Aug. 25, 1931. L. N. DAVY 1,820,448

FAN BLADE

Filed Jan. 13, 1930 2 Sheets-Sheet 1

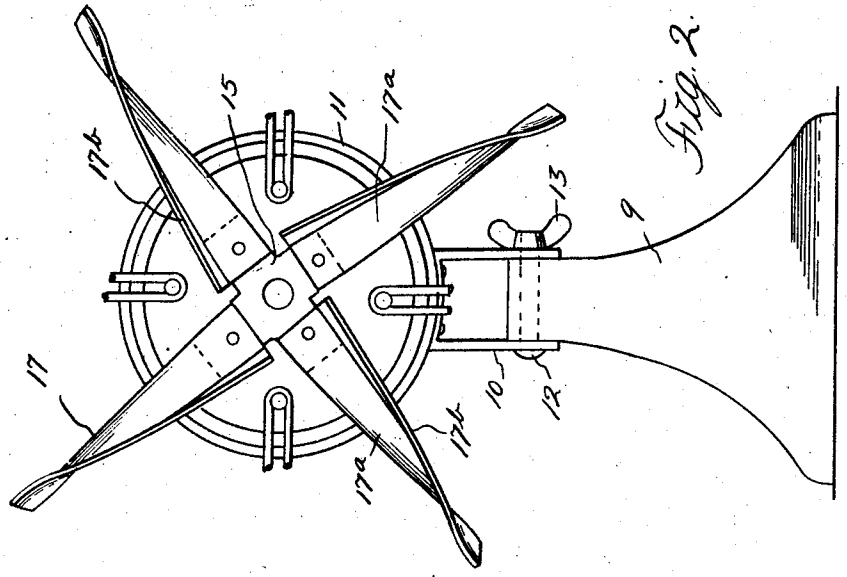


Fig. 2.

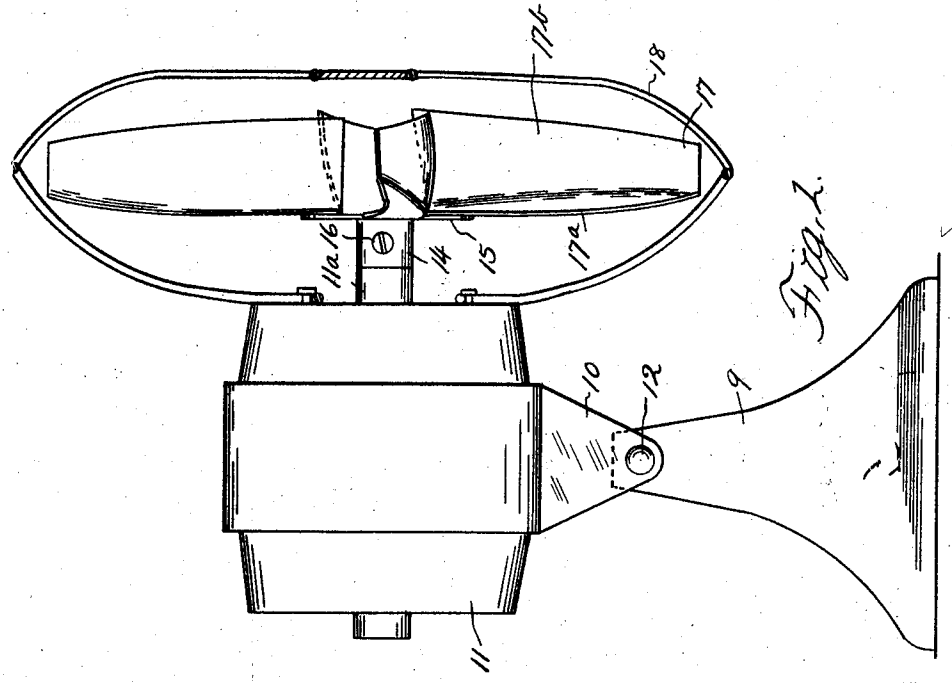


Fig. 1.

Lynden N. Davy INVENTOR

BY

Swan & Frye.

