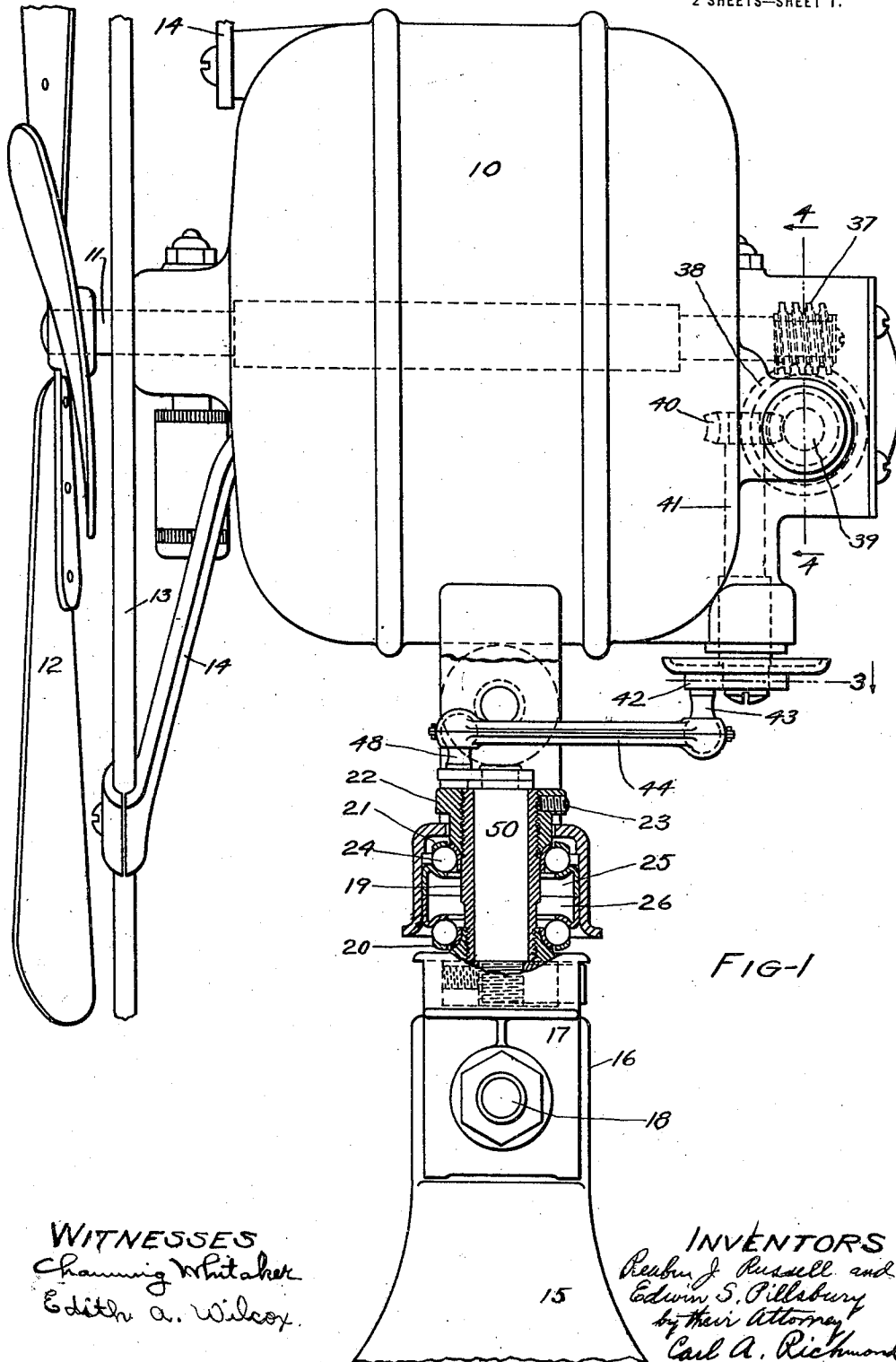


R. J. RUSSELL AND E. S. PILLSBURY.
 OSCILLATING ELECTRIC FAN.
 APPLICATION FILED MAY 19, 1915.

1,326,155.

Patented Dec. 23, 1919.

