Dec. 19, 1939. T. H. TORNBERG 2,183,979

OSCILLATING FAN

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Fig. 2.

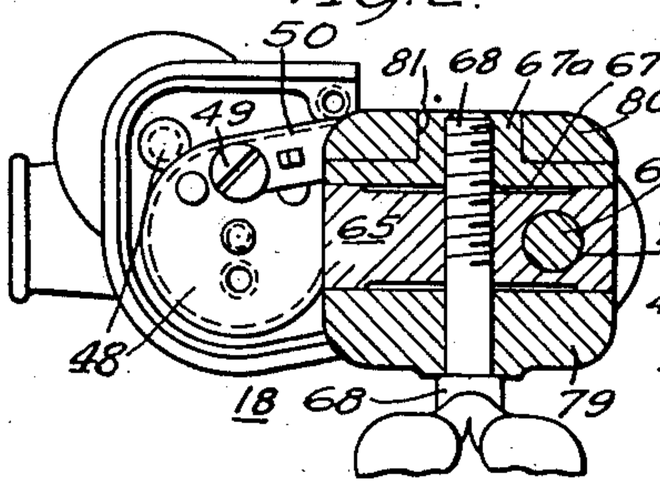
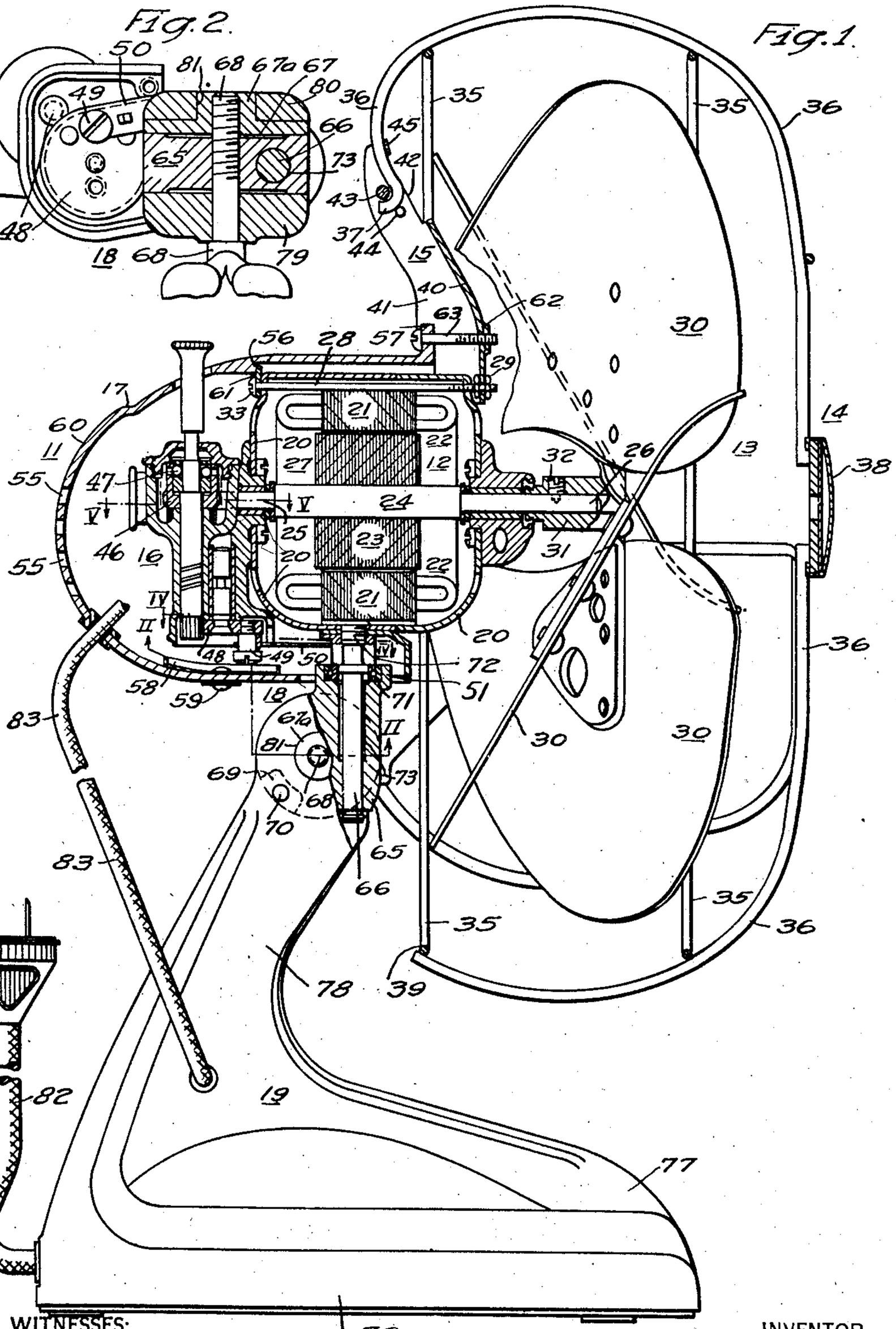