ATTORNEYS

Aug. 25, 1931. L. N. DAVY 1,820,448

FAN BLADE

Filed Jan. 13, 1930 2 Sheets-Sheet 2

Fig. 3.

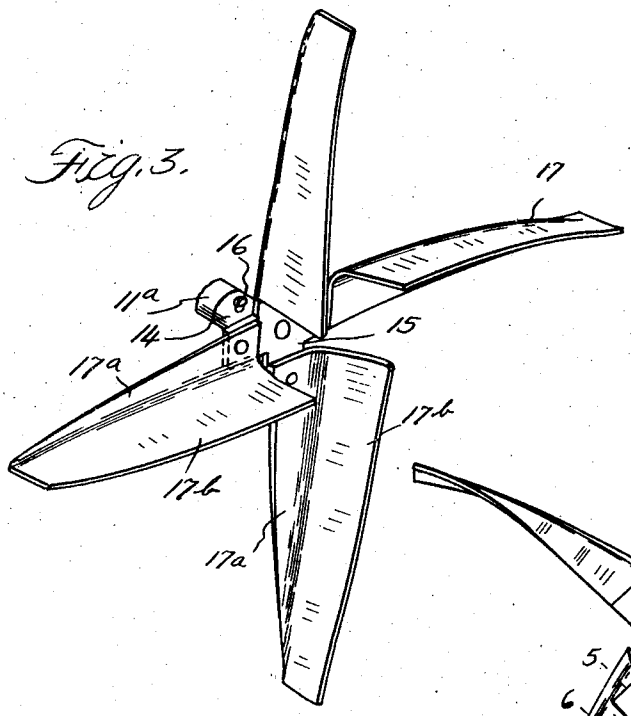


Fig. 4.

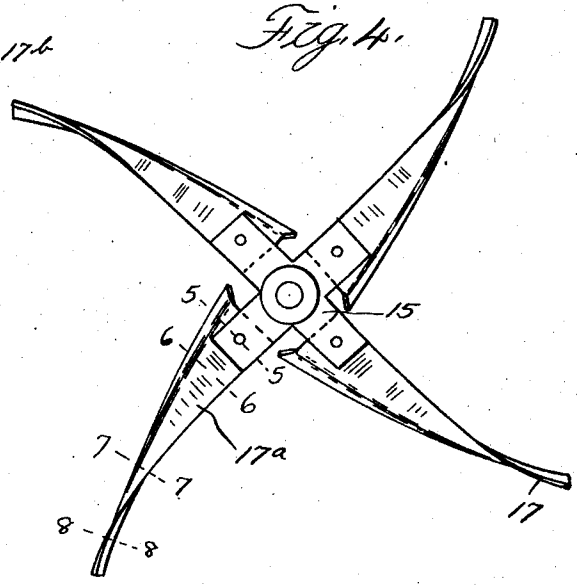


Fig. 5.

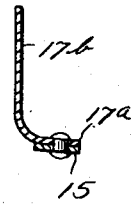


Fig. 6.

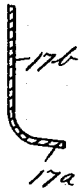


Fig. 7.

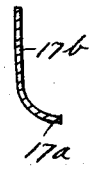
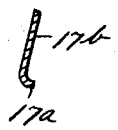


Fig. 8.



INVENTOR

Lynden N. Davy

BY

Dwan & Frye.

ATTORNEYS

Patented Aug. 25, 1931 1,820,448

UNITED STATES PATENT OFFICE

LYNDEN N. DAVY, OF BUTTE, MONTANA

FAN BLADE

Application filed January 13, 1930. Serial No. 420,465.

This invention relates to improvements in electric fans of the type ordinarily used in producing a circulation of air for cooling and ventilating rooms in residences, offices and other dwellings.

One of the objects of this invention is the provision of an electric fan that will direct air currents through substantially the entire semi-spherical space in front of and around the fan blades.

Another object of this invention is the arrangement of the fan blades whereby only a relatively gentle breeze is thrown directly forward from the fan and the remainder of the air currents delivered from the fan blades in radially outward and on outwardly divergent paths, whereby the objectionable strong draft ordinarily created by the usual electric fan is obviated and a person may remain directly in front of the fan without inconvenience or detrimental effects.

