Aug. 29, 1944. G. L. MOELLER 2,357,053

FAN CONSTRUCTION

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Fig. 1.

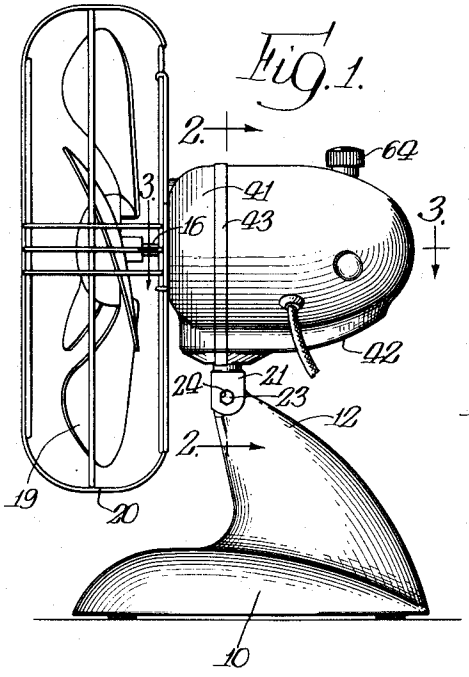


Fig. 2.

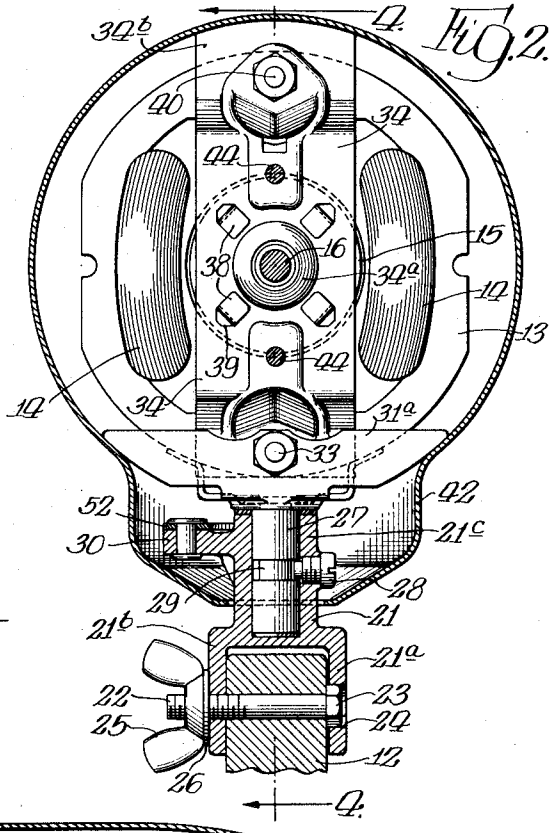
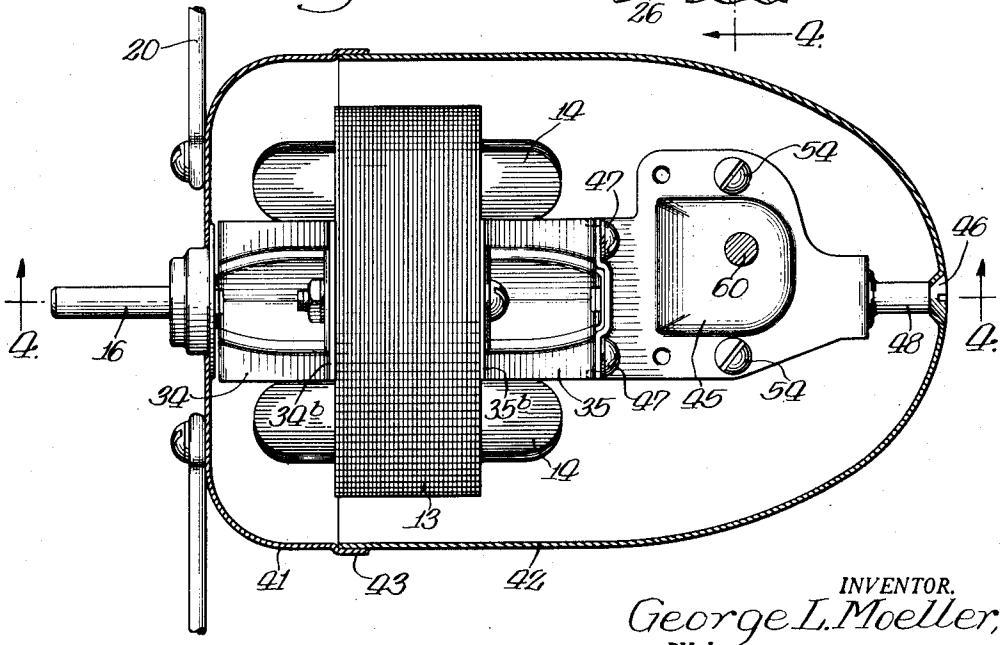


