March 31, 1942. G. E. LOFGREN 2,278,082

FAN

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Fig. 1.

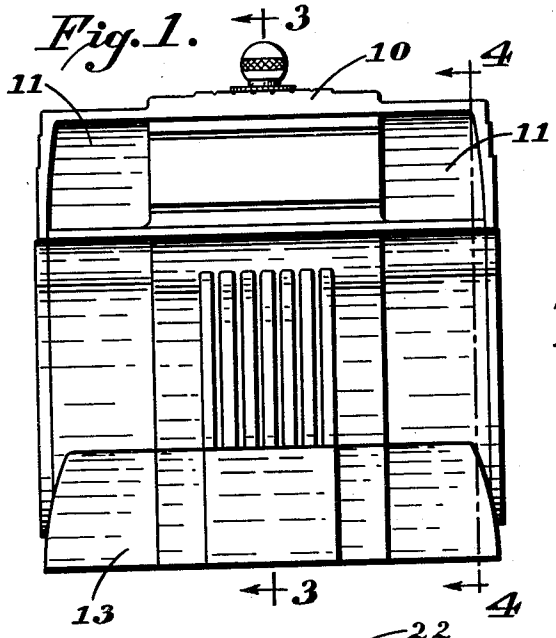


Fig. 2.

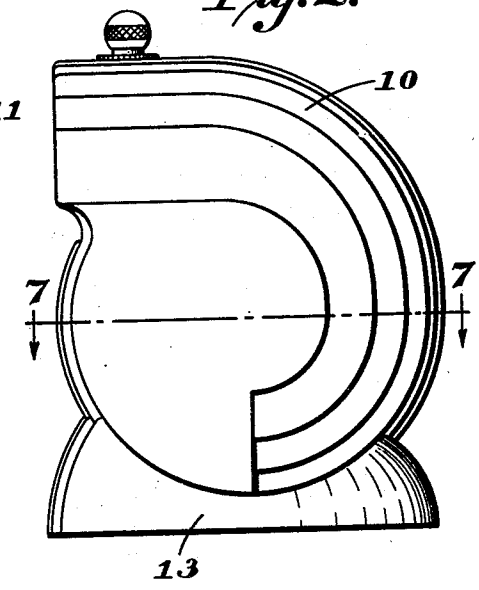
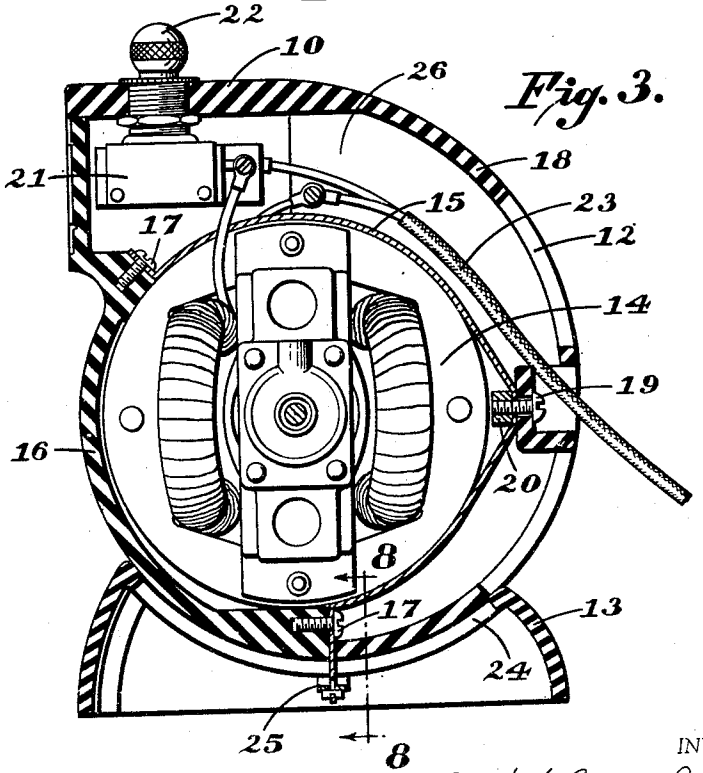


Fig. 3.



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Fig. 4.

