Aug. 6, 1940. J. J. GOUGH 2,210,865

OSCILLATING ELECTRIC FAN

Filed Oct. 6, 1938 2 Sheets-Sheet 1

FIG. 1.

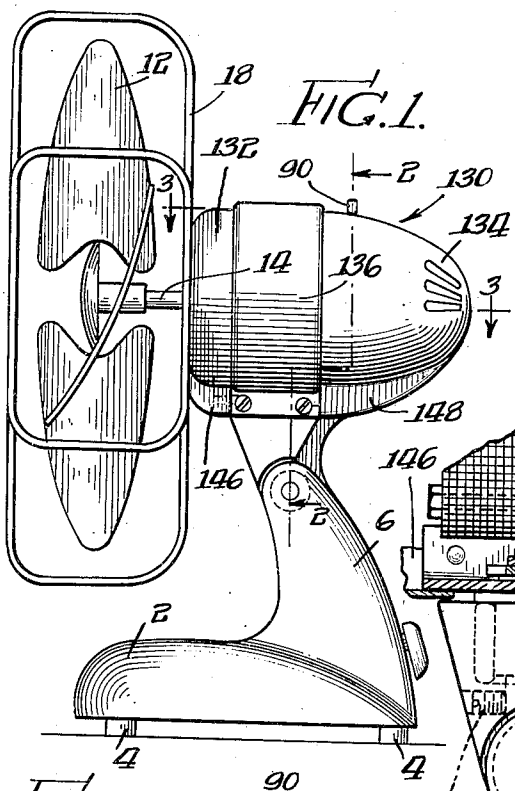


FIG. 4.

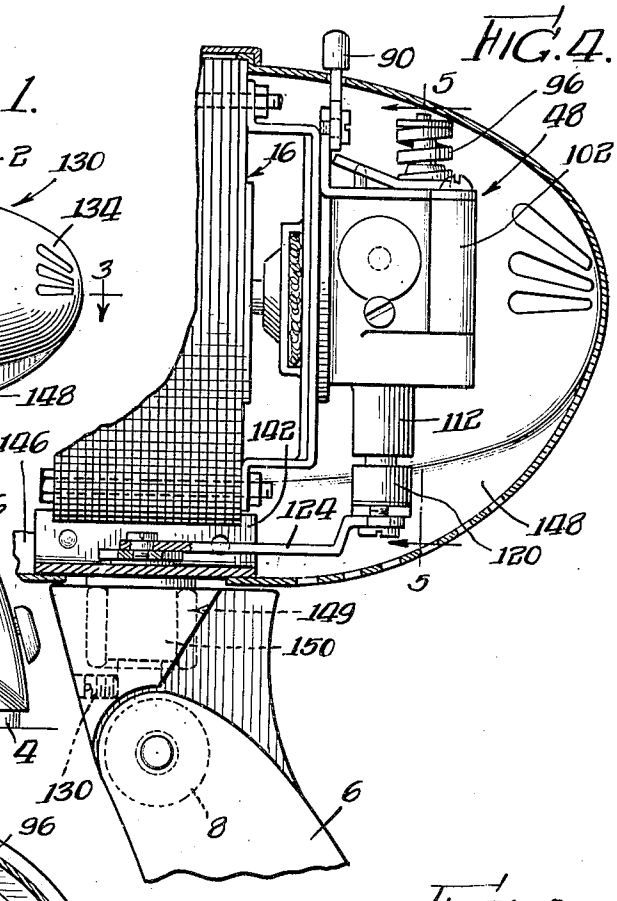


FIG. 2.