Fig. 3.



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Fig. 4.

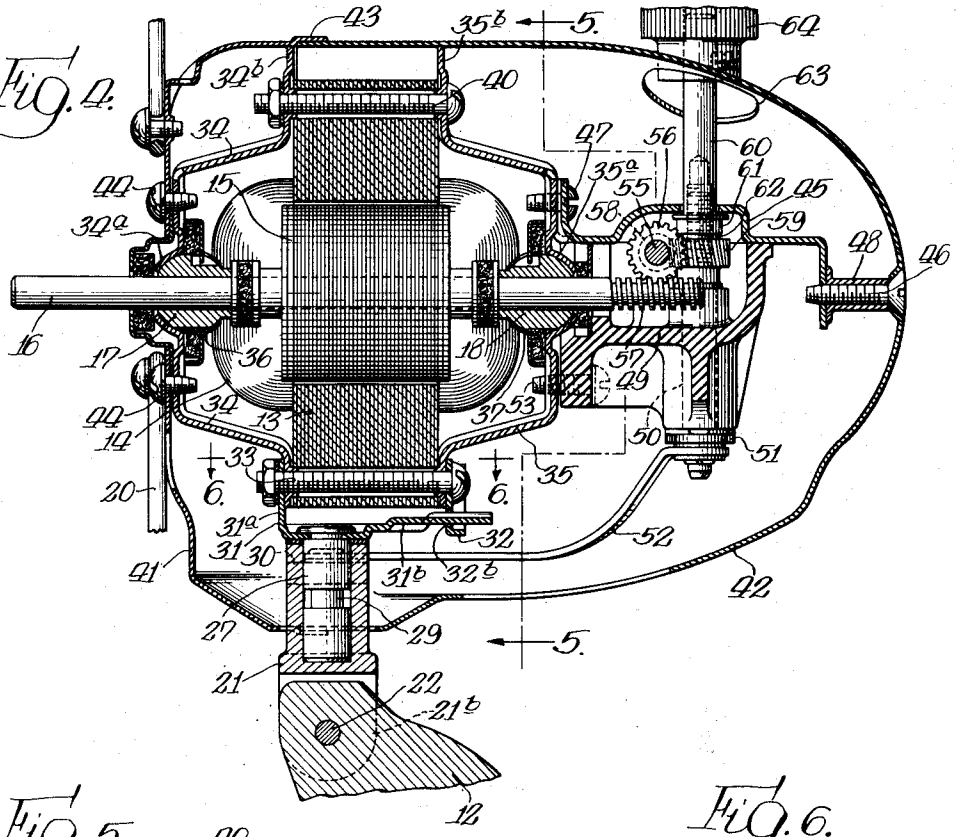


Fig. 5.

