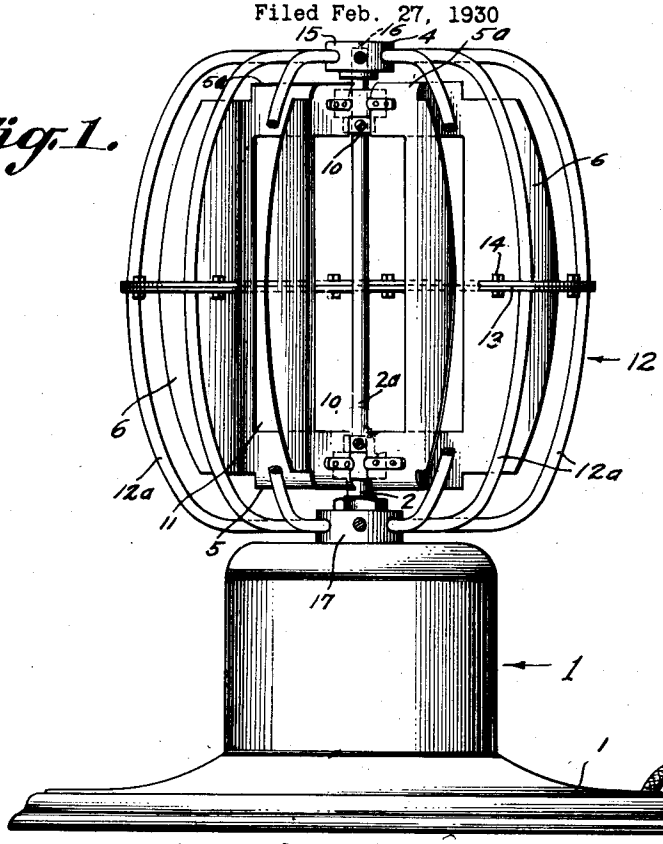
Dec. 9, 1930. M. F. OLIVER 1,784,072

ELECTRIC FAN

Filed Feb. 27, 1930

Fig. 1.



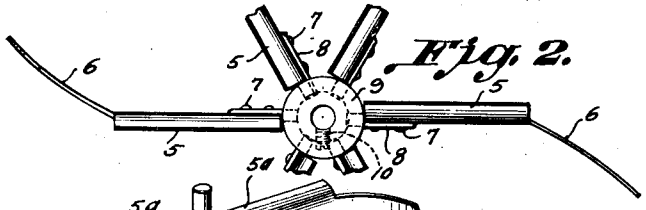


Fig. 2.

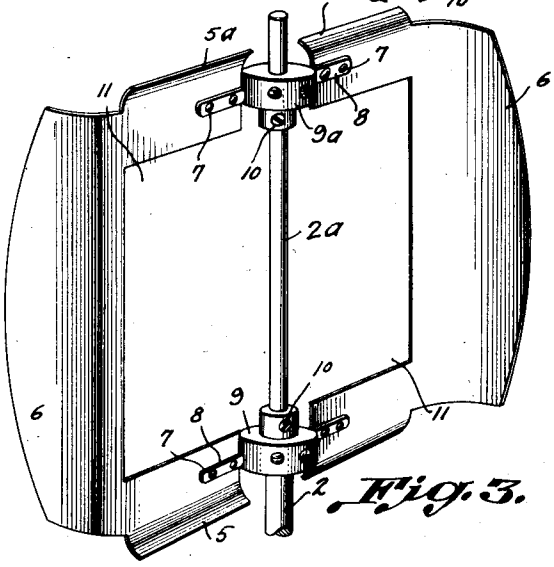


Fig. 3.

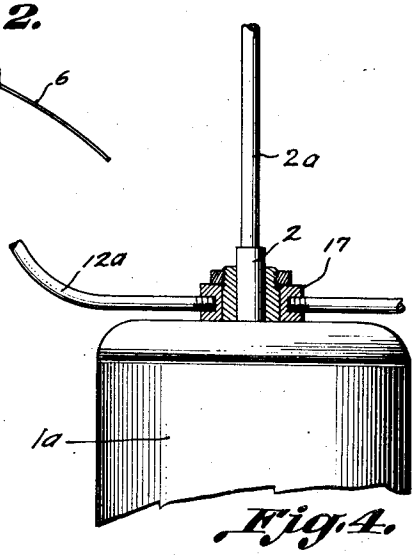


Fig. 4.

