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VENTILATING FAN

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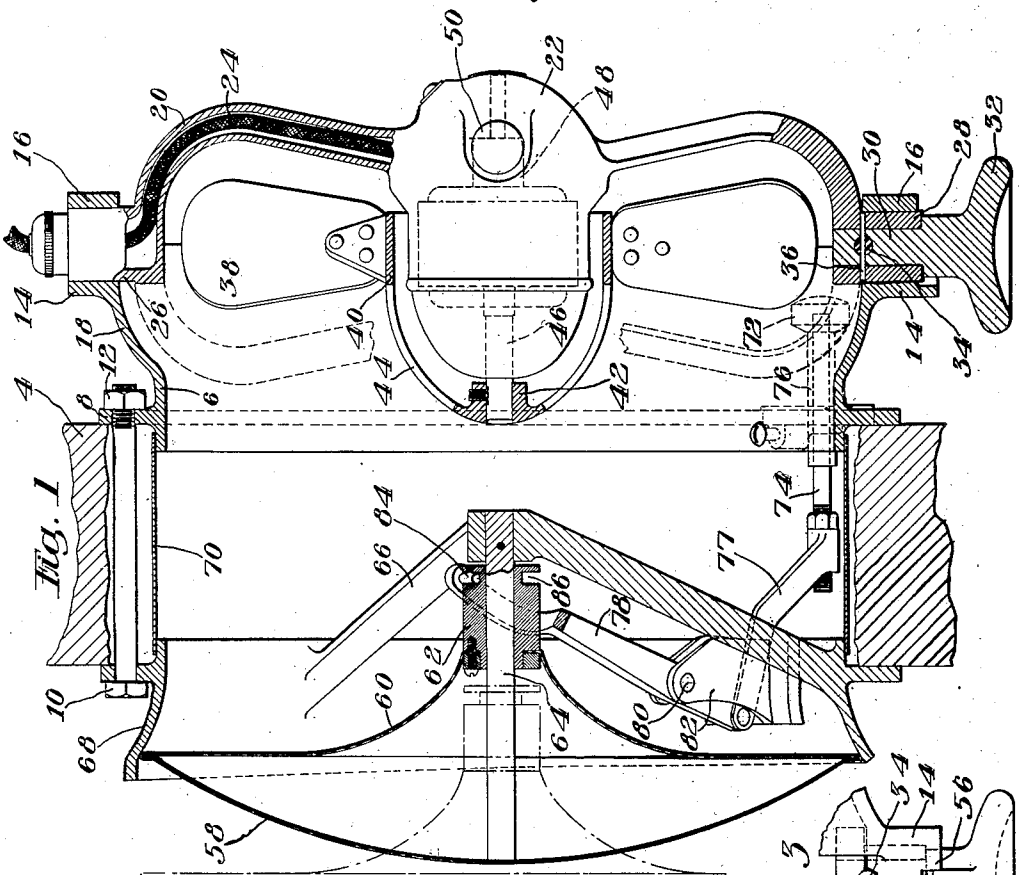


Fig. 1

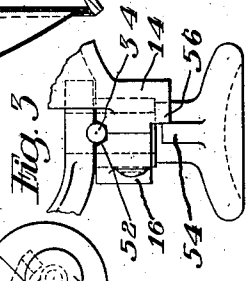


Fig. 3

Fig. 2

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VENTILATING FAN

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4 Claims. (Cl. 230—273)

The present invention relates to ventilating fans and more particularly to an electric motor driven ventilating fan of the propeller type, mounted for bodily reversal so that the current of air will be discharged in either one of a number of directions at the option of the operator.

The object of the present invention is to provide an electric motor driven propeller fan which is adapted to be positioned angularly to direct a stream of air in one or another of several directions at the will of the operator.

A further object of the present invention is to provide a ventilating fan which shall be compact, of simple construction, and particularly adapted for use in the ventilating of rooms or spaces where provision must be made both for supplying fresh air to the room and for exhausting the air from the room.

A still further object of the present invention is to provide a wall ventilator which may be placed in an aperture in a wall or partition and which may be closed tight, or which when the aperture is opened may be employed to force air from the outside into the room or from the room to the outside, as conditions require.

With these objects in view the present invention consists in the ventilating fan and associated parts herein shown and described and more particularly defined in the appended claims.

In the accompanying drawing which illustrates the preferred form of the present invention as embodied in a wall ventilating set, Fig. 1 is a vertical sectional view showing the unit mounted in an opening in a wall, with the closure or shutter shown in full lines in its closed position and in dotted lines in its open position; Fig. 2 is an end elevation of a portion of the unit looking from the right of Fig. 1, and Fig. 3 is a side elevation of a detail.

Mounted in an opening in the wall 4 is the thimble 6 having a flange 8 over-lapping the wall 4 and carrying the clamping bolts 10 and nuts 12. The thimble is provided at diametrically opposite top and bottom with the vertical bearings 14 having the caps 16. As shown in Fig. 2, the thimble is diametrically enlarged adjacent the bearings as shown at 18, Fig. 2, to provide clearance for the bowed swinging motor casing 20, which is mounted in the bearings 14.

The motor casing 20 comprises two vertical arms integrally formed with the main portion 22, the upper arm being hollow to receive the electric conductor 24 and being provided with the bearing hub 26. The lower arm is solid and has a bearing hub 28 bored to receive the stem 30 of the reversing knob or handle 32. The stem and hub are secured together by means of the lock pin 34 and the smaller pin 36 passing therethrough.

