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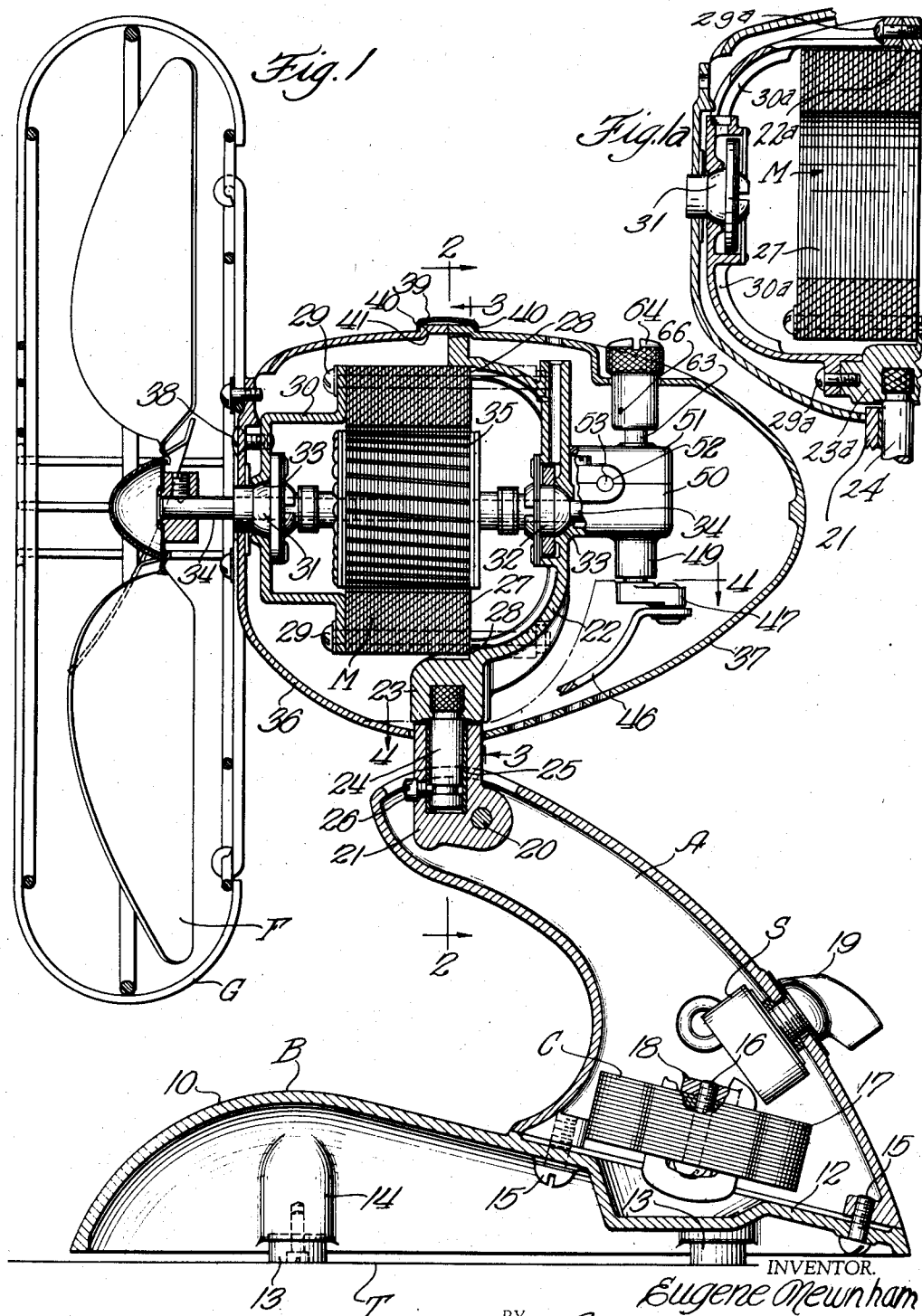
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2,154,767