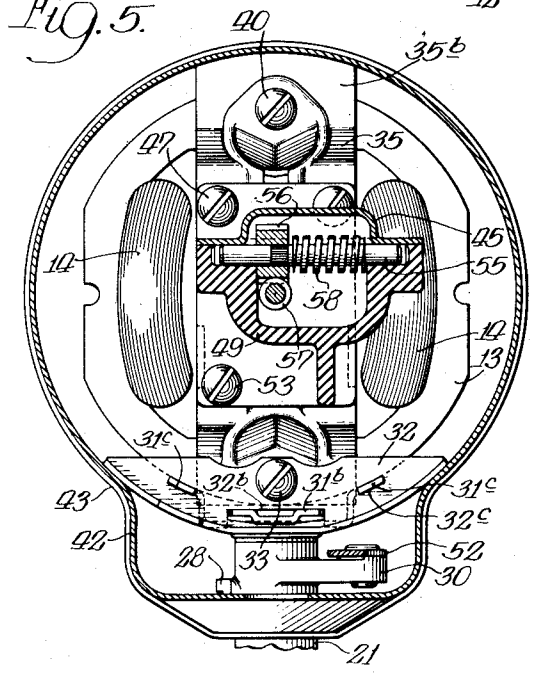
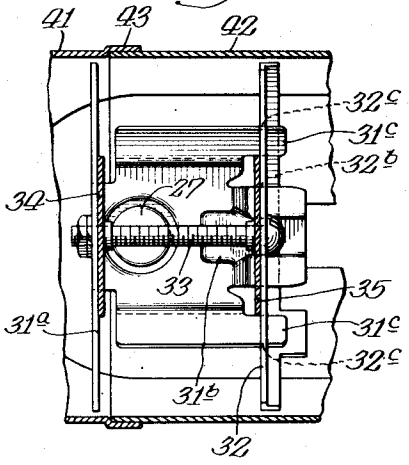


Fig. 6.



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UNITED STATES PATENT OFFICE

2,357,053

FAN CONSTRUCTION

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Application May 11, 1942, Serial No. 442,447

7 Claims. (Cl. 230—264)

My present invention relates to a fan structure, and particularly to certain constructional features thereof.

One object of the invention is to provide a fan structure wherein the motor, the oscillating mechanism therefor, a support therefor and a housing for the mechanism, are formed of parts requiring a minimum of operations in manufacture, and the parts being so associated as to facilitate assembly.

Another object is to provide a fan structure wherein a motor having the usual stack of field laminae is provided with bearing supports for the shaft of the motor, and the bearing supports have extensions for locating a housing for the motor laterally with respect to the motor, the housing being formed in two parts so connected with the bearing supports as to locate the housing axially of the motor.

A further object is to provide oscillating mechanism for the fan which is entirely enclosed within the motor housing and which is contained in a gear casing connected with one of the bearing supports of the motor and the housing for the motor connected therewith to retain it in position.

A further object is to provide a supporting arrangement for the motor relative to the base, permitting pivoting for oscillating movement and for adjustment of the air stream parallel to the supporting surface for the fan or at an angle thereto, the connection of the base to the motor involving a novel arrangement, permitting the stack of laminae to be properly compressed with the supporting connection rigidly maintained.

Still a further object is to provide a novel arrangement of clamping mechanism for the motor relative to the base to effectively clamp the fan at any desired angle without the danger of subsequent loosening of the pivotal connection when the fan is operating, which would permit the fan to tip forward against the base.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings. Although the invention is susceptible of a variety of embodiments, it is unnecessary to fully describe and illustrate more than one in order to give a full understanding of the invention both from its structural and functional standpoints. Accordingly, I have illustrated a preferred and desirable embodiment of the invention in the accompanying drawings, in which:

Figure 1 is a side elevation of a fan structure embodying my invention;

Figure 2 is an enlarged vertical sectional view on the line 2—2 of Figure 1;

Figure 3 is an enlarged horizontal sectional view on the line 3—3 of Figure 1;

Figure 4 is a vertical sectional view on the line 4—4 of Figure 2;

Figure 5 is a vertical sectional view on the line 5—5 of Figure 4; and

Figure 6 is a horizontal sectional view on the line 6—6 of Figure 4.

On the accompanying drawings I have used the reference numeral 10 to indicate a supporting base. An extension 12, upward therefrom, is provided for connection of the fan motor to the base. The motor itself includes a stack of field laminae 13, the field coils 14 and an armature 15. The armature 15 is mounted on the shaft 16 of the motor which extends through a pair of self-aligning bearings 17 and 18, and has on its front end a fan blade assembly 19. The usual wire guard 20 is provided for the fan blades 19.

The motor of the fan is supported on the base 10 by means of a yoke member 21 and a pivot bolt 22. The yoke member 21 has a pair of arms 21^a and 21^b which straddle the extension 12 of the base 10. The clamp bolt 22 has an angular head 23 against one side of the extension 12, and the arm 21^a of the yoke 21 has a perforation 24 therein of substantially the same shape as the clamp bolt head 23. Thus the clamp bolt head may tightly engage the extension 12, inasmuch as the head is slidable axially of the bolt and through the arm 21^a. The perforation 24 therein, however, prevents the head and the bolt from turning.