Fig. 1.



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OSCILLATING FAN

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Fig. 3.

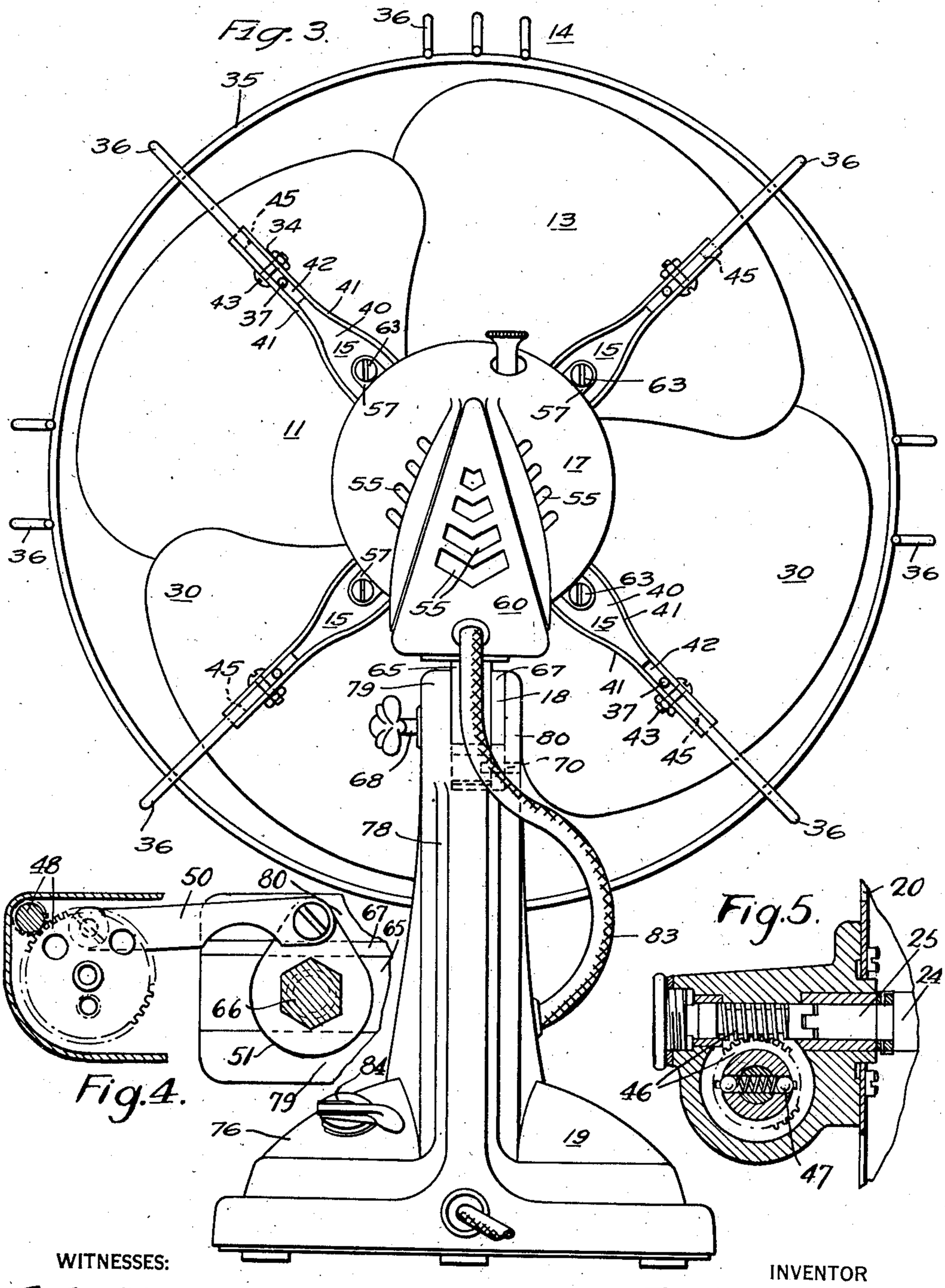

Fig. 4.

Fig. 5.