FAN CONSTRUCTION

Filed May 31, 1938

2 Sheets-Sheet 1



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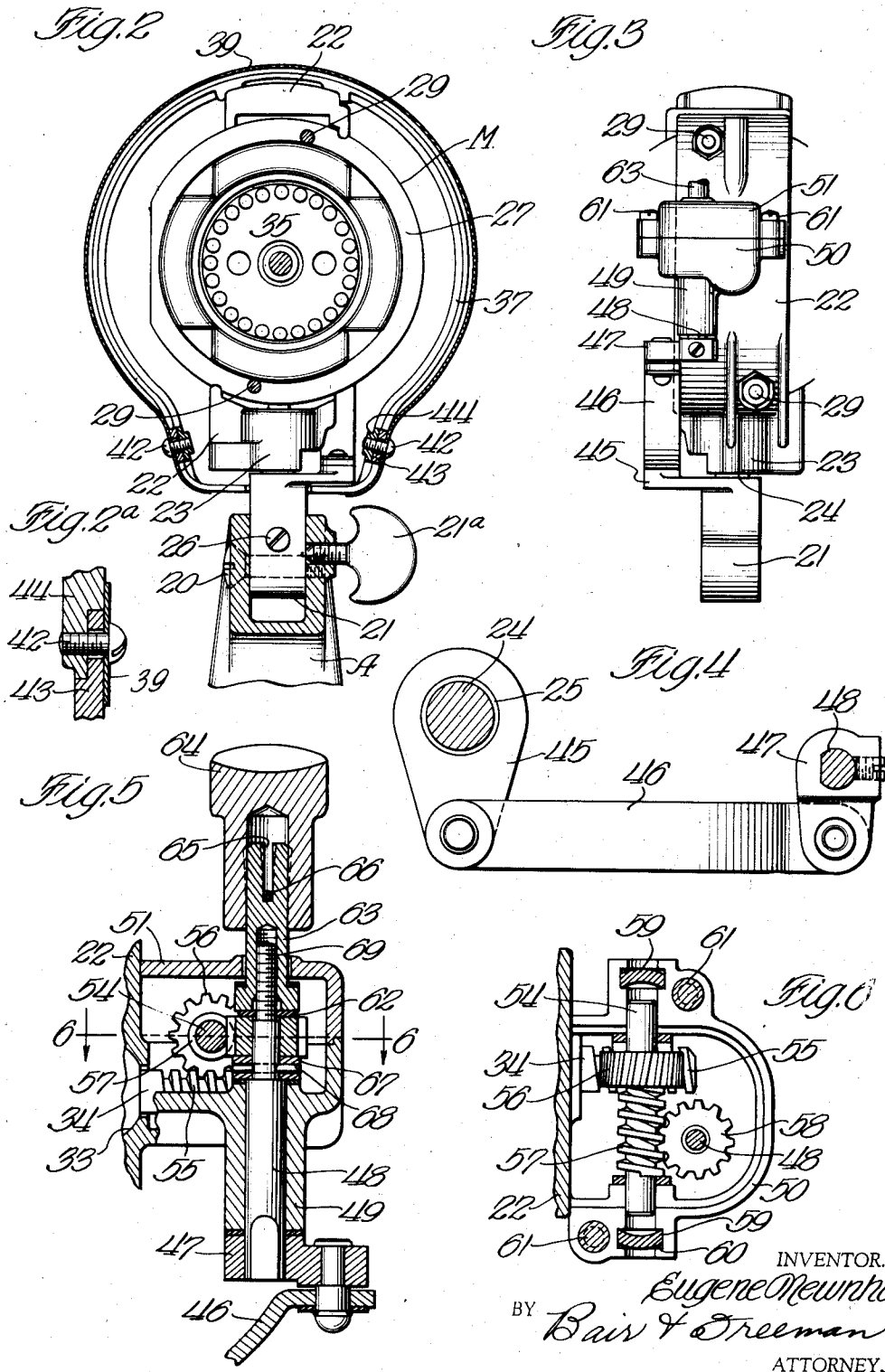
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## UNITED STATES PATENT OFFICE

2,154,767

## FAN CONSTRUCTION

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9 Claims. (Cl. 230—256)

An object of my invention is to provide a fan construction particularly of the oscillating type having several improved features of construction, the fan however being simple and inexpensive to manufacture and assemble.

Another object is to provide a fan construction in which a switch for controlling the fan motor and a choke coil for use in connection with the switch to control the speed of the motor are mounted in a hollow supporting arm which, in conjunction with a base for the supporting arm, forms a complete enclosure for the switch mechanism and choke coil, such construction permitting a design of base which is relatively thin in height and therefore of insufficient size to contain the choke coil and switch mechanism.