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Patented Dec. 9, 1930 1,784,072

UNITED STATES PATENT OFFICE

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ELECTRIC FAN

Application filed February 27, 1930. Serial No. 431,856.

This invention relates to motor fans of the portable type.

Briefly stated, the invention forming the subject of this application contemplates a motor fan in which the blades thereof may be adjusted to vary the direction of flow of the blast of air created thereby without the necessity of changing the position of the associated motor to the end that the mounting of the motor is greatly simplified and strengthened, it being noted in this connection that in present day conventional fans variation of the position of the motor is required to vary the direction of travel of the blast of air created by the fan.

The invention will further be found to embody a fan in which the air is taken in axially of the direction of rotation of the fan and is expelled radially or nearly so depending entirely on the adjustment of the blades so that a definite circulation of air is set up in the area entirely around the fan as distinguished from the more or less concentrated and confined blast from conventional fans.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings,

Figure 1 is a side elevation of the improved fan, a portion of the guard thereof being broken away.

Figure 2 is a fragmentary plan view illustrating the upper portion of the fan.

Figure 3 is a fragmentary perspective illustrating two of the blades of the fan and supporting means therefor.

Figure 4 is a detail section showing the manner of mounting the guard of the fan.

In the drawing, in which similar numerals refer to similar parts throughout the several views, the motor base 1, is preferably made flat, to rest on a horizontal support such as a disk or table or be attached to a ceiling and is so constructed as to accommodate a motor 1*a*, in any manner, well known in the art.

The motor 1*a* has a shaft 2—2*a*, projecting beyond the motor on the side remote from the base. As best shown in Fig. 4, the shoulder 3 divides the shaft 2—2*a*, into a lower portion 2, of larger diameter and an upper portion 2*a*, of smaller diameter, the shoulder 3 forming a stop for the lower hub 9, of the fan element. If desired the motor shaft 2, may terminate with the shoulder 3, and a shaft 2*a*, of smaller diameter may be screwed into a recess therein. Each blade comprises three distinct impelling members made integral, and formed out of a single piece of sheet metal. The upper impeller 5*a* and lower impeller 5 are connected to the hubs 9*a* and 9 by some such means as arms 8 and rivets 7, and project radially from said hubs and serve as spokes for the bight portion or the vertical impeller member 6. The vertical impeller joins the outer ends of the two horizontal impellers and forms therewith a complete U shaped blade. The horizontal impellers have a curve forward in the direction of rotation of the fan for the purpose of drawing the air from above and below into the central portion 11 thereof. The vertical impeller 6, in a similar manner, is given a curve backward with relation to the direction of rotation of the fan, to expel that air substantially radially which has been drawn in to the center 11 of said fan by the horizontal impellers 5 and 5*a*.

It will be noted that this construction, omitting a solid supporting ring at the outer edge of the blades, gives a rather flexible fan, which of necessity must be supported against deformation both at the upper and lower edges thereof. If desired, this flexibility of the blade may be utilized to advantage in directing, to a limited extent, the direction of discharge of the air from the fan. By fastening the lower hub 9 rigidly to the shaft the upper hub 9*a* may be rotated relative thereto to give a deformed shape to the vertical impeller 6. By rotating the hub

9a backward relative to the direction of rotation of the fan the resultant blast of air discharged will be slightly inclined above the horizontal plane, whereas by rotating the hub 9a forward in the direction of rotation of the fan the resultant blast will be below the horizontal plane.

The assembled fan is mounted on the smaller portion 2a of the shaft, the lower hub 9 resting on the shoulder, as heretofore mentioned. Set screws 10 may be used in securing the fan member against rotation relative to the shaft, although any other suitable means, such as keys and slots or cotter pins may also be used.