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OSCILLATING FAN

Filed June 19, 1937 3 Sheets-Sheet 3

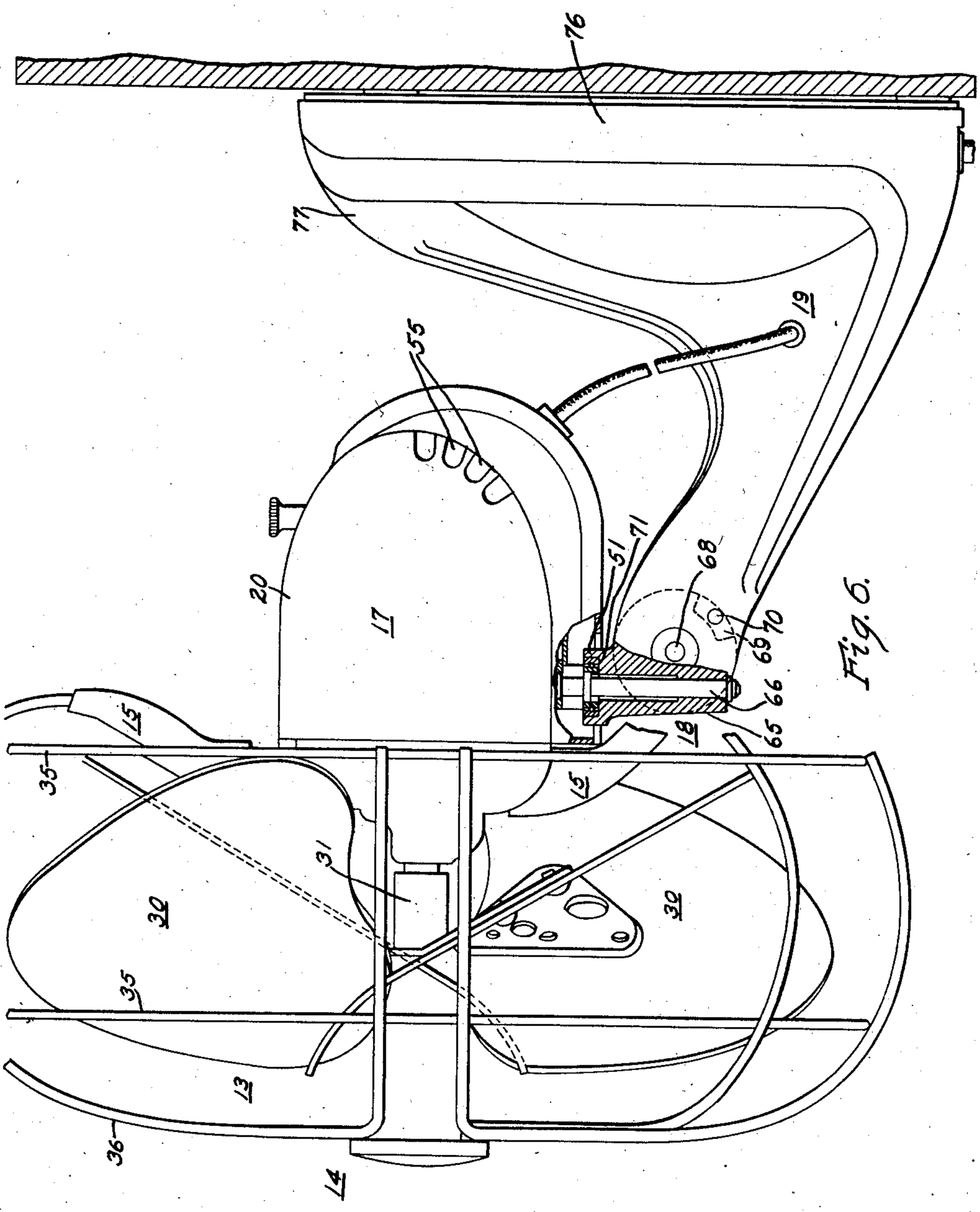

Fig. 6.

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UNITED STATES PATENT OFFICE

2,183,979

OSCILLATING FAN

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Application June 19, 1937, Serial No. 149,142

6 Claims. (Cl. 230—256)

My invention relates to oscillating fans and more particularly to the mounting of fan guards and of the fan upon a support member.

It is an object of my invention to provide a fan structure which will permit a fan incorporated therein to be satisfactorily used interchangeably as a desk fan or as a wall fan.

A further object of my invention is to provide a removable cover which will enclose the fan oscillating mechanism and will act as a support for the fan guard.

A further object of my invention is to provide guard arms which will support the fan guard and hold a cover over the oscillating mechanism.

A further object of my invention is to provide a fan supporting structure which will limit the amount of vertical swinging motion of the fan thereupon and will guarantee the proper assembly of the fan upon such structure.

A further object of my invention is to provide a swivel housing and clutch plate which can be assembled in only one manner and which will permit the fan to be assembled with the supporting member in various positions.

Other objects of my invention will either be pointed out specifically in the course of the following description of a device embodying my invention, or will be apparent from such description.