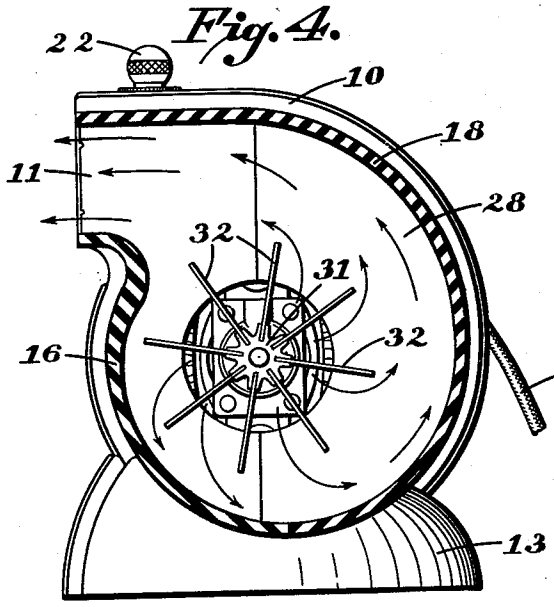


Fig. 5.

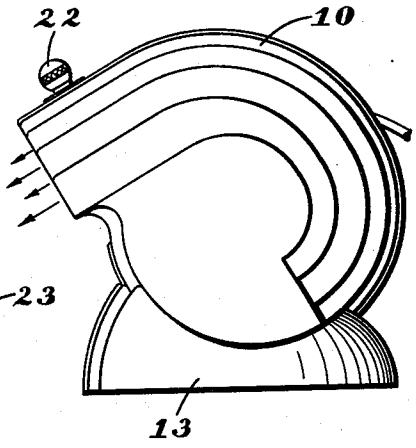


Fig. 7.

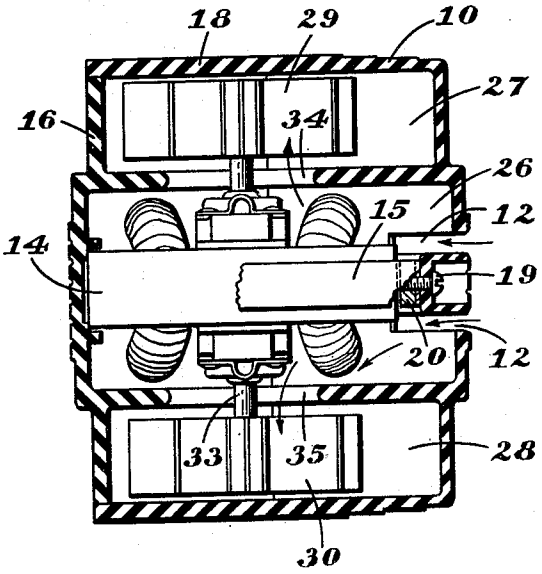


Fig. 6.

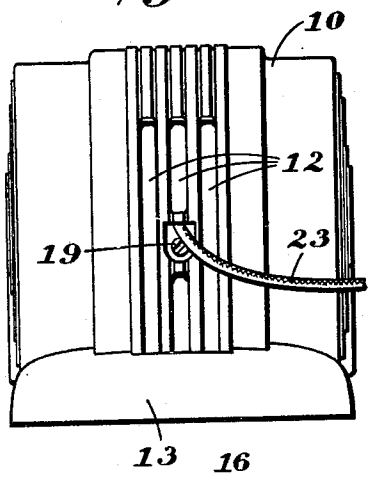
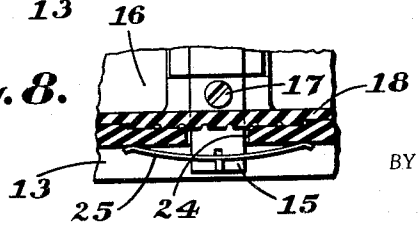


Fig. 8.



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UNITED STATES PATENT OFFICE

2,278,082

FAN

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Application September 21, 1939, Serial No. 295,862

7 Claims. (Cl. 230—117)

My invention relates to fans and more particularly to fans of the centrifugal type.

