May 29, 1951 O. A. SUTTON 2,554,600

MOUNTING YOKE FOR FANS OR SIMILAR APPLIANCES

Filed Oct. 10, 1949 2 Sheets-Sheet 1

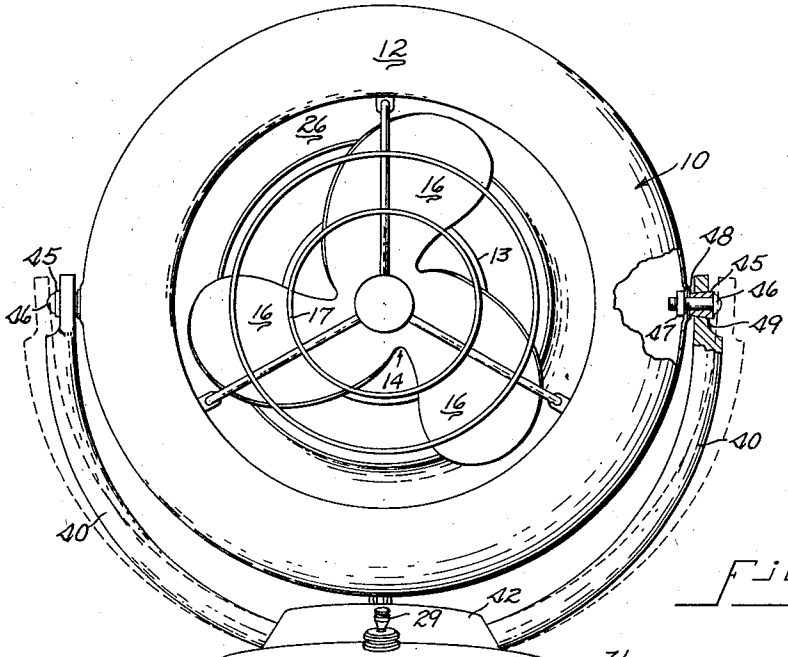



Fig. 1.

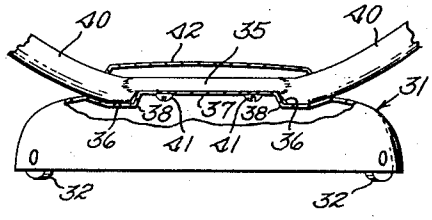



Fig. 3.

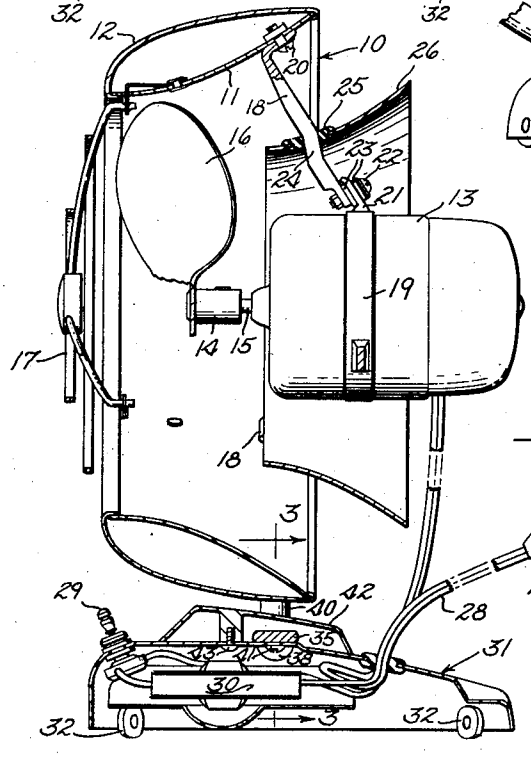



Fig. 2.

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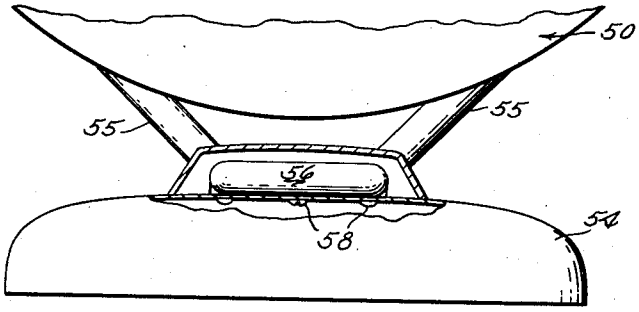



Fig. 5.