2 SHEETS—SHEET 1.



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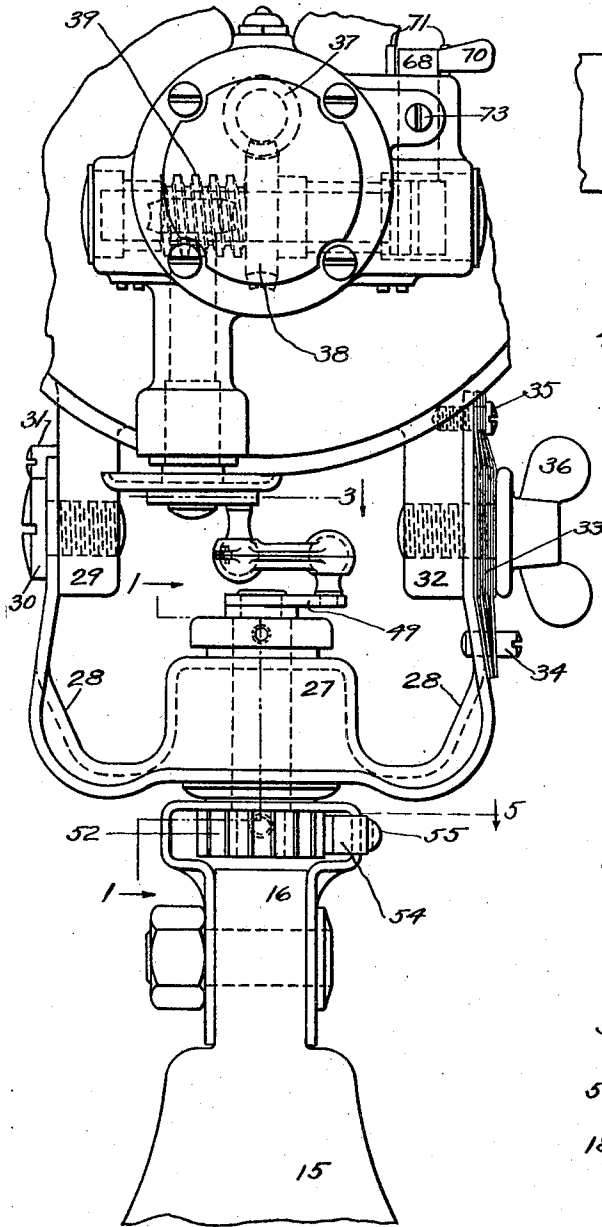


FIG-2

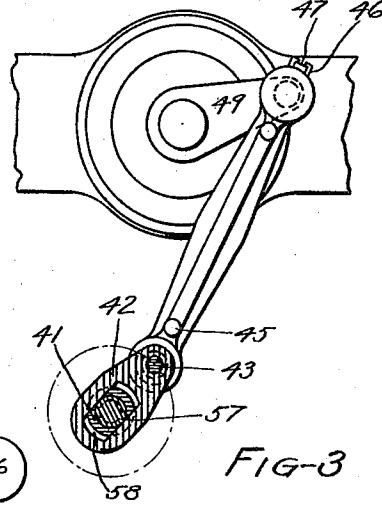


FIG-3

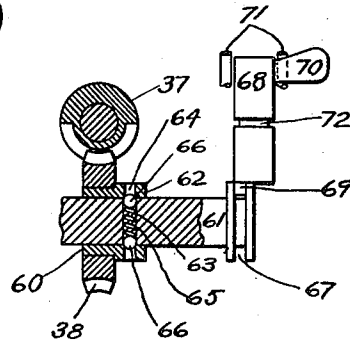


FIG-4

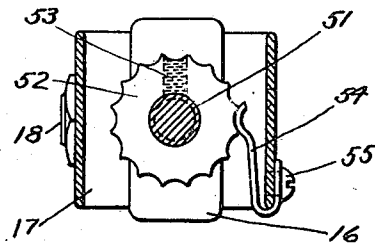


FIG-5

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UNITED STATES PATENT OFFICE.

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SOURI.

OSCILLATING ELECTRIC FAN.

1,326,155.

Specification of Letters Patent.

Patented Dec. 23, 1919.

Application filed May 19, 1915. Serial No. 29,251.

To all whom it may concern:

Be it known that we, REUBEN J. RUSSELL and EDWIN S. PILLSBURY, both citizens of the United States, and both residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Oscillating Electric Fans, of which the following is a specification.