Many of us prefer to arrange a fan to blow air directly on us. The air blowing over the surface of the skin cools by the evaporation of moisture. Fans usually are constructed to produce a relatively high air velocity. This velocity is too high to permit the fan to be located in close proximity to the person. Of course, the air velocity diminishes rapidly at increased distances from the fan. However, when the fan is located at a sufficient distance to reduce the air velocity so that it is not uncomfortable, the air is diffused over such a wide area as to make it impossible to keep papers and other light material from blowing around unless weighted down.

An object of my invention is to provide an improved fan which may be located directly on a desk to direct a stream of air at the person using it without disturbing any papers or the like on the desk.

Another object of my invention is to provide a fan producing a stream of air which is wide in a horizontal plane but narrow in a vertical plane.

A further object of my invention is to provide a fan of the centrifugal type which may be readily positioned to propel a stream of air in any direction and at any angle desired.

A still further object of my invention is to provide an enclosed fan compact in construction and efficient in operation.

What I consider to be novel and my invention may be better understood by reference to the following specification and appended claims when considered in connection with the accompanying drawings, in which

Fig. 1 is a front view of my improved fan;

Fig. 2 is a side view;

Fig. 3 is an enlarged sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 1;

Fig. 5 is a side view similar to Fig. 2, showing the fan adjusted to direct the air at an angle to the horizontal;

Fig. 6 is a rear view;

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 2; and

Fig. 8 is a detail view of the base locking means.

Referring to Figs. 1 to 3, 10 indicates a housing having two outlet openings 11 and inlet openings 12. Housing 10 is supported on a base 13. A motor 14 is mounted within housing 10 by means of a strap 15. Housing 10 is divided into two halves as best indicated in Fig. 3. Motor 14 is secured to the front half 16 by means of two screws 17 which pass through openings provided therefor in the strap 15. The rear half 18 of housing 10 is secured to the housing half 16 by means of a screw 19 in threaded engagement with a nut 20 located on the opposite side of strap 15. A switch 21 is located in housing 10 and has a projecting operating handle 22. An electric cord 23 is connected to switch 21 and motor 14. Housing 10 is movable with respect to base 13 on a horizontal axis. A projecting portion of strap 15 passes through a slot 24 in base 13 and is secured thereto by a spring 25 and a locking key as best indicated in Fig. 8.

Referring to Figs. 4 to 7, it will be seen that housing 10 is divided into a central motor chamber 26, a fan chamber 27 at one end, and a second fan chamber 28 at the opposite end. If desired, chambers 26, 27, and 28 for housing respectively, the motor 14 and the two centrifugal fans 29 and 30, could be made as separate housings and secured together. Chambers 27 and 28 are in the form of scrolls. Fan elements 29 and 30 each consists of a hub 31 and a plurality of radially extending blades 32, which are preferably formed of a flexible material, such as rubber, leather, or fibrous material. The fans 29 and 30 are connected to opposite ends of a shaft 33. The air is drawn into the housing 10 through the inlet openings 12, passing over the motor 14 for cooling it and entering the chambers 27 and 28 through openings 34 and 35. The air leaves the chambers 27 and 28 through the outlet openings 11. The fans 29 and 30 are preferably of relatively small diameter for compactness. As it is only necessary to move a small volume of air, any desired velocity in the projected air column can be obtained as determined by the speed of rotation of the fans. The velocity of the air projected from the openings 11 should be maintained at a relatively low value so that the fan may be located on a desk in close proximity to the person using the fan.

The direction of the projected column of air is determined by the positioning of the fan. When the fan is located on an elevation above the person using it, the air may be directed downwardly by rotating the housing 10 in a counter-clockwise direction on a horizontal axis with respect to the base 13 to a position as indicated in Fig. 5. Similarly, the air may be directed upwardly by rotating the housing 10 in an opposite direction. The flexible blades 32 prevent injury even to anyone who may insert a finger in either of the outlet openings 11. The

flexible blades 32 also serve to reduce the noise of operation of the fan by eliminating the transmission of noise from the motor to the air through the fan blades or of noise which originates in the fan blades by impingement of the air thereon.

The fans 29 and 30 are employed with two outlet openings 11 arranged side by side in a horizontal direction to enlarge the area of influence of the projected air column in a horizontal plane without increasing too greatly the volume of air handled by the fan. At a relatively short distance in front of the housing 10, the two columns of air projected from the exhaust openings 11 merge into a single column of air in a horizontal plane. This makes it possible to obtain a stream of air which is amply wide in a horizontal plane but not so wide in a vertical direction, as to disturb any papers or other light material that may be located in the vicinity of the fan.