In the accompanying drawings:

Figure 1 is a view partly in elevation and partly in section of a device embodying my invention, the fan parts being arranged so as to adapt the fan for desk or table use;

Fig. 2 is an enlarged sectional view taken along line II—II of Fig. 1, with a portion of the cover removed from the device embodying my invention;

Fig. 3 is a rear elevational view of the device shown in Fig. 1.

Fig. 4 and Fig. 5 are cross-sectional views taken along the lines IV—IV and V—V, respectively, of Fig. 1; and

Fig. 6 is a view, partly in elevation and partly in section, showing the arrangement of fan parts when adapted for use as a wall fan.

Referring to the accompanying drawings, I show a fan structure 11 comprising a motor 12, a fan 13, a fan guard 14, guard arms 15, an oscillating mechanism 16 operatively associated with the motor 12 and fan 13, a swivel mechanism 18 and a stand 19 for supporting the swivel mechanism 18 about which the oscillating mechanism 16 oscillates the motor 12 and fan 13.

The motor 12 comprises a housing 20, stator laminations 21 with stator coils 22 wound therein, and a rotor 27 comprising a laminated core 23 and a shaft 24. One end 25 of the shaft 24 is operatively associated with the oscillating mechanism 16 while the other end 26 of shaft 24 is operatively associated with the fan 13.

The fan 13 comprises a plurality of blades 30 which may be of any shape desired and may be rigidly attached to a collar 31 in any suitable manner. The fan blades 30 and collar 31 are then rigidly attached to the extended shaft portion 26 of rotor 27 by means of a set screw 32 located within the sleeve 31.