The principal object of our invention is to provide a new and improved oscillating electric desk fan. Another object of our invention is to make such a fan with convenient means for adjusting the mean direction in which it delivers its blast of air. Another object of our invention is to provide oscillating mechanism that will comprise a yielding connection so that if the oscillating parts strike any obstruction this yielding connection will give temporarily and no damage will be done. Another object is to make the parts of the oscillating mechanism and connect them together in such a way that there will be a minimum of lost motion in this mechanism. Another object is to provide a simple and effective device for adjusting the fan so it will oscillate or not, as may be desired. Another object is to provide adjustment for the range of oscillation. Still another object is to provide the train of oscillating mechanism with means to accommodate a tilting adjustment of the fan. Our invention is defined in the appended claims, and for the purpose of showing how it may be utilized we have illustrated one specific embodiment of it in the drawings, and we now proceed to describe the same. The foregoing stated objects and other objects and advantages of our invention will become apparent in this connection. Referring to the drawings,

Figure 1 is a side elevation of a fan embodying our invention. This is partly in section on the line 1—1 of Fig. 2.

Fig. 2 is an end elevation showing a portion of the device.

Fig. 3 is a section on the line 3 of Figs. 1 and 2, looking down.

Fig. 4 is a section on the line 4 of Fig. 1, looking in the direction of the arrows.

Fig. 5 is a section on the line 5 of Fig. 2 looking down.

The electric motor 10 has a fan 12 mounted on the end of its rotor shaft 11. The fan 12 is surrounded and guarded by a case 13 supported by the arms 14 attached to the

casing of the motor 10. A yoke 17 has its sides clamped by a bolt 18 to the end 16 of the base or pedestal 15, and a tubular standard 19 has rigid screw-threaded engagement with said yoke. Thus the tubular standard 19 may be said to carry the depending side arms of the yoke 17. The yoke 17 can be turned 90 degrees relatively to the base 15, so as to adapt the base 15 to be fastened to a vertical wall, if so desired. Similar opposite ball-races 20 and 21 surround the standard 19, and are retained and adjusted to proper tightness by the screw-threaded collar 22 locked by the set-screw 23. An inverted cup 27 surrounds the standard 19 and within it are the opposite ball-races 25 and 26; these parts just described and the balls 24 make the ball-bearings that support the motor 10 and attached fan 12. The cup 27 is formed integrally with a pair of opposite up-turned side arms 28, the ends of which are pivotally connected to lugs 29 and 32 that project down from the casing of the motor 10. The cup 27 and the arms 28 may be said to constitute a yoke. The stud 31 on lug 29 serves as a stop to limit tilting movement about the pivot screw 30. Beside the other lug 32 are washers 33 with their side edges alternately engaging the studs 34 and 35 respectively on the arm 28 and the lug 32. The winged head pivot screw 36 clamps these washers and thereby holds the motor and fan at any desired angle of tilting adjustment.

The armature shaft 11 at its end opposite the fan 12 carries a small worm 37 that engages a worm wheel 38 on a short cross shaft that also carries the worm 39, which in turn engages the worm wheel 40 on a vertical shaft 41 that carries a crank 42 at its lower end. Projecting down from the end of the crank 42 is a stud 43 with a phosphor bronze ball at its end. The link or connecting-rod 44 is formed of two identical pieces stamped from sheet-metal, and fastened together by the rivets 45. At their ends these pieces have lugs that interlock and give proper registry of the pieces when they are fitted together to form the link 44.

Within the tubular standard 19 is a rotatable shaft 50 carrying a crank 49 at its upper end with an up-standing stud 48 that ends in a phosphor bronze ball engaging the corresponding socket of the link 44. The lower end of the shaft 50 is screw-threaded

and carries a nut or disk 52 fixed by a set-screw 53. The circumference of this nut or disk 52 has shallow notches, and a leaf spring 54 is attached by a screw 55 to one side of the yoke 17, and its end engages one of the notches. The end of the spring 54 is beveled so that it will slip either way from notch to notch when a sufficient torque is applied on the shaft 50.