The fan is assembled by first securing the motor 14 with the fan elements 29 and 30 attached to the front housing half 16 by means of strap 15 and screws 17. The switch 21 is then connected to the motor 14 and the electric cord 23. Switch 21 is secured in the rear housing half 18. Housing half 18 is secured to the front half 16 by means of screw 19. The projecting end of strap 15 is inserted through the slot 24 of base 13. Spring 25 is secured over the end of strap 15 locking the housing 10 and base 13 together. The fan is then assembled for operation and may be positioned to direct a column of air at any point desired simply by rotating the housing 10 on a vertical axis with the base 13 and by rotating the housing on a horizontal axis with respect to the base 13.

While my invention is illustrated and described in connection with a specific embodiment, it is to be understood that this invention is not limited to any specific construction but modifications may be made within the scope of the appended claims.

What I claim is:

1. A fan including a two-part housing having an inlet opening and an outlet opening, a motor secured to one part of said housing, a switch secured to the other part of said housing, means connecting said motor to said switch, fan blades carried by said motor for producing a flow of air by centrifugal action, a base having a slot adapted to receive a projecting portion of said housing, and spring means to lock said projecting portion to said base to frictionally hold said housing in any desired position on said base.

2. A fan including a housing having horizontally spaced outlet openings and an inlet opening, a base, a projection from said housing entering a slot in said base, spring means connected to said projection for securing said housing to said base for movement on a horizontal axis and for holding said housing in any desired position on said base, a motor mounted in said housing, and a plurality of fan elements connected to said motor and adapted to draw air through said inlet opening and project air out said outlet openings.

3. A fan including a base, a housing mounted on said base for rotation on a horizontal axis and having a plurality of horizontally spaced outlet openings and an inlet opening, a projection from said housing entering a slot in said base, spring means connected to said projection and engaging said base for holding said housing in a selected position on said base, a motor mounted in said housing, and fan blades connected to opposite ends of said motor adapted to draw air in through the inlet opening and project air out through said outlet openings.

4. A fan including a housing formed in two parts, a motor, a strap securing said motor to one part of said housing and having a projecting end, a switch secured to the other part of said housing, means engaging said strap to connect the two parts of said housing together, said housing having spaced outlet openings and an inlet opening, fan blades located within said housing and secured to opposite ends of said motor, a base having a slot adapted to receive the projecting end of said strap, and means to secure said housing to said base for movement on a horizontal axis.

5. A fan including a housing having a motor chamber and two fan chambers, said fan chambers having outlet openings and inlet openings communicating only with said motor chamber, said motor chamber having an air inlet opening, a motor mounted in said motor chamber on a horizontal axis, a shaft connected to said motor and extending into each of said fan chambers, fan blades secured to said shaft in each of said fan chambers, a base, a projection from said housing entering an opening in said base, and a spring engaging said projection and said base to permit movement of said housing on an axis parallel to the axis of said motor.

6. A fan including a housing having a central motor chamber and two fan chambers, said motor chamber having an air inlet opening, said fan chambers having air inlet openings communicating only with said motor chamber and air outlet openings, a motor mounted in said motor chamber, a shaft connected to said motor extending into each of said fan chambers, a plurality of flexible fan blades secured to said shaft in each of said fan chambers, a base, a projection from said housing entering an opening in said base, and a spring engaging said projection and said base for securing said housing to said base for movement on the axis of said motor shaft.

7. A fan including a centrifugal fan element, a spiral housing surrounding said fan element having an imperforate side wall and a discharge opening in the enlarged end of the spiral, a second fan element, a spiral housing surrounding said second fan element and having an imperforate side wall and a discharge opening in the enlarged end of the spiral, a motor having shaft extensions connected for driving said fan elements, a spiral housing surrounding said motor having an inlet opening and connected to said spiral housings surrounding said first and second fan elements, walls located within said housings separating said motor from said fan elements and having openings communicating therebetween, and a switch secured in the enlarged end of the spiral housing surrounding said motor having an operating member extending to the exterior of said housing.

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