The fan guard 14 comprises a plurality of wire guard rings 35, the planes of which are substantially normal to the axis of the rotor 27, and a plurality of radial guard wires 36, the planes of which are substantially normal to the planes of the guard rings, attached at one end to the center escutcheon plate 38 and at the other end to either a guard ring 35, as shown at 39, or to a guard arm 15.

The guard arms 15 are preferably of an irregular curved channel shape substantially as shown in Fig. 3, being substantially wider at the base than at the upper or outer end. The guard arm 15 has a back portion 40 and a plurality of side portions 41. An aperture 42 is located within the back portion 40 near the top or outer end of the guard arm 15. A bolt 43 is located between the side portions 41 at a point slightly farther from the base than a pin 44, which is likewise located between the side portions 41, substantially as shown in Figs. 1 and 3.

The oscillating mechanism 16 operatively associated with the end 25 of the rotor shaft 24 comprises a plurality of suitable gears 46 which are capable of changing the horizontal rotational energy transmitted thereto by rotor 27 to the vertical rotational energy transmitted therefrom by a suitable clutch 47 and gears 48. See Fig. 5. A shoulder screw 49 operatively associated with gear 48 eccentrically mounts a connecting rod 50 to the gear 48, whereby the rotational energy of said gear 48 is converted to reciprocating oscillating energy. As shown in Figs. 1 and 4, the connecting rod 50 is pivotally connected to a stationary block 51 that is disposed between the motor housing 20 and a swivelled support 65, the latter defining a part of the swivel mechanism 18. Accordingly, the motor 12, fan 13 and oscillating mechanism 16 will oscillate because of the oscillating action imparted to the connecting rod 50 by the gear 48.

The cover 17 is preferably substantially cup-

shaped with an irregular protruding portion 60 extending from the rear portion thereof substantially as shown in Figs. 1 and 3. A plurality of ventilating apertures 55 are located within the protruding portion 60 and within the main cover portion 17 to permit adequate circulation of air through the oscillating mechanism 16 and motor 12. A plurality of shoulder portions 56, or a continuous shoulder portion 56 is located approximately at the midpoint of the cover 17 and on the inside thereof substantially as shown in Fig. 1. A plurality of foot portions 57 is located about the open end of the cover 17 substantially as shown. A drip pan 58 is attached to the cover 17 by rivets 59 and is located upon the inner portions of said cover at positions substantially below the oscillating mechanism 16 to collect any oil which may leak therefrom.

The swivel mechanism 18 comprises the swivelled support 65, a swivel pin 66 and a clutch plate 67, which has a projecting hub 67*a* operatively associated therewith. The swivel pin 66 is operatively associated with the swivelled support 65 and has a ball bearing 71 operatively associated therewith near the upper end thereof and with the support 65.

The stand 19 comprises a foot portion 76 having a toe portion 77 and a neck portion 78 having a forked portion located at the upper end thereof. The fork comprises a plurality of tines 79 and 80. An aperture 81 is located in the center portion of tine 80, in which the projecting hub 67*a* of the clutch plate 67 operates.

The guard arms 15 are rigidly attached to the motor housing 20 in any suitable manner, it being preferred that a through bolt 28 be inserted through the housing 20 and the guard arm 15, whereupon a nut 29 attaches such guard arm thereto. A washer 61 is inserted under the head 33 of the through bolt 28 upon which the shoulder portion 56 of the cover 17 rests. A bolt 63 is then inserted through the foot portion 57 of the cover 17 and through the base portion 40 of the guard arm 15 and has placed thereon a nut 62 which, upon being tightened against the guard arm 15, will draw the shoulder portion 56 of the cover 17 tightly against the washer 61 and give added support to the guard arms 15, preventing such guard arms from rotating about the through bolt 28. It is, therefore, obvious that guard arm 15 supports cover 17 against washer 61 and conversely cover 17 supports or prevents the guard arm 15 from rotating about the through bolt 28 and accordingly supports such guard arm. It will be apparent from the foregoing description that the housing 17 may be removed without disturbing the guard by removing the screws 63. Accordingly, access to the oscillating mechanism 16 is readily effected.