As shown in Fig. 4, the worm wheel 38 is carried by a bushing 60 around shaft 61. A diametrical hole 63 in shaft 61 contains two balls 66 with a compression coil spring 65 between them. The edges of hole 63 are upset so the balls 66 cannot escape therefrom though they can protrude a little. The bushing 60 has a flange 62 at its end with radial holes 64 adapted to register with the hole 63. At its end the shaft 61 has a head with a circumferential groove 67. A shaft 68 has an eccentric stud 69 in its lower end that enters the groove 67. This shaft 68 carries a handle 70, and stops 71 are provided to limit the range of its movement. A screw 73 engages a circumferential groove 72 and thus retains the shaft 68 in place.

The crank arm 42 has a slot 58 that engages the lower end of the vertical shaft 41; thus the throw of the crank 42 can be adjusted. The screw 57 clamps the crank 42 to the shaft 41 at any desired adjustment.

Whatever the position of the notched disk 52, the spring 54 will hold it against rotation in the normal operation of the device. Hence the ball-stud 48 will remain fixed, and as the crank 42 rotates slowly when the fan is operating, its effect will be to oscillate the cup 27 and parts supported thereby around the vertical axis of the shaft 50 on the ball bearings contained within said cup 27. If it is desired to direct the blast of the fan at an angle up or down, this may be done by loosening the winged head screw 36 and tilting the motor about the pivotal axis 30—36, and then clamping the winged head screw 36 at the desired angle of adjustment. This adjustment will be facilitated by the ball-and-socket joints at the ends of the link 44. If it is desired to change the mean horizontal direction of the blast of air from the fan this may be done by seizing the cage 13 or the motor casing 10 and turning these parts to the desired position. In this adjustment the notched disk 52 will be forced to rotate under the leaf-spring 54 which will snap in succession out of one notch into the next. Should the fan be started in operation in such a location that the cage in its oscillation will strike an obstacle, then the cage will stop its course when it strikes the obstacle and the notched disk 52 will be turned under the spring 54 until the point is reached where a reversal of motion occurs; thereafter the fan will swing freely away

from the obstacle and back to it. Were there not this yielding connection in the train of oscillating mechanism, the apparatus might be tumbled over or otherwise injured when the cage strikes an obstacle as just described. By the use of worm gearing instead of spur-tooth gearing and by the use of the ball-and-socket joints at the ends of the link 44 the lost motion in the oscillating mechanism is reduced to a practical minimum. The rivets 45 in the link 44 draw the two parts thereof together so that the half-sockets in the ends of those pieces fit closely to the balls on the ends of the studs 42 and 48.

When it is desired to operate the fan as a non-oscillating fan the handle 70 is thrown over from one stop 71 to the other stop 71, and thereby the eccentric stud 69 carries the shaft 61 over, so as to draw the balls 66 out from within the bushing 60. Thereafter the worm wheel 38 and bushing 60 turn idly on the shaft 61. The reverse movement of the handle 70 causes the balls 66 to engage the holes 64 in the bushing 60 so that the shaft 61 is caused to rotate with the bushing 60 and thereby the oscillating mechanism is driven. There is a yielding engagement between the bushing 60 and shaft 61; if a sufficient torque is applied between them, it will jump the balls 66 out of the holes 64 and permit one member to rotate without the other until the resistance of the latter is sufficiently decreased, whereupon the balls 66 instead of jumping across the holes 64 will engage them and the parts will rotate together. One advantage is when the oscillating mechanism is suddenly connected while the fan is running; also the device acts as a yielding connection for the oscillating mechanism similar in effect to the notched disk 52 and spring 54 in case those parts for any reason fail to act as described. Ordinarily the parts are adjusted so that a release will come at 52—54 instead of at 66—64.

It will be seen that our improved oscillating fan facilitates tilting adjustment and also adjustment of the mean horizontal direction in which the air is delivered. At the same time the device is protected against any damage due to an obstacle in the way of the oscillating parts, and the lost motion in the train of oscillating mechanism is made as little as practicable.

We claim:

1. In combination, a pedestal, a bearing thereon, a motor stator supported thereby and adapted to oscillate on said bearing and also adapted to be tilted to any desired angle of adjustment, a rotor associated with the stator, a fan carried by the rotor, a crank shaft driven by the rotor, journal bearings therefor fixed on the stator, a crank carried by the crank shaft, a link having one end

flexibly connected to the end of said crank, and a flexible connection for the other end of the link at a point normally fixed relatively to the pedestal, said flexible connections being adapted to accommodate tilting of the stator and parts carried thereby.