A suitable nut, such as the wing nut 25, is mounted on the threaded end of the bolt 22 against a washer 26 which, in turn, bears against the other yoke arm 21^b. Due to the construction just described, any tightening of the clamp bolt does not have to spring the yoke arms 21^a and 21^b toward each other before a good frictional grip is secured to hold the motor against subsequent pivotal movement on the clamp bolt, due to vibration of the fan structure during operation.

The yoke 21 has an upwardly extending sleeve portion 21^c in which a pivot stud 27 is rotatably mounted. A shouldered set screw 28 coacts with an annular groove 29 of the stud 27 to retain the

stud against pulling out of position. The sleeve 21c has an arm 30 connected with oscillating mechanism, which will hereinafter be described.

The stud 27 extends downwardly from a bracket 31, the stud being riveted or otherwise suitably secured thereto. The bracket 31 has an upwardly extending perforated ear 31a and rearwardly extending arms 31b and 31c. There are two of the arms 31c. The arms 31b and 31c extend through slot-like openings 32d and 32e of a second bracket 32. The brackets 31 and 32 serve to support the stack of field laminae 13 by means of a clamp bolt 33 extending through the brackets and through the stack of laminae. Interposed between the laminae and the brackets are bearing supports 34 and 35, so that the clamp bolts 33 retain the parts 13, 31, 32, 34 and 35 in assembled relation to each other.

The extensions 31b and 31c provide for movement of the brackets 31 and 32 toward each other as the clamp bolt 33 is tightened, and any difference in the total thickness of the stack of laminae may thereby be taken up, with assurance that the brackets 31 and 32 will be properly aligned, yet permit for any variation in the total thickness.

The bearing brackets 34 and 35 have socket portions 34a and 35a to receive the bearings 17 and 18, and retainers 36 and 37 coact with the bearings to retain them in the sockets. Each retainer 36 and 37 has four ears 38 (see Figure 2) passing through slots 39 of the bearing brackets 34 and 35 and bent over to retain the retainers in assembled position. The brackets 34 and 35 are also retained, and the top of the stack of field laminae 13 is clamped, by a second clamp bolt 40. Extensions 34b and 35b, upward from the clamp bolt 40, serve in conjunction with the brackets 31 and 32 which constitute extensions of the bottom of the motor to laterally locate a housing for the motor. The housing referred to has a front portion 41 and a rear portion 42. These portions telescope together at a flange 43 formed on the front housing portion 41. The brackets or extensions 31, 32, 34b and 35b are semi-circular at their outer edges, as shown in Figures 2 and 5, to fit the interior surface of the housing parts 41 and 42.

For locating the housing 41—42 axially of the motor, the housing part 41 is secured to the front bearing support 34 by screws 44, and the rear housing part 42 is secured to a gear casing cover 45 by a screw 46, the gear casing cover being, in turn, secured to the rear bearing bracket 35 by screws 47. The gear casing cover has a sleeve-like extension 48 to receive the screw 46.

Oscillating mechanism for the fan includes a gear casing 49, a crank shaft 50 having a crank arm 51 thereon and a link 52 for connecting the crank arm 51 with the arm 30 of the yoke member 21. The gear housing 49 may be inexpensively formed of Bakelite or similar material, and secured in position by screws 53 extending into the rear bearing support 35. The gear casing cover 45 is secured to the gear casing 49 by screws 54 (see Figure 3). Within the gear casing a cross-shaft 55 is journaled, having a worm gear 56 thereon meshing with a worm thread 57 of the motor shaft 16. The cross-shaft 55 has a worm 58 thereon meshing with a worm gear 59 which floats freely on the crank shaft 50. A clutch is provided for clutching the worm gear 59 with relation to the crank shaft 50 and consists of a sleeve 60 threaded on a reduced upper end of the crank shaft 50 and having a shoulder 61 for frictionally engaging a fibre washer or the like 62 and engaging the washer with the upper face of the worm gear 59. The sleeve 60 extends through an enlarged opening 63 in the housing portion 42, and has a clutch operating knob 64 thereon.