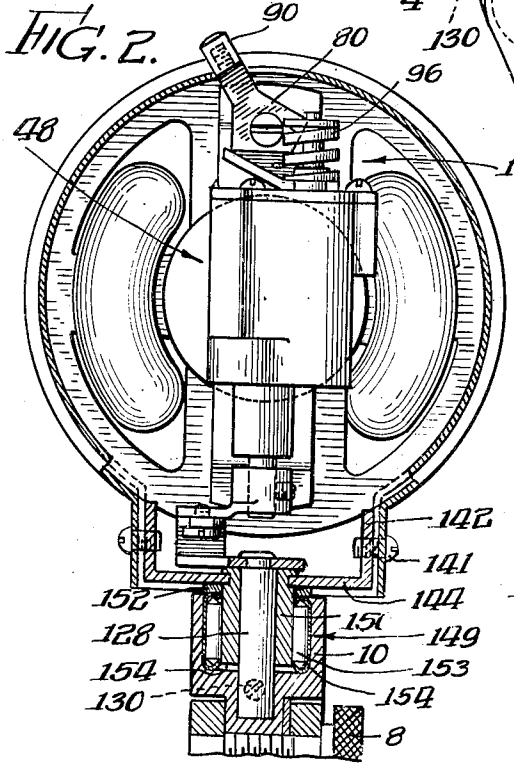
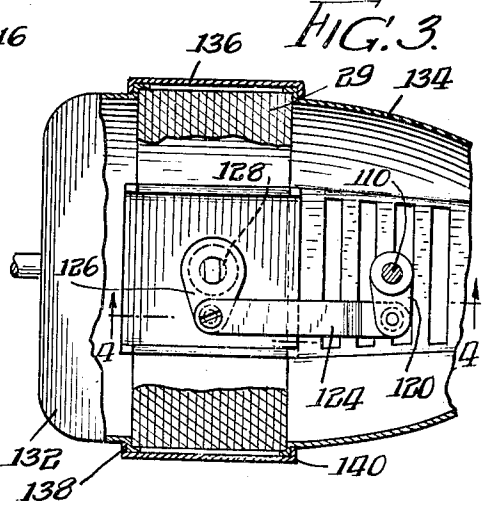


FIG. 3.



INVENTOR.
James J. Gough
BY: Cox & Moore
ATTORNEYS.

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Filed Oct. 6, 1938 2 Sheets-Sheet 2

FIG. 5.

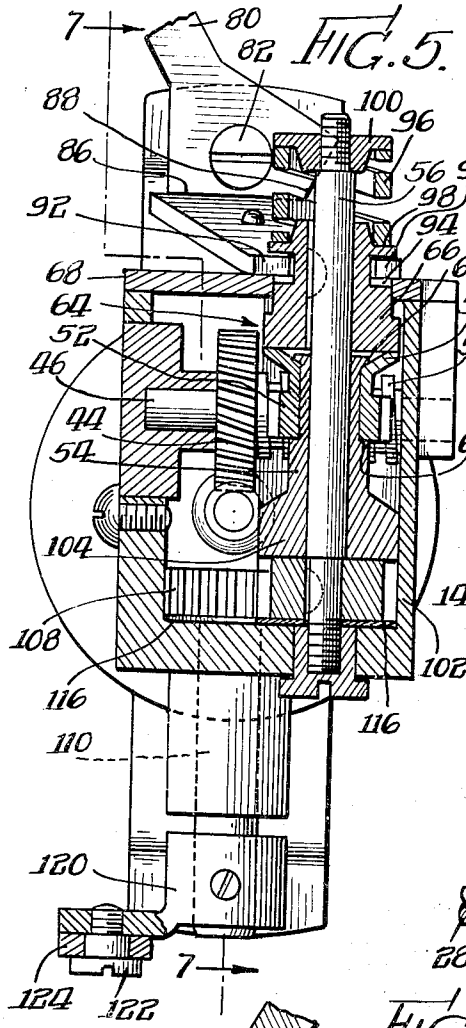


FIG. 7.