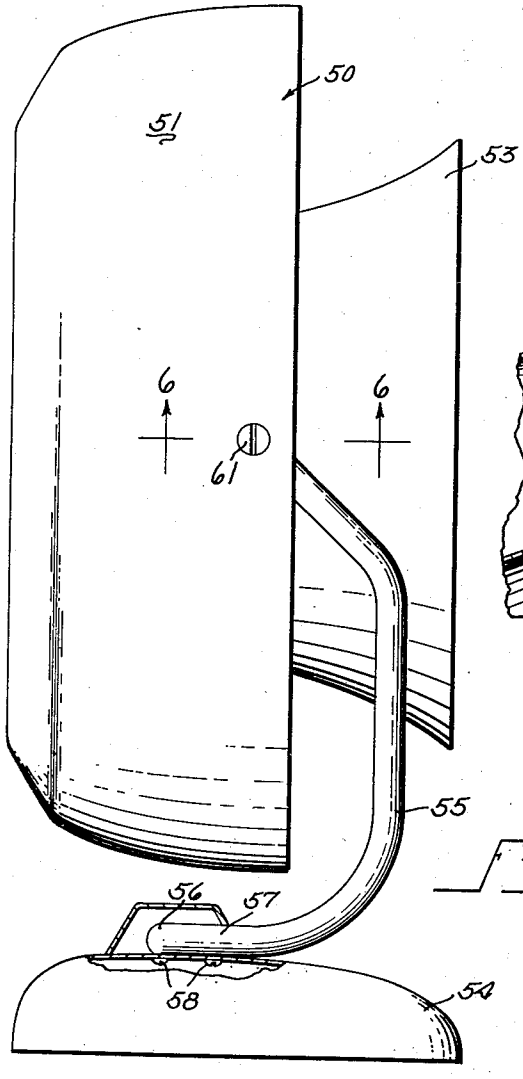



Fig. 4.

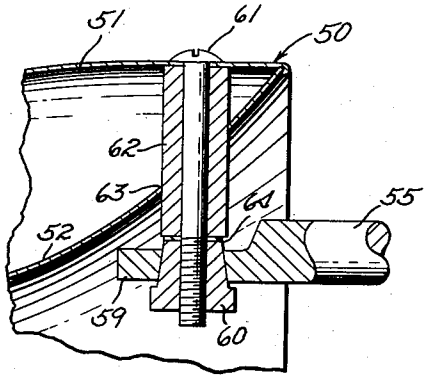



Fig. 6.

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# UNITED STATES PATENT OFFICE

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## MOUNTING YOKE FOR FANS OR SIMILAR APPLIANCES

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Application October 10, 1949, Serial No. 120,502

7 Claims. (Cl. 230—259)

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The present invention relates to mounting means for a fan or similar structure and has particular reference to the type of fan comprising a cowl surrounding an aerodynamic device for moving air axially through the cowl. Such a fan is of particular utility in offices and rooms when mounted upon a standard which may be moved about from place to place. It is common practice in the art to mount such fans upon a pedestal having connection to the body structure of the fan through an adjustable joint including manually releasable means such as a wing nut or the like. In order that the direction of the airstream created by such a structure may be changed, it is necessary to release the wing nut or similar holding means, adjust the fan, and then tighten the holding means. The principal object of the present invention is to provide a structure whereby adjustment of the air direction may be accomplished without releasing the means for holding the structure in the desired position in order that rapid adjustment may be accomplished with ease.

The objects and advantages of the present invention will be more readily ascertained from inspection of the following specification taken in connection with the accompanying drawings wherein like numerals refer to like parts throughout, while the features of novelty will be more distinctly pointed out in the appended claims.

In the drawings,

Fig. 1 is a front elevation of a fan constructed in accordance with the present invention, with a portion thereof broken away;

Fig. 2 is a vertical section taken diametrically through the fan of Fig. 1;

Fig. 3 is a partial view of the fan mounting means, with parts broken away, taken substantially along line 3—3 of Fig. 2;

Fig. 4 is a side elevation of a modified form of fan embodying the present invention, with parts broken away;

Fig. 5 is a partial front elevation of the fan illustrated in Fig. 2, with parts broken away; and

Fig. 6 is a partial horizontal section, on an enlarged scale, taken substantially along line 6—6 of Fig. 4.