A further object of this invention is the provision of an electric fan having blades each provided with a rear portion substantially normal to the axis of rotation and a front portion having a comparatively wide extremity adjacent the shaft arranged at an angle of greater than ninety degrees to the rear portion, and then as it extends from its inner end to its outer end, has a substantially uniform twist to less than a ninety degree angle to the rear portion, while also diminishing in width from its inner to its outer extremity.

Other objects and advantages will be apparent from the following description wherein reference is made to the accompanying drawings showing a preferred embodiment of my invention, and wherein similar reference numerals designate similar parts throughout the several views.

In the drawings:

Figure 1 is a side elevation of my improved electric fan with a portion of the protecting cage broken away.

Figure 2 is a front elevation thereof, with almost all of the protecting cage omitted to disclose the construction of the fan blades.

Figure 3 is an enlarged perspective view of the fan blades and the forward extremity of the drive shaft.

Figure 4 is a rear elevation of the fan blade assembly, and

Figures 5, 6, 7 and 8 are detail cross sections taken respectively on the lines 5—5, 6—6, 7—7 and 8—8 of Figure 4.

Referring now to the drawings, the numeral 9 designates the base of a portable electric fan and 10 a bracket carrying the motor 11, the bracket 10 being adjustably mounted upon the base 9 and secured in any desired angular position by means of the bolt 12 and wing nut 13. It is to be understood that the illustrated embodiment of the support for the motor and fan blade assembly is merely for purposes of exemplification, and that any desired means of supporting the fan blade assembly forming the claimed disclosure herein may be employed. The adjustability of the support, substantially as herein shown, however, emphasizes the adaptability of the fan blade assembly to substantially all conditions arising in the ordinary use of electric fans, the operation of the fan blade assembly being substantially the same whether the revolving motor shaft is in horizontal, vertical, or in various angular positions.

The motor 11 may be of any desired type for operation by an desired form of current, and forwardly extending therefrom is the stub shaft 11^a upon which is suitably mounted the sleeve 14 carrying the spider 15 forming the central portion of the fan blade assembly, the sleeve 14 being suitably fastened upon the stub shaft 11^a, as by means of the set screw 16. The spider 15 is arranged with its center portion in alignment with the axis of the motor shaft and is provided with a plurality of radially extending arms for the reception of the fan blades. Obviously, any desired number of spider arms may be employed, according to the intended use of the fan and the desired number of blades. Secured to each arm of the spider 15 is a fan blade 17 preferably constructed substantially as herein shown and comprising a rear portion 17^a of substantially triangular shape and arranged as a radial extension of the

spider arm, and a forwardly extending portion 17^b integrally formed with rear portions 17^a. As best shown in Figures 2—4, the rear portion 17^a of each fan blade is arranged substantially as a right angled triangle with its base secured in proximity to the motor shaft 11^a and its straight side arranged as a substantial extension of one side of the spider arm to which it is secured. The front portion 17^b of each fan blade extends along the hypotenuse of the triangular rear portion 17^a and is shaped to provide for the desired dissemination of the air currents throughout the entire semi-spherical space in front of and around the fan blades. To this end the inner extremity of the front portion 17^b of each fan blade is formed with a comparatively wide portion arranged at a greater than ninety degree angle to the rear portion 17^a of the blade, and then as the front portion extends toward its outer extremity it has a substantially uniform twist while also diminishing in width. The twist of the front portion of the blade extends from a greater than ninety degree angle to the rear portion at its inner end to a less than ninety degree angle to the rear portion adjacent its outer end, and the outer end of the blade is preferably about one-half of the width of the inner end of the front portion 17^b. The extra width of the front portion 17^b of each blade adjacent the center of the fan is important in preventing the formation of a vacuum directly in front of the fan, and the twist of the forwardly extending portion 17^b of the fan blades determines the proportions of air currents disseminated in a forward direction, radial directions, and through intermediate directions. The outer extremities of the blades throw the air currents substantially outward and then as the twist in the front portion 17^b of each blade extends beyond the normal to the rear portion 17^a of the blade the air currents directed thereby extend forwardly and outwardly through angles intermediate such radial direction and the axis of the revolving motor shaft. In addition to twisting, the forward portion 17^b of each blade extends obliquely across the straight side of the rear portion 17^a of the blade (note Figures 2 and 4.)