The bearing supports 34 and 35 are suitably ribbed, as illustrated, to reinforce them to the desired degree, yet permit the use of relatively light sheet metal that can be formed by stamping. Likewise, the brackets 31 and 32 are provided with reinforcing ribs, flanges and the like, and formed of stamped sheet metal. The arrangement is such that a minimum of operations is required for assembly, and there is a maximum of assurance for proper operating alignment of the various parts of the fan structure. The resultant structure is relatively inexpensive to manufacture, and the time for fabrication is reduced to a minimum. The various features described contribute to the provision of a fan assembly accomplishing the objects set forth in my specification and contained in the claims.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure, or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. A fan structure comprising a motor, a housing for said motor, a base for oscillatably supporting said motor, and oscillating mechanism for said motor and housing including a gear casing carried by said motor, a crank arm and a link, said base having a lateral arm connected with said link, said crank arm, lateral arm and link being enclosed within said housing, a cover for said gear casing, means for securing said cover to said casing and to said motor, and means for securing said housing to said cover.

2. In a fan structure, a motor including a stack of field laminae, a housing for said motor, bearing supports for the shaft of said motor, said bearing supports being secured against opposite sides of the stack of field laminae, oscillating mechanism for said motor including a gear casing secured to one of said bearing supports, a cover for said gear casing having a pair of extensions, said housing being secured to one of said extensions and to the other of said bearing supports and the other of said cover extensions being secured to the other of said bearing supports.

3. A fan structure comprising a motor including a stack of field laminae, a bearing bracket against each end of said stack, a housing for said motor, a support for said motor including a supporting bracket secured against one of said bearing brackets, and a second supporting bracket secured against the other of said bearing brackets, said second supporting bracket having an opening therethrough, said first supporting bracket having an extension guided and slidable in said opening to insure alignment and permit variation in the distance between said supporting brackets, said supporting brackets having extensions beyond the sides of said bearing brackets to engage said housing and position it with respect to said motor.

4. In a fan structure, a motor including a stack of field laminae, a bearing bracket against each end of said stack, a housing for said motor, a pair of supporting brackets secured against said bearing brackets, one of said supporting brackets having an opening therethrough, the other of

said brackets having an extension guided and slidable in said opening and held thereby against relative rotation to insure alignment and permit variation in the distance between said supporting brackets, said supporting brackets having extensions beyond the sides of said bearing brackets to engage said housing and position it with respect to said motor, one of said supporting brackets and its adjacent bearing bracket having coacting means to prevent rotation of one relative to the other, and means for supporting one of said supporting brackets.

5. In a structure of the kind disclosed, a motor including a stack of field laminae, a pair of bearing brackets, a supporting bracket against each of said bearing brackets, a clamp bolt through said bearing brackets, and through said supporting brackets and through said stack of field laminae, one of said supporting brackets having an opening therethrough, the other of said brackets having an extension guided and slidable in said opening to insure alignment and permit variation in the distance between said supporting brackets as said clamp bolt is tightened, and means for supporting one of said supporting brackets and thereby said motor.

6. In a fan motor construction, the combination of a supporting pin, a motor including a stack of field laminae, an armature and a shaft, bearing brackets secured to the ends of said stack of laminae and provided with bearings for said shaft, a clamp bolt thru said bearing bracket and said stack of laminae, means for mounting said motor on said supporting pin comprising a supporting bracket secured to the pin and positioned against one of said bearing brackets, and a second supporting bracket positioned against the other of said bearing brackets and slidably connected with said first supporting bracket, said brackets being held in position by said clamp bolt, and means on one of said bearing brackets and its adjacent supporting bracket to prevent their relative rotation about said clamp bolt.

7. In a fan motor construction, the combination of a swivel pin, a support therefor, a motor including a stack of field laminae, an armature and a shaft, bearing brackets secured to the ends of said stack of laminae and provided with bearings for said shaft, and means for mounting said motor on said swivel pin comprising a bracket secured to the pin and to the stack of laminae at one end, a second bracket secured to the stack of laminae at the other end and slidably connected with said first bracket, and oscillating mechanism operatively connected with said motor and with said support to oscillate said swivel pin and thereby said fan motor relative to said support.

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