The preferred form of the invention is illustrated in Figs. 1 to 3 inclusive wherein a fan is shown as including a body structure comprising a cowl 10 including an inner shell 11 and an outer shell 12, as more completely illustrated and described in my copending application, Serial No. 120,504, filed concurrently herewith. The cowl 10 coaxially supports a motor 13 having an aerodynamic device 14 connected to the armature shaft 15 thereof, in this form the aerodynamic device comprising a plurality of radial blades 16 extending to within a short distance of the inner shell 11 and so arranged as to move air axially of the cowl through a grille 17 extending across the front end of the cowl, the grille preferably being as illustrated and described in my copending application, Serial No. 120,503, filed concurrently herewith. The motor 13 is supported by a plurality of radially extending arms 18 connected to the inner shell 11 and to a band 19 encircling the motor, the outer ends of the arms being connected by separable screw fastening means 20 extending through the shell 11 and the inner ends of the arms being connected to lugs 21 extending outwardly from the band 19, the connection thereof being preferably comprising separable screw-fastening means 22 and resilient cushioning members 23. The arms are offset intermediate their length at 24 and pass through resilient grommets 25 in a tapered air funnel 26 which coaxially surrounds the motor in spaced relation thereto and to the inlet end of the cowl 10, the funnel 26 being held in concentric relation by the offsets 24 in the arms 18. The motor is supplied with current through a plug connector 27 and cord 28 which is connected to the motor through a manual switch 29 and choke coil 30 mounted on a base 31. Other types of bases may be substituted for that shown, such as upright pedestals and the like. The type herein illustrated is preferred for small household fans and is preferably supported in spaced relation to furniture upon which the fan may be placed by resilient feet 32 fastened to the lower edge thereof.

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In accordance with the present invention, the base supports a yoke which in turn supports the body structure of the fan, in the present illustration the yoke comprising a slightly resilient bar bent into a curved shape substantially along an arc of greater diameter than the outer diameter of the cowl 10. An intermediate portion of the bar is flattened at 35 with the rounded portion of the bar at each side providing downwardly projecting shoulders 36. The base 31 comprises a sheet-metal shell having a central flat portion 37 and inwardly extending depressions 38 adapted complementarily to receive the shoulders 36 on the yoke so that the yoke may be rapidly centered with respect to the base. The flattened portion 35 provides means to maintain the opposite yoke arms 40 in a vertical plane. The flattened portion 35 may be fastened to the

central portion 37 of the base by suitable means such as screws 41 or by welding, brazing or the like. An ornamental cap 42 is preferably placed over the portion 35 of the yoke and maintained in position by suitable means such as screws 43, the cap being provided with openings through which the arms 40 project.

The cowl 10 supports a pair of mounting members 45 which, in the present embodiment, comprise conical members extending along the horizontal diameter of the cowl with their larger ends outward. The mounting members are held against rotation by bolts 46 passing therethrough and through suitable openings in the outer shell 12 into nuts 47 welded or otherwise affixed to the inner surface of the shell 12. A lock washer 48 is preferably interposed between the inner end of the mounting member 45 and the surface of the shell in order to prevent rotation of the mounting member 45. The free end of each yoke arm 40 is flattened at 49 and provided with an inwardly tapering opening complementarily receiving the conical mounting member 45. As illustrated in dash outline, the arms 40 when in unstressed condition are spaced outwardly from the surface of the cowl at their ends so that stressing of the arms toward each other may be accomplished when the bolts 46 are adjustably moved inwardly along the common axis thereof. The stressing of the arms causes firm frictional engagement of the complementary surfaces of the mounting members 45 and the openings through the arms so that rotation of the cowl about the axis of the mounting members is frictionally resisted. Adjustment of the fan may be accomplished, however, merely by pushing or pulling some portion of the body structure. The fan may be moved through an arc of at least 180° in order that air may be propelled in either direction.

