable to and from locking engagement with the striated surface, and a locking pivot screw passing concentrically through the locking member and having screw threaded engagement with the other branch and shaped to bear against the locking member and force it inwardly into locking position.

6. A motor fan comprising a base, a motor and casing therefor pivotally supported upon the base, oscillatory means including a crank member carried by the casing and driven by the motor, a fulcrum member carried by the base and angularly adjustable thereon, and a connecting rod connecting the crank member with the fulcrum member and having a fixed engagement with both members.

7. A motor fan comprising a base, a motor and casing therefor pivotally supported upon the base, a crank member carried by the casing, transmitting means arranged to transmit actuation from the motor shaft to the crank member, a fulcrum carried by the base and angularly adjustable thereon, and a connectng rod pivotally connected at one end to the crank member and at the other end to the adjustable fulcrum and arranged to impart oscillation to the motor as the crank member is actuated.

8. In an oscillating electric fan, a base, a motor frame, a support for said frame pivotally mounted on said base, and mechanism comprising a reciprocally acting link connecting from said frame to a point of said base eccentric to said pivotal support, said mechanism being adapted to oscillate said frame about said pivotal support and comprising elements with means to hold them normally in any particular one of a plurality of different definite relative positions but adapted to yield to an abnormal force and permit said elements to assume another one of said definite relative positions.

9. In an oscillating electric fan, a base, a motor frame, a pivotal support for said frame carried by said base, and mechanism connecting said frame to a point of said base eccentric to said pivotal support, said mechanism being adapted to oscillate said frame about said pivotal support and comprising elements with means to hold them normally in any particular one of a plurality of different definite relative positions but adapted to yield to an abnormal force and permit said elements to assume another one of said definite relative positions.

10. In an oscillating electric fan, a base, a motor frame, a support for said frame pivotally mounted on said base, and mechanism comprising a reciprocally acting link connecting from said frame to a point of said base eccentric to the axis of the pivotal support, said mechanism being adapted to oscillate said frame about said pivotal support and comprising elements associated with one end of said link with means to hold them normally in a definite relative position but adapted to yield to an abnormal force and permit said elements to depart from said relative position.

11. In an oscillating electric fan, a base, a motor frame, a rotor therein, a fan carried thereby, gearing driven by said rotor, a reciprocally acting connecting rod with one end driven by said gearing, an eccentric connection on the base for the other end of said connecting rod, and yielding means at one end of the connecting rod adapted to hold the rod and associated elements normally in a definite relation but on the application of an abnormal force to permit them to depart from that relation.

12. In a fan structure of the character described, the combination of a supporting member, a fan motor revolubly mounted thereon, a shaft disposed to be operated by the motor and movable therewith relative to the supporting member, a thrust member, means pivotally connecting one end of said thrust member with the supporting member, adjustable means connecting the other end of said thrust member with said shaft, said adjustable means being operable by rotation of said shaft to vary the spacial relationship of said thrust member relative to the axis of said shaft, whereby to vary the extent of movement of the motor on the supporting member.

13. In a device of the class described, the combination of a fan motor mounted for oscillatory movement, a fan operated thereby oscillating mechanism operated by the fan motor for producing oscillatory move-

ment thereof, said oscillating mechanism including adjustable means operable upon impedance of the oscillatory movement of the motor to change the length of the arc of oscillatory movement thereof.

14. In a device of the class described, the combination of a fan motor mounted for oscillatory movement, a fan operated thereby, oscillating mechanism for giving the motor its oscillatory movement, said oscillating mechanism including means operable by the motor to vary the length of the oscillatory stroke.

15. A motor fan comprising a base, a motor and casing therefor pivotally supported upon the base, a crank carried by the casing and actuated by the motor, and connecting means between the casing and the base operative to oscillate the motor as the crank is actuated, said connecting means including an angularly adjustable collar on the base surrounding the pivotal support, and a connecting rod connecting at one end to the collar.

16. In an oscillating fan, the combination of a rotatably mounted fan and its carried parts, and means for oscillating said fan, said means being capable of automatically adjusting the arc of oscillation when the fan or any part carried thereby meets with an obstruction in moving in its oscillating stroke.

17. A motor fan comprising a base, a motor and casing therefor pivotally supported upon the base, a crank carried by the casing and actuated by the motor, and connecting means between the crank and the base operative to oscillate the motor as the crank is actuated, said connecting means including parts adjustable to vary the distance between the crank and the pivotal axis of the base for any given angular position of the casing without varying the length of the crank arm, whereby the arc of oscillation relative to the base may be adjusted.

18. A motor fan comprising a base having a fulcrum member thereon, a motor and casing therefor having a pivotal engagement with the base, a rotative crank member carried by the motor casing and arranged to be rotated by the motor, a connecting rod directly connecting the crank member to the fulcrum member and adapted to impart oscillation to the motor as the crank member is rotated, said connecting rod having a swivel connection with the crank and fulcrum members and also being pivoted to one of said members on a horizontal and to the other on a vertical axis.

In testimony whereof, I have affixed my signature in the presence of two witnesses.

CHAS. H. J. DILG.

Witnesses:
EUGENE J. BUSHER,
GEO. BAMMANN.