The propeller fan comprises the blades 38 mounted upon the flat ring or annulus 40 supported from the hub 42 by the curved spokes 44. The hub of the fan is secured upon the end of the rotor shaft 46 of the motor, which in the drawing is illustrated as a direct current motor, having a commutator 48 and the brush holders 50.

The fan construction is such, it will be noted, that the medial plane of rotation of the fan blades and of the rotor lies midway between the ends of the motor shaft and in the axis of the bearings 14 for the motor frame. As a result, the position of the fan and motor is in no way changed whether the parts be adjusted as shown in full outline in Fig. 1 to cause the air to flow in one direction, say, outwardly through the wall opening, or whether it be set in the position indicated in dotted lines to cause the air to flow inwardly. Thus the minimum space is required by fan and motor since the projection of either fan or motor beyond the end of the thimble is the same for either adjustment of the apparatus.

The motor casing is securely held in the desired adjusted position by means of the lock pin 34, the projecting ends of which are adapted to be received in the notches 52 formed by beveling the adjacent shoulders of the lower bearing 14 and bearing cap 16. Provision is made for a slight vertical movement of the casing 22 in the bearings 14 so that the lock pin 34 may be disengaged from the notches 52 by pressing upwardly on the reversing knob 32. The casing may then be rotated, swinging the parts through 180 degrees and upon releasing the knob the pin will again engage the notches 52. The weight of the parts is such as to preclude any possibility of accidental swinging of the motor casing in its bearings. For convenience to the operator a stop shoulder 54 has been formed on the reversing knob which is arranged to engage one or the other of the shoulders 56 formed on the bottom of the lower bearing 14 to prevent overthrow of the parts when they are being adjusted.

In order to close the thimble opening when the fan is not in use a shutter has been provided of circular form and movable lengthwise of the motor axis. In Fig. 1, this shutter is shown in

full line in closed position, its open position being indicated in broken line. It comprises a hollow, mushroom-like structure formed of thin sheet metal with dished outer wall 58 and curved inner wall 60 united at their margins. The inner wall 60 is fixed upon the hub 62, adapted to slide upon the fixed shaft 64 carried by the spider 66 projecting inwardly from the flanged frame 68. The clamping bolts 10 clamp this frame securely against the outer face of the wall 4 with an intermediate sleeve or section 70 of thin metal connecting such frame and the thimble.

The shutter is actuated by means of the knob 72 secured upon the outer end of the rod 74 mounted to slide in bearing 76 carried by the thimble 6. An arm 78 connects the rod 74 with the lower end of the shifting lever 78 pivoted at 80 upon the bracket 82 carried by the frame 68. The upper end of the lever 78 is forked and carries pins 84 which enter the groove 86 in the end of the hub 62.

Thus it will be obvious that when the actuating knob 72 is pulled by the operator, the shutter will be moved from the full line position to the dotted position to provide an annular opening between the margin of the shutter and the frame for the flow of air inwardly or outwardly as the case may be. The frame 68 is tapered as shown so that the shutter will make a tight joint when in closed position. Also, the top of the frame is given a slight overhang as shown in Fig. 1, to prevent entrance of the rain.

In operation, the motor will be controlled from a switch at some convenient point. When the fan is not in use the shutter may be closed or, if desired, may be left open to any degree extent to provide some ventilation. When, however, the fan is to be operated, the shutter will be opened wide and the fan casing will be adjusted by swinging about the vertical pivots to cause the fan to force air outwardly or to draw fresh air in as desired.

The action of the fan may be reversed, and while the fan is in operation if desired, by merely pressing upwardly on the reversing knob, turning the knob to the limit of its movement in the free direction, and then releasing the knob.

While the present invention has been illustrated in a ventilating unit especially designed for mounting in an opening in a wall or partition, it is not necessarily limited to such construction and use, but may be embodied in other constructions and used in other connections without departing from the invention.

Having thus described the present invention what is claimed is:

1. The combination with a thimble adapted to be mounted in a wall aperture and having a flange adjacent one end thereof for engagement with the face of the wall and at the other end a pair of diametrically opposite bearings, a swinging, bowed casing pivotally mounted at its ends in said bearings and carrying at its middle a motor, the thimble being provided with separated, diametrically disposed enlarged portions adjacent the bearings to provide clearance for the casing, and a fan mounted on the motor and driven thereby.

2. A fan comprising a fixed support provided with a vertical bearing, a swinging casing pivotally mounted in the bearing and having provision for limited longitudinal movement therein, a handle located beneath the bearing and rigidly connected to the casing for raising and turning the casing, the casing and support having cooperating projection and recess adapted to be disengaged when the frame is raised and to be engaged when the frame is lowered to hold the casing in adjusted position, and a motor and fan carried by the casing.

3. A fan comprising a motor having a casing with rounded ends, a rotor, and a shaft projecting beyond one end of the casing, curved arms extending from the other end of the casing for supporting the motor, a hub fixed upon the end of the shaft and having a rounded end, a fan comprising a cylindrical base surrounding the casing, blades mounted on the base, and spokes curved to conform to the rounded end of the casing and connecting the rounded end of the hub and base.

4. A fan comprising a fixed support provided with diametrically opposite bearings, a swinging casing having bearing members mounted in the bearings for rotational and longitudinal movement thereof, devices for normally holding the members and casing at the limits of their rotational movement, the members and casing having provision for limited longitudinal movement to release them from the said devices to permit rotational movement thereof, and a motor and fan carried by the casing.

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