The squirrel cage guard member 12 is formed in two halves, the lower half terminating in a hub or ring 17 which surrounds the shaft 2 and may fit over a projection 17a of the motor and be secured in place by any such means as a lock nut 18a or may be fastened directly to the motor casing as desired. The meeting portions of the two halves are provided with connecting rings 13 having aligned apertures therein to which fastening devices 14 are extended. The upper portion of the guard member extends above the top of the fan and terminates in a collar 15 which holds a bearing 4 for the upper end of the shaft 2a, to support the fan against lateral vibration due to any unbalance that may exist in the fan impeller. Means to lubricate the bearing 4 are provided by the oil port 16. The bearing 4 may be of any type such as a ball bearing or may be a bushing as desired, the particular design thereof forming no part of this invention.

The guard 12 may be made either of wire or perforated sheet metal and preferably be either brass or steel. The design of the guard member 12 involves giving it, first, sufficient strength to give the necessary rigidity of the bearing 4, and secondly, in placing the guard wires close enough together to prevent persons from accidentally coming in contact with the rotating blades. The guard is shaped so as to give sufficient clearance from the blades of the fan and in general conforms to the shape thereof.

It is obvious that this invention is susceptible of various changes and modifications. It will therefore be understood that this invention is not to be limited to the particular form of construction shown herein but only by the scope of the appending claims.

Having thus described the invention, what is claimed as new is:

1. A desk fan including a fan element comprising a lower hub member, and an upper hub arranged in spaced vertical relationship and a plurality of blades attached to said hub members, each blade comprising two radial impellers having means to draw the air axially into the center of the fan and an impeller parallel to the axis connecting the two horizontal impellers, said last named impeller having means to expel said air radially from said fan.

2. A fan element comprising an upper hub member, a lower hub member, blades mounted between said hub members and radiating therefrom, said blades being formed of two horizontal impellers spaced apart and supporting a vertical impeller, the outer ends of said horizontal impellers being bent in the direction of rotation of the fan, and the vertical portion being bent back from the direction of rotation.

3. In a device of the class described, a base, a motor mounted on said base, a shaft projecting from said motor on the side remote from said base, and a fan mounted on said shaft having means to draw the air into said fan axially from both sides thereof, means to discharge the air substantially, radially, and means to vary the angle of discharge.

4. In an air circulating device, a motor having a shaft, spaced hub members mounted on the shaft, and U-shaped blades having parallel end members secured to said hub members, said hub members having means whereby the same may be individually adjusted about the circumference of said shaft to vary the position of said U-shaped blades with respect to the axis of said shaft.

5. In a device for circulating air, a motor having a shaft, separate hub members mounted on the shaft, U-shaped blades having bight portions and parallel end portions, means connecting the terminals of said end portions to said hub members, and means whereby one of said hub members may be adjusted circumferentially about the axis of said shaft and with respect to the other hub member to vary the positions of said bight portions with respect to said shaft.

6. In a device for circulating air, a motor having a shaft, separate hub members mounted on the shaft, U-shaped blades having bight portions and parallel end portions, means connecting the terminals of said end portions to said hub members, and means whereby one of said hub members may be adjusted circumferentially about the axis of said shaft and with respect to the other hub member to vary the positions of said bight portions with respect to said shaft, said parallel end portions of the U-shaped blades being provided with means to direct air axially into the space between the bight portions of the blades.

7. In an air circulating device, a motor having a shaft, a plurality of U-shaped blades having bight portions arranged in annular formation about the shaft and in spaced relation thereto, said U-shaped blades being provided with approximately parallel end members connected to the bight portions and to the shaft and having transversely curved portions directing air axially of said shaft into the space between said bight portions.

8. In an air circulating device, a motor having a shaft, a plurality of U-shaped blades having bight portions arranged in annular formation about the shaft and in spaced relation thereto, said U-shaped blades being provided with approximately parallel end members connected to the bight portions and to the shaft and having transversely curved portions directing air axially of said shaft into the space between said bight portions, the bight portions of said blades being provided with means by which air is directed angularly therefrom.

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