In the form of the invention illustrated in Figs. 4 to 6 inclusive the same principle is utilized in a different manner. In this form the fan comprises a body structure including a cowl 50 formed of an outer shell 51 and an inner shell 52. An aerodynamic device (not shown) or other mechanism is mounted within the structure and, in the case of a fan, the aerodynamic device may be mounted within an air funnel 53 as in the previously described modification. The body structure is supported upon a base 54 through a yoke including a pair of arms 55. The yoke comprises a central portion 56 extending transversely of the base and rearwardly directed portions 57 immediately adjacent thereto which are maintained in a horizontal position upon the top of the base 54 by means of screws 58 or equivalent means. The arms 55 are then bent upwardly and outwardly from each other so as to extend toward the horizontal diameter of the cowl 50 in spaced relation to the rear edge thereof and then are bent forwardly into the cowl in spaced relation to the inner surface of the rear portion of the inner shell 52. The arms terminate in flattened end portions 59 having conical openings therethrough with the larger ends of the openings directed inwardly and with the openings extending along a horizontal diameter of the cowl. Each of the arms is retained in position by a conical mounting member 60 constituting a nut screwed onto the inwardly projecting end of a bolt 61 having its head outside of the outer shell 51 and lying along the selected diameter of the cowl 50. The bolt passes through a spacer 62 having its outer end welded or otherwise affixed to the inner surface of the shell 51 and its inner end projecting through an opening 63 in the inner shell 52. A lock washer 64 is interposed between the inner end of the spacer 62 and the adjacent surface of the mounting member 60 so as to hold the mounting member 60 against rotation.



In this form of the invention the ends of arms 55 normally are spaced apart by a distance less than the distance they occupy when in assembled relation so that tightening of the bolts 61 causes the arms to be stressed apart, thereby causing rotation of the body structure about the axis of the mounting members to be frictionally resisted as in the previous example.

In both forms of the device there is provided a fan or similar appliance comprising a body structure including a cowl, and means for mounting said body structure comprising a base, a yoke mounted on said base and including a pair of arms extending upwardly in spaced relation, the end of each of said arms having a conical opening therethrough extending along a common axis, said arms being resilient to an extent such that they may be sprung from an unstressed position with respect to each other, a pair of conical mounting members projecting from said body structure and complementarily received in the openings in said arms, and means to adjust the spacing of said mounting members to hold said arms in stressed condition whereby rotation of said body structure about said common axis is frictionally resisted.

Having illustrated and described preferred embodiments of the invention, it should be apparent to those skilled in the art that the invention permits of modification in arrangement and detail. I claim as my invention all such modifications as come within the true spirit and scope of the appended claims.

I claim:

1. A fan comprising a cowl, an aerodynamic device supported coaxially within said cowl so as to propel air axially through said cowl, a pair of conical mounting members projecting from said cowl along a diameter thereof, said mounting members having their larger ends outward, and means supporting said cowl including a yoke extending between said mounting members in spaced relation to said cowl, said yoke having an opening in the end of each of its arms complementarily receiving one of said mounting members, said yoke being resilient to an extent to permit stressing of said arms and when in unstressed condition having its ends spaced from said cowl, and means adjustably connecting said mounting members to said cowl for axial movement toward said cowl whereby said arms may be stressed toward each other in order that rotation of said cowl between the arms of said yoke may be frictionally resisted.

2. A fan comprising a cowl, an aerodynamic device supported coaxially within said cowl so as to propel air axially through said cowl, a pair of conical mounting members projecting inwardly from said cowl along a diameter thereof, said mounting members having their larger ends inward, and means supporting said cowl including a yoke extending between said mounting members in spaced relation to said cowl, said yoke having an opening in the end of each of its arms complementarily receiving one of said mounting members, said yoke being resilient to an extent to permit stressing of said arms and when in unstressed condition having its ends spaced from

said cowl, and means adjustably connecting said mounting members to said cowl for axial movement toward said cowl whereby said arms may be stressed away from each other in order that rotation of said cowl about said diameter may be frictionally resisted.