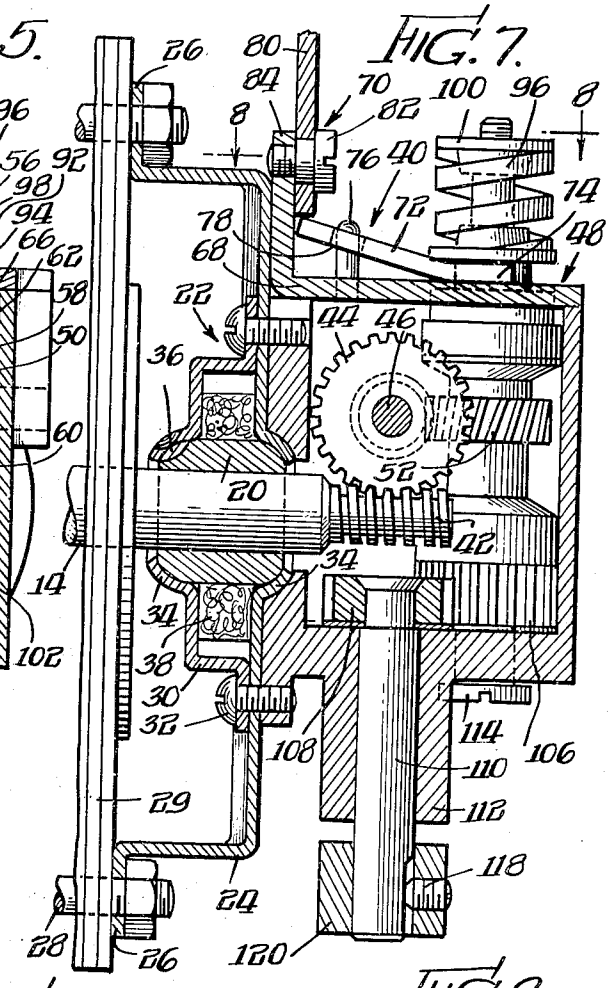


FIG. 6.

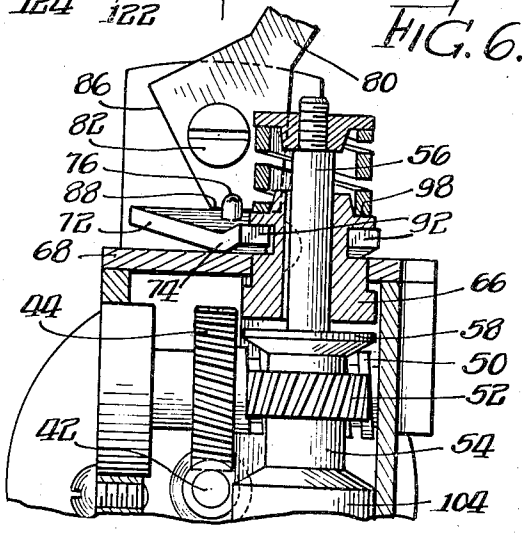
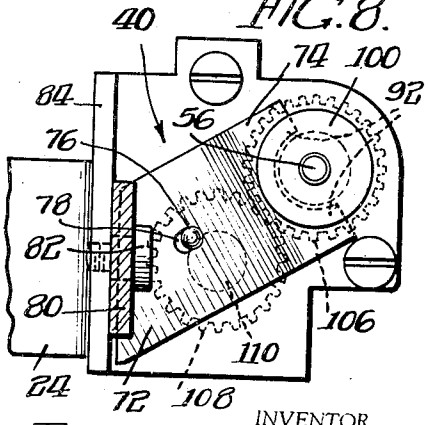


FIG. 8.



INVENTOR.
James J. Gough
BY:- Cox & Moore
ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,210,865

OSCILLATING ELECTRIC FAN

James J. Gough, Chicago, Ill., assignor to Chicago Electric Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application October 6, 1938, Serial No. 233,647

10 Claims. (Cl. 230—256)

This invention relates to an oscillating fan.

It is an object of this invention to provide an electric fan of the oscillating type having all of the parts of the mechanism which causes oscillation enclosed within the motor housing so that these parts may be properly lubricated, thereby decreasing the maintenance cost and increasing the trouble free life of the fan and so that the beauty and cleanliness of the fan may be enhanced.

Another object of the invention is to provide in an oscillating electric fan an improved driving mechanism for oscillating the fan, which mechanism is inexpensive in construction; efficient in operation; and in which the driving gears and related shafts are protected against dust and dirt and maintained properly lubricated.

A further important object of the invention is to provide a novel mechanism readily operable to render the oscillating mechanism ineffective.

Other and further objects and advantages will be apparent from the following specification when taken in connection with the accompanying drawings, wherein:

Fig. 1 is a view in elevation of a fan embodying the invention;

Fig. 2 is a fragmentary, vertical section taken along the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary, plan view showing the motor housing and part of the oscillating mechanism taken along the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary, vertical section taken substantially along the line 4—4 of Fig. 3;

Fig. 5 is a further enlarged vertical section taken substantially along the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary section showing a portion of Fig. 5, but with certain parts in a different position of adjustment;

Fig. 7 is a fragmentary, vertical section taken along the line 7—7 of Fig. 5; and

Fig. 8 is a fragmentary, horizontal section taken along the line 8—8 of Fig. 7.