2. In combination, a pedestal, a bearing thereon, a motor and fan supported thereby and adapted to oscillate on said bearing, and oscillating mechanism driven by the motor and extending thence to the pedestal, said mechanism comprising a crank on a crank-shaft in journal bearings fixed on the motor frame and a link extending from the crank with a ball and socket joint at its end, one member of said joint being normally fixed relatively to the pedestal.

3. In combination, a pedestal, a bearing thereon, a motor and fan supported thereby, and a train of mechanism to produce oscillation of the motor and fan about said bearing, said mechanism extending from the motor and connected to the pedestal and comprising a crank on a crank-shaft in journal bearings fixed on the motor frame and a link extending from the crank with ball and socket joints at its ends, whereby the motor and fan may be tilted relatively to the base as well as to oscillate relatively thereto, one member of one of said joints being normally fixed relatively to the pedestal.

4. In combination, a pedestal, a bearing thereon, a member supported thereby and adapted to oscillate about said bearing, a motor and fan mounted on said member on a horizontal pivotal axis to facilitate tilting of the motor and fan, said horizontal axis lying below said motor, and a train of oscillating mechanism extending from the motor to the pedestal and comprising a link with ball-and-socket joints at its ends, one member of one of said joints being normally fixed relatively to the pedestal at a point near the said pivotal axis.

5. In combination, a pedestal, a bearing thereon, a motor and fan supported thereby, a slow moving crank carried by the motor frame and journaled in bearings fixed on the motor and driven by the motor, said crank ending in a ball, a ball carried by the pedestal and normally fixed relatively thereto, and a link with sockets in its ends engaging said balls, whereby said motor and fan may be tilted relatively to the base as well as to oscillate relatively thereto.

6. In combination, a pedestal, a bearing thereon, a motor and fan supported thereby, a slow moving crank shaft and crank carried by the motor frame and driven by the motor, said crank shaft being journaled in bearings fixed relatively to the motor frame and said crank ending in a ball, a ball carried by the pedestal and normally fixed relatively thereto, and a link with sockets in its ends engaging said balls, whereby said

motor and fan may be tilted relatively to the base as well as to oscillate relatively thereto.

7. In combination, a pedestal, a yoke rotatably mounted thereon, a motor and fan pivoted on the ends of the yoke, means to clamp the motor and fan on the yoke at any desired angle of tilting adjustment, and mechanism to oscillate the yoke and the motor and fan therewith relatively to the pedestal, said mechanism engaging the pedestal near the tilting axis at a point between the arms of the yoke and comprising a link with ball and socket joints at its ends.

8. In combination, a pedestal, a yoke rotatably mounted thereon, a motor and fan pivoted on the ends of the yoke, means to clamp the motor and fan on the yoke at any desired angle of tilting adjustment, speed reducing gearing mounted on the motor frame and driven by the motor, a crank shaft therefor in bearings fixed on the motor frame, said crank ending in a ball, a normally fixed ball carried by the pedestal, and a link with sockets at its ends engaging said balls.

9. In combination, a pedestal, a yoke rotatably mounted thereon, a motor and fan pivoted on the ends of the yoke, means to clamp the motor and fan on the yoke at any desired angle of tilting adjustment, speed reducing gearing mounted on the motor frame and driven by the motor, a slow moving crank driven thereby, a crank shaft therefor in bearings fixed on the motor frame, said crank ending in a ball, a normally fixed ball carried by the pedestal, a link with sockets at its ends engaging said balls and means to adjust around the pedestal the normal position of the ball carried thereby.

10. In combination, a pedestal, a yoke rotatably mounted thereon, a motor and fan pivoted on the ends of the yoke, means to clamp the motor and fan on the yoke at any desired angle of tilting adjustment, speed reducing gearing mounted on the motor frame and driven by the motor, a slow moving crank driven thereby, said crank ending in a ball, a normally fixed ball carried by the pedestal, a link with sockets at its ends engaging said balls and means to adjust around the pedestal the normal position of the ball carried thereby and to fasten it yieldingly at any desired position.