Another object is to provide a motor which includes a novel supporting frame member for the stator of the motor, the stator being secured to the frame member and a stamped yoke being secured to the stator, the frame and yoke being provided with self-aligning bearings for the motor shaft.

A further object is to provide a housing for the motor consisting of a pair of bowl-like members having their edges contacting with each other and retained in contacting position by a clamp band, one of the bowls being secured to the motor frame whereby both bowls are supported and the clamp band being secured to overlapping ears of the two bowls whereby the bowls and the clamp band may be readily assembled and effectively retained in position.

Still a further object is to provide a gear casing for the oscillating mechanism of the fan formed in two halves, one of which is integral with the motor frame and the other secured to the first half in such manner that bearings are provided in the two halves for a cross shaft and a bearing is provided for a crank shaft in one of the halves, the construction thereby facilitating ready assembly of the gearing mechanism.

Still another object is to provide for alignment of a swivel pin of the oscillator mechanism with a crank shaft thereof to secure substantially equal throw of the fan during oscillation on alternately opposite sides of a straight-ahead center position without interference of any of the working parts of the fan construction with each other.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my fan construction whereby the objects contemplated are attained, as hereinafter more fully set forth,

pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view through a fan construction embodying my invention;

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a rear elevational view of a supporting frame for the motor of my fan construction.

Figure 4 is an enlarged sectional view on the line 4—4 of Figure 1 showing an oscillating link connection for the oscillator mechanism of my fan construction.

Figure 5 is an enlarged vertical sectional view through the gear casing of the oscillator mechanism looking in the same direction as illustrated in Figure 1; and

Figure 6 is a sectional view on the line 6—6 of Figure 5 with the upper portion or cover of the gear casing removed.

On the accompanying drawings I have used the reference numeral B to indicate a base, A a supporting arm, M a motor, and F an air propeller comprising a plurality of fan blades. The base B has an upwardly bulged front portion 10 and a relatively thin rear portion 12 consistent with present day "streamlining" design. Within the base B a plurality of plugs 13 of rubber or the like are secured to bosses 14 for supporting the base B relative to a table top or the like T.

The arm A is hollow having an open lower end closed by the base B as illustrated in Figure 1. Screws 15 serve to retain the base and arm assembled relative to each other. Due to the relative thinness of the base B I have mounted a choke or resistance coil C in the arm A rather than in the base as usually done. The choke coil C may be retained relative to the arm as by screws 16 passing through the laminated core 17 of the choke coil and threaded into bosses 18 extending from opposite sides of the arm A.

A switch S is also mounted in the arm A and has an operating element or knob 19 located on the exterior of the arm whereby the switch may be manipulated to energize and deenergize the motor M and connect the choke coil C in series therewith to reduce the speed of the motor in the usual manner.

The upper end of the arm A carries a pivot pin 20 on which is pivoted a bracket 21. A C-shaped frame member 22 for the motor M is formed of die cast material or the like and has a hub portion 23. The hub 23 has imbedded therein a post 24. The post 24 is rotatable in a socket 25 of the bracket 21 and is retained against removal therefrom by a shouldered set screw 26. The

bracket 21 may be rocked relative to the arm A for directing the stream of air propelled by the fan blades F either downwardly or upwardly. It is retained in any position to which it is adjusted by a set screw 21a (see Figure 2) threaded through the arm A and contacting with the bracket 21.

The motor M includes a stator 27 (usually formed of laminations) which is secured against shoulders 28 of the motor frame 22 by screws 29. (The upper screw in Figure 1 has been shown in dot and dash lines as it is in front of the vertical center line of the fan.) The screws 29 also secure a yoke 30 in position relative to the stator 27. The yoke 30 may be stamped of heavy sheet metal as accurate alignment for the bearings of the motor is not essential because I use self-aligning bearings 31 and 32. The bearings 31 and 32 have spherical portions seating against spherical seats 33 of the frame 22 and the yoke 30, whereby such self-alignment is secured.

In Figure 1a I show a modification in which the frame member 22a is formed to receive upper and lower screws 29a. A yoke 30a is secured by the screws 29a to the frame member 22a instead of to the stator 27 of the motor. This arrangement precludes the possibility of changing the distance between the bearings 31 and 32 and at the same time permits manufacturing variations in the thicknesses of different stators. With this arrangement the rotor 35 can be built to standard overall dimensions and the end play of the motor held constant.