As shown in the drawings, a base casting 2 is provided with feet 4 and an upstanding, forwardly inclined arm 6.

The arm 6 adjustably supports at its upper end, by means of a thumb screw or bolt 8, a block 10 upon which the fan proper is mounted. The fan proper comprises a propeller 12, comprising a plurality of blades mounted on the shaft 14 of the motor 16. The usual fan guard 18 encloses the propeller 12.

The motor shaft 14, adjacent its rear end, is journalled in a bushing 20 mounted in a bracket 22. The bracket 22 comprises a generally U-shaped strap 24 having outwardly turned flanges 26 receiving the bolts 28 by which the laminations of the motor stator 29 are retained in assembled relation. The bracket 22 also comprises a substantially U-shaped strap 30 having outwardly turned flanges secured by screws 32 to the base of the U-shaped strap 24. The straps 24 and 30 of the bracket 22 are provided with struck out portions 34 forming a mounting for the bushing 20, and the bushing 20 is non-rotatably secured to the bracket by an inwardly struck lug or rib 36. A lubricant retaining washer 38, of felt or similar material, is mounted within the housing formed by the straps 24 and 30, and surrounds the bushing 20.

The oscillating mechanism 40 comprises a worm gear 42 formed on or secured to the rear end of the motor shaft 14. The worm gear 42 meshes with a worm wheel 44, secured to a stud shaft 46 journalled in the side walls of a housing 48, preferably formed of aluminum casting and secured by the screws 32 to the strap 24 of the bracket 22.

A second worm gear 50 is secured to or formed on one end of the stud shaft 46 and meshes with the worm wheel 52 journalled by a bushing 54 on a vertical shaft 56. The gear 52 is formed on or secured to a friction driving cone 58, and the gear 52 and the cone 58 are secured against axial movement on the bushing 54 by means of the annular shoulder 60 and the peened-over end 62 of the bushing.

The friction cone 58 forms one part of a manually controlled clutch 64, the driven member of which comprises a sleeve 66 splined to the vertical shaft 56 for axial movement relative thereto and for rotation therewith. The cone-engaging bottom surface of the sleeve 66 is roughened or otherwise treated to increase the frictional engagement with the cone, or the sleeve may, itself, be made of compressed fibre or other material embodying such a cone-engaging friction surface.

The sleeve 66 is slidably and rotatably journalled in the detachable cover plate 68 of the housing 48 as seen in Figs. 5 and 6.

Control means 70 for the sleeve 66 comprises a bent lever or plate having arms 72 and 74 fulcrumed at the point of bend on the cover plate 68 of the housing 48. The lever or plate is guided for movement from the position shown in Fig. 5 to the position shown in Fig. 6 by a pin 76 upstanding from the cover plate 68 and passing through an enlarged opening 78 in the arm 72 of the lever. Movement of the lever is controlled by a

manually operable cam 80, pivoted by cap screw 82 to the upstanding flange 84 of the cover plate 68. The cam is provided at its lower edge with diverging plane cam surfaces 86 and 88 which engage the free edge of the arm 72 of the control lever or plate. These cam surfaces 86 and 88 act not only to move the control lever or plate into its different settings, but also to retain said lever or plate in those settings. At its upper end the cam 80 is provided with a detachable internally threaded operating knob 90.

The arm 74 of the control lever or plate is bifurcated, and the furcations 92 thereof are received within an annular groove 94 in the sleeve 66. A coil spring 96, produced from stock which is preferably rectangular in cross-section, is interposed between the annular flange 98 of the sleeve 66 and a collar or nut 100 threaded onto the upper end of the vertical shaft 56. The spring 96 urges the sleeve 66 into driving engagement with the friction cone 58, and the collar 100 provides means for adjusting the tension of the spring to determine the driving pressure between the cone 58 and the sleeve 66.