The blades, when mounted for operation, are usually confined by a wire protecting cage 18 of the usual or any desired construction.

In operation the air to be set in motion by the rotating fan blades is drawn over and around the motor at the rear of the fan blade assembly, and is thrown forwardly, radially, and obliquely forwardly and outwardly by the various portions of the fan blades, whereby air currents are set in motion throughout substantially the entire semi-spherical space in front of the fan. This action takes place regardless of whether the motor shaft is arranged vertically, horizontally or at intermediate angles. The greater proportion of the air currents are disseminated obliquely forwardly and upwardly from the fan blades, leaving only a relatively gentle breeze effect directly in front of the fan, whereby a person may remain directly in front of the fan without being inconvenienced by the usual strong draft emanating from the ordinary electric fans. The distribution of the air currents over a wide area also serves to quickly stir up the air throughout a room, facilitating ventilating and cooling of the room.

It will also be noted that the desired effect of creating air currents throughout the entire semi-spherical space in front of the fan is secured by a simple and comparatively inexpensive arrangement of the fan blades, which are mounted upon the motor shaft in substantially the same manner as the blades of the ordinary electric fan as distinguished from the substantially spherical or semi-spherical types of revolving blowers and the like that are used primarily for withdrawing air and gases from factories and other buildings.

While it is apparent that the illustrated embodiment of my invention herein disclosed is well calculated to adequately fulfill the objects and advantages primarily stated, it is to be understood that the invention is susceptible to variation, modification and change within the spirit and scope of the subjoined claims.

I claim:

1. An impeller having a plurality of blades each provided with a rear portion arranged substantially normal to the axis of rotation of the fan blades and a front portion having an inner extremity arranged at a greater than ninety degree angle to said rear portion and having an outer extremity arranged at a less than ninety degree angle to said rear portion, the front portion intermediate its extremities having a substantially uniform twist.

2. An impeller having a plurality of blades each provided with a rear portion arranged substantially normal to the axis of rotation of the fan blades and a front portion having an inner extremity arranged at a greater than ninety degree angle to said rear portion and having an outer extremity arranged at a less than ninety degree angle to said rear portion, the front portion intermediate its extremities having a substantially uniform twist and the inner extremity of the front portion being comparatively wide and the outer extremity thereof comparatively narrow.

3. An impeller having a plurality of blades each provided with a substantially triangular rear portion arranged substan-

tially normal to the axis of rotation of the fan blades and a front portion having an inner extremity arranged at a greater than ninety degree angle to said rear portion and having an outer extremity arranged at a less than ninety degree angle to said portion, the front portion intermediate its extremities having a substantially uniform twist and extending along the hypotenuse of the rear portion.

4. An impeller having a plurality of blades each provided with a substantially triangular rear portion arranged substantially normal to the axis of rotation of the fan blades, and a front portion having a comparatively wide inner extremity arranged at an obtuse angle to said rear portion and a comparatively narrow outer extremity arranged at an acute angle to said rear portion, the front portion intermediate its extremities having a substantially uniform twist and reduction in width.

5. An impeller having a plurality of blades each provided with a substantially triangular rear portion arranged substantially normal to the axis of rotation of the fan blades, and a front portion having a comparatively wide inner extremity arranged at an obtuse angle to said rear portion and having a comparatively narrow outer extremity arranged at an acute angle to said rear portion, the front portion extending along the hypotenuse of the rear portion and having a substantially uniform twist and reduction in width from its inner to its outer extremity.

6. A fan blade assembly comprising a central spider and a plurality of blades secured upon the spider, each blade including a substantially triangular rear portion arranged substantially parallel to the spider and a front portion extending obliquely along the hypotenuse of the rear portion and having spaced portions arranged respectively at obtuse and acute angles to the rear portion.

In testimony whereof I sign this specification.

LYNDEN N. DAVY.