11. In combination, a pedestal, a tubular standard carried thereby, a shaft in said tubular standard, a crank on the upper end of said shaft, a notched disk on the lower end, a spring catch engaging a notch of said disk, a motor and fan, bearings around said tubular standard supporting said motor and fan and permitting them to oscillate, and

oscillating mechanism from the motor comprising a link with one end engaging the end of said crank.

12. In combination, a pedestal, a tubular standard with depending side arms clamped to the end of the pedestal, a rotatable shaft within said tubular standard, a notched disk fixed on the lower end of said shaft between said side arms, a crank fixed on the upper end of said shaft, a spring catch mounted on one of said side arms and yieldingly engaging a notch of said disk, a motor and fan supported by the pedestal and adapted to be oscillated relatively thereto, and oscillating mechanism from the motor engaging the end of said crank.

13. In combination, a pedestal, a tubular standard with depending side arms clamped to the end of the pedestal, a rotatable shaft within said tubular standard, a notched disk fixed on the lower end of said shaft between said side arms, a crank fixed on the upper end of said shaft, a spring catch mounted on one of said side arms and yieldingly engaging a notch of said disk, a motor and fan supported by the pedestal and adapted to be oscillated relatively thereto, and oscillating mechanism from the motor comprising a link with ball and socket joints at its ends, such joint at one end connecting said link to said crank.

14. In combination, a pedestal, a tubular standard with depending side arms clamped to the end of the pedestal, a rotatable shaft within said tubular standard, a notched disk fixed on the lower end of said shaft between said side arms, a crank fixed on the upper end of said shaft, a spring catch mounted on one of said side arms and yieldingly engaging a notch of said disk, a yoke rotatably mounted around said tubular standard, said yoke having upstanding side arms, a motor and fan pivoted on the ends of said side arms, and oscillating mechanism from the motor comprising a link with ball and socket joints at its ends such joint at one end connecting said link to said crank.

15. In combination, a pedestal, a bearing thereon, a motor and fan supported thereby, a train of mechanism to produce oscillation of the motor and fan about said bearing, said mechanism extending from the motor and comprising a crank on a crank-shaft journaled in bearings fixed on the motor frame and a link flexibly connected with said crank at one end, a member on the pedestal adapted to be adjusted around it, and a flexible connection between said member and the other end of said link, said flexible connections being adapted to accommodate tilting of the fan relatively to the pedestal.

16. In combination, a pedestal, a bearing thereon, a motor stator supported thereby

and adapted to oscillate on said bearing and also adapted to be tilted to any desired angle of adjustment, a rotor associated with the stator, a fan carried by the rotor, a crank shaft driven by the rotor, journal bearings therefor fixed on the stator, a crank carried by the crank shaft, a link having one end flexibly connected to the end of said crank, a member on the pedestal adapted to be adjusted around it, and a flexible connection between said member and the other end of said link, said flexible connections being adapted to accommodate tilting of the fan relatively to the pedestal.

17. In combination, a pedestal, a member adapted to be adjusted around the axis of the pedestal, a circumferential series of notches on said member, a spring catch supported on the pedestal and adapted to engage one of the notches, a motor and fan, means supporting said motor and fan on the pedestal permitting them to oscillate relatively thereto and also to be tilted relatively thereto, and oscillating mechanism comprising a link and a ball and socket joint connecting one end of said link with an eccentric point of said member.

18. In combination, a pedestal, a member adapted to be adjusted around the axis of the pedestal, a yielding means for holding said member normally at any particular adjustment, a motor and fan, means supporting said motor and fan on the pedestal permitting them to oscillate and be tilted relatively thereto, and oscillating mechanism comprising a link having a universal connection at one end with an eccentric point of said member.

19. In combination, a pedestal, an oscillatory yoke on said pedestal, a motor and fan pivotally supported for tilting on the ends of said yoke, and oscillating mechanism driven by the motor and extending thence to the pedestal, said mechanism comprising a link flexibly connected with said mechanism at one end and likewise at the other end with an eccentric point of the pedestal between the arms of the yoke near the tilting axis.

20. A motor fan comprising a base having a fulcrum member thereon, said fulcrum member being automatically adjustable around said base, 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.

In testimony whereof we have subscribed our names.

REUBEN J. RUSSELL.
EDWIN S. PILLSBURY.