The vertical shaft 56 is journalled by the sleeve 66 and the bushing 54 in the part circular end wall 102 and the cover plate 68 of the housing 48. As shown in Fig. 5, the bushing 54 at its lower end is provided with an enlarged circular portion 104 which engages the inner surface of the part circular end wall 102 of the housing so as to be journalled therein. A gear 106 is keyed to the shaft 56 adjacent its lower end, and this gear meshes with a gear 108 secured to a vertical stud shaft 110 journalled in a bearing block 112, formed on or secured to the bottom wall 112 of the housing 48.

An internally threaded sleeve or nut 114 is received on the lower threaded end of the vertical shaft 56, providing a thrust bearing, the sleeve being received in a slightly larger opening in the bottom wall 112. Lubricant-retaining washers 116 may be interposed between the gears 106 and 108 and the bottom wall 112 so as to prevent escape of lubricant from the housing 48.

The stud shaft 110 has secured to its lower end, as by a set screw 118, a crank 120, the free end of which is pivotally connected, as by a cap screw 122, to an oscillating link 124. The oscillating link 124 is pivotally connected at its other end to a fixed crank 126, secured to the upper end of a pin 128, held against rotation in the block 10 as by a set screw 130.

It will be apparent that as the motor shaft 14 rotates, the worm wheel 52 will be correspondingly rotated to drive the friction cone 58 of the clutch 64. When the sleeve 66 of this clutch is in driving engagement with the cone 58 the shaft 56 will be rotated to rotate the crank 120 through the gears 106 and 108 and the stud shaft 110.

Since the oscillating link 124 is pivoted at one end to the fixed crank 126, rotation of the crank 120 will, in the customary manner, cause the oscillation of the fan about the pin 128. Rotation of the operating cam 80 in a clockwise direction, as seen in Fig. 5, to the position shown in Fig. 6, will cause the sleeve 66 to be moved axially of the shaft 56 out of engagement with the driving cone 58, thereby to break the driving connection to this shaft and render the oscillating mechanism inoperative.

The motor 16 and the oscillating mechanism 40 are completely enclosed within the same housing or streamlined casing 130. The casing 130 preferably comprises a forward sheet metal section 132, enclosing the forward portion of the motor and supporting the fan guard 18, which may be secured to it as by welding, soldering, or by a suitable fastening element. The casing also comprises a rear bullet-shaped or streamlined sheet metal section 134, enclosing the rear portion of the motor and the oscillating mechanism 40. The front and rear sections 132 and 134 of the casing are secured in assembled relation by a central sheet metal section 136, which preferably comprises a ring having inwardly turned annular flanges overlying the outwardly turned peripheral flanges 138 and 140 of the front and rear sections, respectively. The opposed edges and the flanges 138 and 140 of the front and rear sections preferably abut the opposite sides of the stator 29 so as to be clamped thereagainst by the ring 136.

The ring 136 is secured, as by screws 141, to the opposed upstanding flanges 142 of a base plate 144. The flanges 142 are cut away to receive, in the groove thus formed, the stator 29 so that the plate 144 forms a support for the motor as well as the motor casing, and assures simultaneous rotation of the plate with the motor.

The bottoms of the front and rear sections 132 and 134 of the casing 130 are centrally offset, as at 146 and 148, respectively, to provide a substantially horizontal portion, permitting these sections to be set over the bottom plate 144 and in closing relation therewith, as seen in Fig. 4. The supporting plate 144 is rotatably journalled in the block 10 and on the pin 128 by means of a needle bearing 149, a sleeve 150 and a washer 152, the washer encircling the sleeve and interposed between the bearing 149 and the plate 144. The sleeve 150 is secured to the plate 144 as by peening over the end of the sleeve. The needle bearing 149 comprises a plurality of vertically disposed needle-like rollers 153 received within a relatively rotatable annular casing 154 substantially U-shaped in cross section. The sleeve is rotatably received by the needles 153, and in turn is journalled on the pin 128. The washer 152 is interposed between the plate 144 and the upper edge of the block 10.

The front and rear sections 132 and 134 of the casing 130 are provided with the usual ventilating openings, permitting the circulation of cooling air to the motor.

