

Feb. 23, 1943.

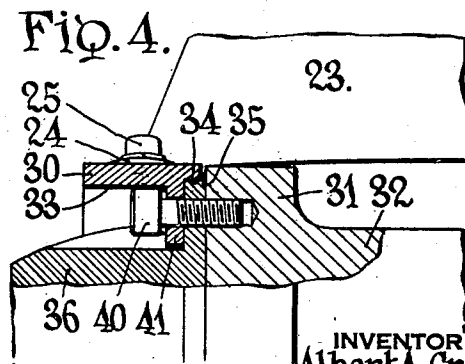
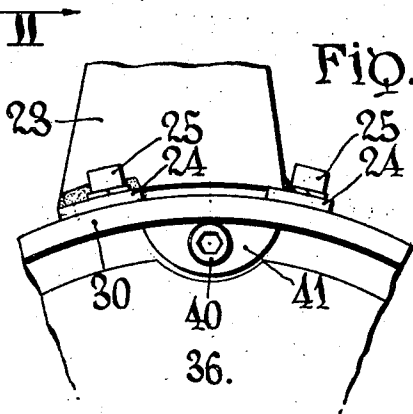
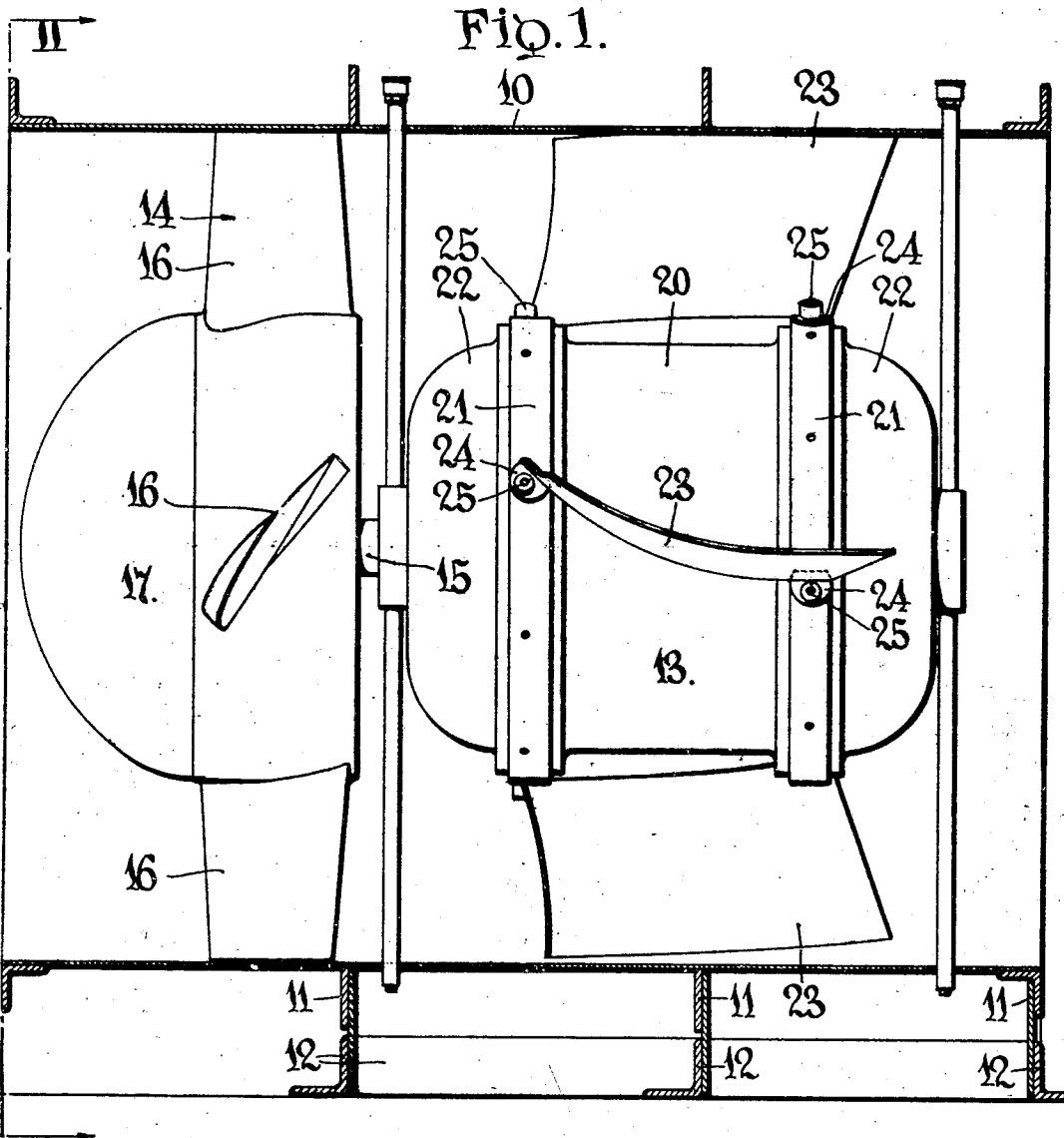
A. A. CRIQUI

2,311,896

FAN

Filed Dec. 11, 1941

2 Sheets-Sheet 1



INVENTOR
Albert A. Criqui,

BY

Beau, Brooks, Buckley & Beau.
ATTORNEYS

Feb. 23, 1943.