By having the guard wires 36 which come in contact with the guard arm 15 extended in length with a curved hook portion 37 upon the end thereof, such hook portion 37 may be inserted about the upper back portion 45 around the bolt 43 against pin 44; as shown. With the guard wire 36 in such position, the nut 34, located upon bolt 43, is tightened against the side walls 41 of the guard arm 15 to rigidly support said fan guard 14. It is obvious that by attaching the guard 14 as hereinabove described with the hooked portion 37 of guard wire 36 around the bolt 43, the upper portion 45 of the guard arm 15 acts as a fulcrum about which the guard 14 is biased due to the spring action of the guard wire 36, while being held in a permanent position by bolt 43 and pin 44. It is, therefore, obvious that with such a connection between the guard arm 15 and the fan guard 14, such fan guard might be removed from the guard arm 15 by merely removing the bolt 43 from the guard arm 15, and that upon being relocated upon the guard arm 15, such fan guard 14 will hold rigidly thereto, as well as acting as an additional means for preventing the guard arms from rotating about the through bolt 28.

The swivelled support 65 may be of die cast construction and has a substantially vertical aperture 73 located therein. A swivel pin 66 is then operatively associated with the support 65 by being inserted within the aperture 73. The swivel pin 66 is rigidly attached to the motor housing 20 at the upper end by means of a cap screw 72, and has the ball bearing structure 71 operatively associated intermediate the ends thereof and with the upper end of the support 65. In such a manner, it is obvious that since the motor 12 is rigidly attached to the swivel pin, which in turn is rotatably mounted within the support 65, the motor 12 is rotatably mounted upon the support and operatively associated stand 19.

The support 65 also has a substantially horizontal aperature therethrough located substantially at right angles to aperture 73 and slightly displaced therefrom for admitting the wing screw 68. The support 65 is inserted within the fork tines 79 and 80 adjacent to clutch plate 67, having hub 67*a* fitting within aperture 81 in tine 80, whereupon the wing screw 68 is inserted through tine 79, support 65 and clutch plate 67 and rigidly connects such support to the stand or supporting base 19. A slot 69 is cut in a portion of the periphery of the support 65 in a position substantially as shown in Fig. 1. A stop pin 70 is operatively associated with the clutch plate 67 and the tines 79 and 80 in such a manner that the clutch plate 67 will rotate about the wing screw 68 but a limited amount. The slot 69 within the support 65 is then located about the stop pin 70 in such a manner that as the support is swung vertically about the wing screw 68 as an axis, such slot will, upon encountering the stop pin, limit the support swinging about the wing screw. It is, therefore, obvious that the motor 12, operatively associated fan 13, and oscillating mechanism 16 are rotatably mounted on the base 19 by means of swivel pin 66, and simultaneously swingably mounted thereon by means of support 65 swinging about the wing screw 68 as an axis though such swinging action is limited by the stop pin 70.

By having the stop pin 70 operatively associated with the base 19 and the clutch plate 67, it is assured that the support 65 and clutch plate 67 will be assembled in their proper relation regardless of the exact angular position of the support 65 in relation to the stand 19. Likewise, the support 65, due to the aperture 69 located within the support 65, can swing substantially 45°, depending upon the size of the aperture 69, regardless of the exact position of such support with respect to the base 19.

The support 65 may be inserted upon the neck portion 78 or base 19 substantially as shown, or may be removed therefrom, reversed in direction, and rotated substantially 90°, whereupon such support may be reassembled with the base 19, as shown in Fig. 6. With the support located upon the base 19 in such a manner, the base may be mounted upon a wall with the toe portion

77 thereof at the top. The fan structure 11 will then operate as an oscillating wall fan. However, with the structure arranged substantially as shown in Fig. 1, the fan may be operated as a table fan. It is, therefore, obvious that a fan having my present invention embodied therewith may operate satisfactorily either as an oscillating wall fan or as an oscillating table fan.