It will be seen from the foregoing description that applicant has provided an electric fan of the oscillating type, having all of the parts of the oscillating mechanism, including the gearing mechanism and oscillating link, and the fixed crank or pin completely enclosed within the motor housing which is journalled for oscillation in a compact and highly efficient manner on the fixed fan support, and that there is also mounted in this casing a novel control mechanism of simple and efficient construction for rendering the oscillating mechanism ineffective, which control mechanism is provided with means for readily operating the same externally of the casing.

Changes may be made in the form, construction, and arrangements of the several parts without departing from the spirit of the invention or sacrificing any of its attendant advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. An electric fan, an oscillating mechanism comprising a motor operated driving shaft, a

driven shaft, a housing in which said driven shaft is journaled, releasable driving connections between the driving and driven shafts, said connections including clutch means comprising a driving member journaled on the driven shaft, a driven member secured to the driven shaft for rotation therewith but movable axially thereof into and out of engagement with the driving clutch member, said driven clutch member having an operating portion projecting out of said housing, a lever means fulcrumed upon said housing externally thereof and engaging the projecting portion of the driven clutch member to move the same axially of the driven shaft and a cam for operating said lever to move the driven clutch member out of engagement with the driving clutch member and means engaging the projecting portion of the driven clutch member for resiliently urging the driven clutch member into engagement with the driving clutch member.

2. In an electric fan, a stationary support, a motor, a supporting member for oscillatably mounting the motor on the stationary support, a motor casing comprising front and rear sections overlapping said mounting member and a central section secured to said mounting member and joining said front and rear sections, an oscillating mechanism comprising a gear reducing and oscillation control clutch mechanism mounted within the rear section of the casing and a driven oscillating link extending from the rear section into the central section, a manually operable clutch control member mounted within the rear section of the motor casing and projecting through a wall thereof for manipulation external of the casing and means including a pin secured to the support and projecting through the mounting member at its point of oscillation into the central section of the casing, and a crank pivoted to the oscillating link and non-rotatably secured to said pin.

3. An electric fan comprising a stationary support, a motor, a casing providing a chamber in which said motor is mounted, means for oscillatably mounting the casing on the stationary support, said means comprising a sleeve secured to said casing and projecting into said support and a combined thrust and journal bearing for said casing and said sleeve comprising a plurality of rollers encircling said member and a roller retaining housing rotatably supporting said casing, an oscillating mechanism mounted within the same chamber as the motor and completely enclosed within said casing and a member secured to said support and projecting through said sleeve to provide an internal journal bearing for said sleeve and to provide a stationary element within the casing to which the oscillating mechanism is connected to compel oscillation of the fan relative to the support.

4. An electric fan including an oscillating mechanism comprising a driving shaft, a driven shaft, a housing adapted to receive lubricating material and in which said driving and driven shafts are journaled, releasable driving connections between said driving and driven shafts, said connections including a driving clutch member journaled on the driven shaft, a driven clutch member, but movable axially thereof into and out of engagement with the driving clutch member, said driven clutch member being slidably and rotatably journaled in and projecting out of one wall of said housing to prevent escape of the lubricating material, but to permit operation of the driven clutch member, means external of the housing and operatively engaging the projecting portion of the driven clutch member to move the same axially of the driven shaft, a motor for operating said driving shaft, a casing enclosing said motor, said oscillating mechanism and said housing, and said manually operable means including a member projecting through said casing for manipulation externally thereof to control a driven clutch member, thereby to render said oscillating mechanism effective or ineffective.

5. An electric fan, an oscillating mechanism comprising a driving shaft, a driven shaft, a housing in which said driven shaft is journaled, releasable driving connections between the driving and driven shafts, said connections including clutch means comprising a driving member journaled on the driven shaft, a driven member secured to the driven shaft for rotation therewith but movable axially thereof into and out of engagement with the driving clutch member, said driven clutch member having an operating portion projecting out of said housing, a lever means fulcrumed upon said housing externally thereof and engaging the projecting portion of the driven clutch member to move the same axially of the driven shaft, a motor for operating the driving shaft, a casing providing a chamber in which said motor and all of said oscillating mechanism is mounted, a base, a pin carried by said base and projecting into said chamber to provide a bearing for said casing and a stationary element to which the oscillating mechanism may be connected to compel oscillation of the fan, a pivoted cam in said casing having a manually operable portion projecting out of said casing and having diverging plane faces alternately engageable with said lever means to move the driven clutch member out of engagement with the driving clutch member, and spring means within said casing for urging the driven clutch member into engagement with the driving clutch member.