3. A fan comprising an annular cowl having a large opening at one end and a smaller opening at its opposite end, said cowl being of generally aerofoil cross-section throughout and comprising an inwardly concave surface and an inwardly convex inner surface and said cowl being tapered toward the large opening and relatively blunt toward the small opening, a motor concentrically mounted within said cowl, a propeller driven by said motor and rotating within said cowl in a direction to draw air through the large opening and discharge the air through the small opening, a base, a supporting member mounted upon said base and including a bar shaped to extend upwardly from said base along both sides of said cowl at least to the horizontal diameter thereof, means pivotally connecting said cowl to said supporting member along said horizontal diameter whereby said cowl may pivotally move about said horizontal diameter at least through 180 degrees from a position in which air is discharged in one direction to an opposite position in which air is discharged in the opposite direction, said supporting member and said pivot means having complementary frictional surfaces whereby pivotal movement of said cowl is frictionally resisted and said cowl will remain in any selected position within the limits of its swinging movement.

4. A fan comprising a hollow annular cowl consisting of an outer ring of outwardly convex cross-section and an inner ring of inwardly convex cross-section, the end edges of one of said rings being clinched over the end edges of the other of said rings, the cowl having a blunt end of smaller diameter than its other end and said other end being relatively sharp whereby the cross-section of said cowl resembles an aerofoil, means supporting said cowl along a horizontal diameter, said means comprising a pair of frictional pivot members whereby said cowl may be tilted about a horizontal axis, a motor supported within said cowl and having its shaft lying coaxially therewith with a protruding portion of the shaft intermediate the ends of the cowl, and an air propeller fixed to the protruding portion of said shaft and having a diameter slightly smaller than the internal diameter of the smaller end of said cowl, the direction of rotation of said propeller being such as to draw air through the larger end of said cowl and discharge the air through the smaller end thereof.

5. A fan comprising a hollow annular cowl consisting of an outer ring of outwardly convex cross-section and an inner ring of inwardly convex cross-section, means affixing the end edges of one of said rings to the end edges of the other of said rings, the cowl having a blunt end of smaller diameter than its other end and said other end being relatively sharp whereby the cross-section of said cowl resembles an aerofoil, means supporting said cowl along a horizontal diameter, said means comprising a pair of pivot members whereby said cowl may be tilted about a horizontal axis, a motor supported within said cowl and including a shaft lying coaxially therewith, a protruding portion of said shaft being disposed intermediate the ends of the cowl, and an air propeller coaxially mounted on the protruding portion of said shaft, said propeller having an effective diameter lesser than the internal diameter of the smaller end of said cowl, and said propeller being effective to draw air through the larger end of said cowl and discharge the air through the smaller end thereof.



6. A fan comprising a cowl, said cowl comprising a plurality of complementary annular members and means securing said members together to form a hollow, annular structure of uniform cross-section throughout, said cowl having a relatively blunt forward end and a relatively sharp rearward end of larger diameter than said forward end, the outer surface of said cowl being outwardly convex and the inner surface of said cowl being inwardly convex, means supporting said cowl comprising a coaxial pair of pivot means connected to diametrically opposed portions of said cowl along a horizontal diameter thereof, a motor including a shaft comprising a propeller supporting portion, means supporting said motor coaxially with respect to said cowl, and a multiple-bladed air propeller coaxially mounted on said propeller supporting portion of the motor shaft, said propeller being disposed between the ends of said cowl and the direction of rotation thereof being such as to draw air into the cowl through the rearward end thereof and to discharge the air from the cowl through the forward end thereof.

7. A fan comprising a cowl, said cowl comprising a plurality of annular, sheet-metal members and means securing said members together to form a hollow, annular structure of uniform aerofoil cross-section throughout, said cowl having a relatively blunt forward end and a relatively sharp rearward end of larger diameter than said forward end, the outer surface of said cowl being outwardly convex and the inner surface of said cowl being inwardly convex, means supporting said cowl comprising a coaxial pair of friction pivot means connected to diametrically opposed portions of the outer surface of said cowl along a horizontal diameter thereof, a motor including a shaft comprising a propeller supporting portion, means supporting said motor coaxially with respect to said cowl and projecting rearwardly therefrom, and a multiple-bladed air propeller coaxially fixed to said propeller supporting portion of the motor shaft, said propeller being disposed between the ends of said cowl and the direction of rotation thereof being such as to draw air into the cowl through the rearward end thereof and to discharge the air from the cowl through the forward end thereof.

OTTIS A. SUTTON.


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