Journalled in the bearings 31 and 32 is a motor shaft 34. A rotor 35 is secured to the shaft 34 for cooperating with the stator 27 to effect rotation of the fan shaft 34 and thereby the fan blades F. The usual wire guard G is provided for the fan blades F and may be secured in supported position in any suitable manner.

For enclosing the motor M I provide a housing consisting of a pair of bowl-like members 36 and 37. The bowl 36 is secured to the yoke 30 and thereby supported relative to the motor by a pair of diametrically opposite screws 38 extending through the front wall of the bowl and into the yoke. The bowl 37 is supported relative to the bowl 36 by a clamp band 39 having inturned flanges 40 on its edges cooperating with beads or peripheral enlargements 41 on the bowls 36 and 37 adjacent their open sides.

For securing the clamp band 39 in position I use a pair of screws 42 as shown in Figure 2 which extend through ears 43 formed on the bowl 37 adjacent the open sides thereof and are threaded into ears 44 which are overlapped by the ears 43 and which are formed on the bowl 36 adjacent its open side.

For oscillating the fan I provide a relatively long arm 45 extending laterally from the bracket 21 and connected by a link 46 to a relatively short crank arm 47. The crank arm 47 is rotated by a crank shaft 48 which is journalled in a bearing 49 of the lower half of a gear casing indicated at 50. The upper half thereof is indicated at 51. The lower half 50 is integral with the motor frame 22 and has formed therein the lower half 52 of a bearing, the upper half of which is indicated at 53 and is formed in the upper portion 51 of the gear casing. Two of the bearings 54 formed by the gear casing halves 52 and 53 are provided for a cross shaft 54 as shown in Figure 6.

The motor shaft 34 has a worm 55 thereon meshing with a worm gear 56 of the cross shaft 54. The cross shaft has a worm 57 meshing with

a worm gear 58 for driving the crank shaft 48. The crank shaft 48, it will be noted, is set off center from the axis of the motor shaft 34 in a direction corresponding to the direction that the arm 45 extends from the post 24. The post itself is in alignment with the motor shaft and with this arrangement, as shown in Figure 4, when the parts are in a center position, the link 46 is aligned with the motor shaft and the motor shaft points in a straight-ahead direction. Thereafter rotation of the crank arm 47 results in a substantially equal throw of the motor during oscillation on each side of the central position.

The bearing halves 52 and 53 are provided with closure disks 59 for the ends of the cross shaft 54. These have their peripheries seated in grooves 60 surrounding the bores of the bearing portions 52 and 53 so that during assembly it is a comparatively simple matter to drop the crank shaft 48 through its bearing 49 and then drop the cross shaft 54 in position prior to fastening the upper half of the gear casing on the lower half. Such fastening is accomplished by screws 61 extending through the upper half of the gear casing and threaded into the lower half.

The disks 59 serve to close the casing 50—51 so that it may be filled with grease for lubricating purposes.

Before the upper half of the gear casing is placed in position, the worm gear 58, a friction washer 62 and a clutch sleeve 63, as shown in Figure 5 are assembled on the crank shaft 48. After the housing bowl 37 is mounted in position, an operating knob 64 for the clutch sleeve 63 is pressed into position on the upper end of the sleeve 63. This sleeve is slotted as indicated at 65 to receive a connecting pin 66 of the knob 64 and is initially spread as shown by dotted lines in Figure 5 so there is frictional engagement between the sleeve 63 and the knob 64 to retain them thereafter assembled.

Below the worm gear 58 I provide a collar 67 secured to the crank shaft 48 as by a pin 68. The worm gear 58 and the washer 62 are interposed between this collar and the clutch sleeve 63. The clutch sleeve is threaded on a reduced portion 69 of the upper end of the crank shaft 48 whereby when the parts are loosened by unscrewing, the worm gear 58 is free to rotate on the crank shaft 48. When the parts are screwed together to frictionally engage 67, 58, 62 and 63 with each other, they will rotate as a unit for thus causing rotation imparted to the worm gear 58 to be transmitted to the crank arm 47.