6. In an electric fan, a motor, a casing providing a chamber in which the motor is disposed, said casing comprising front and rear sections disposed in spaced relationship, a central mounting member comprising a generally channel-shaped member having a continuous bottom wall and upstanding side walls disposed between the spaced sections at the bottom portion thereof, said sections having portions sectionally complementary to the channel member and engaging the extremities of said channel member to provide said casing with a central lower recess, said casing having a central section joining said front and rear sections and fixed at its extremities to said channel member, an oscillating mechanism located completely within said casing and extending into said central, lower recess, supporting means exteriorly of the casing comprising a bearing block below the channel member and cooperating with the lower exterior face of the channel member to provide a supporting bearing for said casing, an aperture within said channel member above said block, and a pin fixedly projecting from said block and extending through said aperture, said pin being free from supporting inter-connection with said motor or casing and being operatively connected to said oscillating mechanism to compel oscillation of the fan.

7. In an electric fan, a motor, a casing providing a chamber in which the motor is disposed,

said casing comprising front and rear sections disposed in spaced relationship, a central mounting member extending between the sections at the bottom of the casing, a central section secured to said mounting member and joining said front and rear sections, a support including a bearing block disposed below said casing, said bearing block operatively cooperating with the lower surface of said mounting member to rotatably support the casing, an oscillating mechanism mounted completely within the casing and operatively driven by said motor, and a pin fixedly projecting from said bearing block through an aperture in said mounting member, said pin, at a point within the casing, being engaged by said oscillating means to compel oscillation of the fan relative to said pin.

8. In an electric fan, a motor, a casing providing a chamber in which the motor is disposed, said casing comprising front and rear sections disposed in spaced relationship, a central mounting member extending between the sections at the bottom of the casing, a central section secured to said mounting member and joining said front and rear sections, a support including a bearing block disposed below said casing, said bearing block operatively cooperating with the lower surface of said mounting member to rotatably support the casing, an oscillating mechanism mounted completely within the casing and operatively driven by said motor, and a pin fixedly projecting from said bearing block through an aperture in said mounting member, said pin, at a point within the casing, being engaged by said oscillating means to compel oscillation of the fan relative to said pin, said pin being free from supporting connection with said motor.

9. In an electric fan, a motor, a casing providing a chamber in which the motor is disposed, said casing comprising front and rear sections disposed in spaced relationship, a central mounting member extending between the sections at the bottom of the casing, a central section secured to said mounting member and joining said front and rear sections, a support including a bearing block disposed below said casing, said bearing block operatively cooperating with the lower surface of said mounting member to rotatably support the casing, an oscillating mechanism mounted completely within the casing and operatively driven by said motor, and a pin fixedly projecting from said bearing block through an aperture in said mounting member, said pin, at a point within the casing, being engaged by said oscillating means to compel oscillation of the fan relative to said pin, said mounting member comprising a channel having its central web forming a bottom wall of said casing, said front and rear sections having lower portions sectionally complementary to said channel and overlapping the extremities of said channel.

10. In an electric fan, a motor, a casing providing a chamber in which the motor is disposed, said casing comprising front and rear sections disposed in spaced relationship, a central mounting member extending between the sections at the bottom of the casing, a central section secured to said mounting member and joining said front and rear sections, a support including a bearing block disposed below said casing, said bearing block operatively cooperating with the lower surface of said mounting member to rotatably support the casing, an oscillating mechanism mounted completely within the casing and operatively driven by said motor, and a pin fixedly projecting from said bearing block through an aperture in said mounting member, said pin, at a point within the casing, being engaged by said oscillating means to compel oscillation of the fan relative to said pin, said mounting member comprising a channel having its central web forming a bottom wall of said casing, said front and rear sections having lower portions sectionally complementary to said channel and overlapping the extremities of said channel, and said central section having its extremities fixed to the side web of said channel whereby said casing is provided with substantially continuous walls.

JAMES J. GOUGH.