It is to be understood that the electrical connections to the fan structure 11 may be made in any manner desired, though it is preferred that the power leads be inserted within the base 19 where suitable condensers and resistors are located, and that lead 83 be connected between the base 19 and the motor 20 in any suitable manner.

In operating a device embodying my present invention as hereinabove described, the plug 85 is connected to a suitable power supply, not shown, and a suitable switch 84 operatively associated therewith is turned to an "on" position, whereupon motor 12 is energized. As rotor 27 of motor 12 rotates, the fan 13 and oscillating mechanism 16 operatively associated therewith are likewise rotated. As the oscillating mechanism 16 is rotated by rotor 27, the gear 48 and crank 50 are likewise rotated and oscillated respectively, causing the motor 12 and operatively associated cover 17 and fan 13 to oscillate about the swivel pin 66, whereby the fan operates in the normal oscillating manner.

However, should it be desired to have the fan structure 11 operate as a wall fan, the motor structure 12 and operatively associated oscillating mechanism 16, fan 13 and support 65 are removed from the base or supporting mechanism 19, whereupon such base is attached to the wall, it being preferred that the toe portion 77 of the base 66 be mounted in the upper position. The fan structure is then re-mounted upon the supporting structure 19 in reversed and rotated manner as hereinabove described, so that the axis of fan guard portion 14 will be substantially normal to the wall and the swivel pin 66 substantially parallel thereto, as shown in Fig. 6. It is thus obvious that the fan structure 11 will oscillate about the pivot pin 66 in a manner common to wall fans now known to the art. Likewise, it is obvious that such fan structure will be swingably mounted about the wing screw 68, permitting such structure to be located in any desired vertical angular position, as hereinabove described.

It will thus be seen that the fan structure hereinabove described may be satisfactorily used interchangeably as a desk fan or as a wall fan and that such structure may be vertically inclined to any position desired. Likewise, it is obvious that due to the action of the clutch plate and the stop pin that it is impossible to reassemble the fan structure upon the base in an improper manner.

It is further obvious that with the cover and guard structure as hereinabove described, such cover and guard supports will supoprt each other in relation to the motor housing as well as supporting the fan guard in the proper relation to the fan.

Various modifications may be made in the device embodying my invention without departing from the spirit and scope thereof, and I desire that only such limitations shall be placed thereon as are imposed by the prior art and the appended claims.

I claim as my invention:

1. A fan comprising a driving motor, means operatively associated with the driving motor for oscillating said motor, a plurality of guard arms, means for attaching said guard arms to the motor, a cover for the oscillating means and means for removably attaching said cover to said guard arms.

2. A fan comprising a driving motor, means operatively associated with the driving motor for oscillating said motor, a plurality of guard arms, a plurality of washers, means for attaching said guard arms at one end of the motor and for attaching said washers at the other end of the motor, a cover, and means comprising said guard arms for holding said cover in place against said washers and over said oscillating means.

3. A fan comprising a plurality of fan blades, a driving motor having a removable cover thereon, a plurality of guard arms, means for attaching said guard arms to said motor, means for supporting said cover from the guard arms, and a fan guard removably attached to said guard arms.

4. A fan comprising a plurality of fan blades, a driving motor operatively associated with said fan blades, means operatively associated with the driving motor for oscillating said motor, a removable cover placed over at least a portion of said motor and oscillating means therefor, a plurality of irregular curved channel shaped guard arms carried by said motor, means for removably attaching said cover to the guard arms and a fan guard comprising a plurality of radial wires removably attached to said guard arms.

5. In a fan, the combination of a stand including a pair of tines having respective aligned openings therein, a support disposed in part between the tines and provided with an opening, a clutch plate disposed between the support and one of the tines and having a portion thereof disposed in the opening in said one of the tines, and a binding screw extending through the openings in said other tine and support and threaded in the clutch plate.

6. The combination as claimed in claim 5 wherein said support includes an arcuate opening in a portion thereof and a pin carried by one of said tines and extending into said arcuate opening.

TORSTEN H. TORNBERG.