The parts of the oscillating mechanism, motor and housing, as well as the arm and base, are all readily assembled relative to each other as obvious from the foregoing description. The particular arrangement of parts contributes to the production of a relatively inexpensive fan construction.

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. I therefore intend 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. In a fan supporting construction, a base member, a hollow supporting arm extending upwardly from the rear portion thereof, and inclined forwardly therefrom, said arm having an enlarged base, a switch and a choke coil mounted

in said hollow arm base, said switch having an operating portion exterior of said arm and said base member constituting a closure for said hollow arm base whereby the hollow arm base and base member in conjunction with each other form a complete housing for said switch and choke coil.

2. In a fan construction, a C-shaped frame having a bearing intermediate the ends thereof, means at one end of said frame for supporting it for oscillating movement, a motor comprising stator laminations secured to the arms of said C-shaped frame, a stamped yoke secured to said laminations, the securing means for said stator and yoke comprising bolts extending through the yoke, laminations and frame, a second bearing carried by said yoke, a motor shaft journaled in said bearings, a rotor on said shaft within said stator and a housing for enclosing said frame, yoke, stator and rotor.

3. In a fan construction, a C-shaped frame having a bearing intermediate the ends thereof, means at one end of said frame for supporting it, a motor comprising a stator secured to the arms of said C-shaped frame, a yoke secured to said stator, the securing means comprising bolts extending through said yoke, stator and frame, a second bearing carried by said yoke, a motor shaft journaled in said bearings and a rotor on said shaft within said stator.

4. In a fan construction, an upright frame having a self-aligning bearing intermediate the ends thereof, means at one end only of said frame for supporting it, a stator secured to the ends of said frame, a yoke supported relative to said frame, a second self-aligning bearing carried by said yoke, a motor shaft journaled in said bearings and a rotor on said shaft within said stator.

5. In a fan construction, a motor, a housing therefor comprising a front bowl and a rear bowl, means for securing one of said bowls to said motor, said bowls having their open sides adjacent each other and having circumferential beads adjacent said open sides, a clamp band for retaining said bowls assembled relative to each other, said clamp band having intumed flanges on the side edges thereof which fit over said beads, said bowls having overlapping ears adjacent their open sides and fastening means extending through said clamp band and ears to retain said bowls and clamp band assembled relative to each other.

6. In a fan construction, a motor, a housing therefor comprising a front bowl and a rear bowl, means for securing one of said bowls to said motor, said bowls having their open sides adjacent each other, a clamp band for supporting

the other of said bowls assembled relative to the one secured to said motor and for covering the joint between the bowls, said bowls having overlapping ears adjacent their open sides and fastening means extending through said clamp band and ears to retain said bowls and clamp band assembled relative to each other.

7. In a fan construction, a motor, a housing therefor comprising a front bowl and a rear bowl, said bowls having their open sides adjacent each other, a clamp band partially surrounding said bowls for retaining them assembled relative to each other and fastening means adjacent the ends of said band for retaining said clamp band assembled relative to said bowls, said bowls having an opening between said ends of said band and supporting means for said motor extending through said opening.

8. In an oscillating fan construction, a support, a motor oscillatably supported thereby and including a frame member, a gear casing comprising a lower portion integral with said frame member and an upper portion connected with said lower portion to provide in conjunction therewith, a complete enclosure for gearing mechanism, gearing mechanism therein including a cross shaft and a crank shaft, cooperating worm gears on the motor shaft, cross shaft and crank shaft, said cross shaft having bearings formed conjointly in said two portions of said gear casing, said crank shaft being journaled in said lower portion of said gear casing, a clutch therefor having an operating element projecting through said upper portion of said gear casing to the exterior thereof, said operating element being frictionally retained in position on said crank shaft and a link connection between said crank shaft and a point on said support spaced from the pivotal axis of said motor to said support.

9. In an oscillating fan construction, a support, a motor oscillatably supported thereby and including a frame member, a gear casing comprising a first portion integral with said frame member and a second portion connected with said first portion to provide in conjunction therewith a complete enclosure for gearing mechanism, gearing mechanism therein including a crank shaft, a clutch therefor having an operating element projecting through said second portion of said gear casing to the exterior thereof, said operating element being frictionally retained in position on said crank shaft and a link connection between said crank shaft and a point on said support spaced from the pivotal axis of said motor to said support.

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