A. A. CRIQUI

2,311,896

FAN

Filed Dec. 11, 1941

2 Sheets-Sheet 2

FIG. 2.

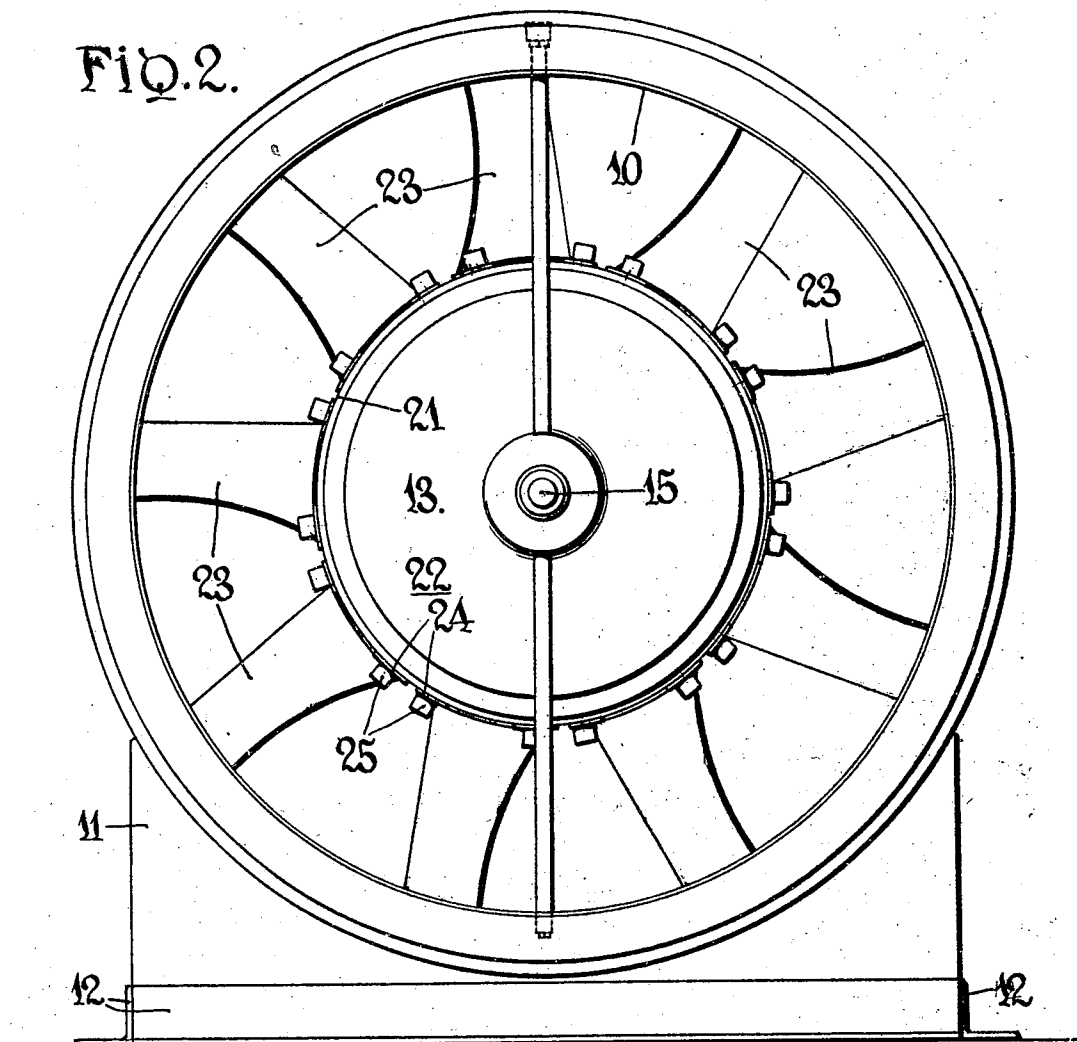


FIG. 6.

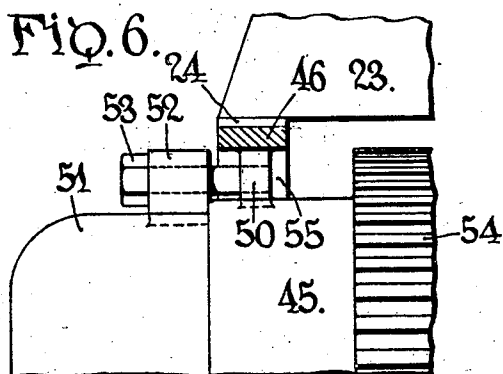
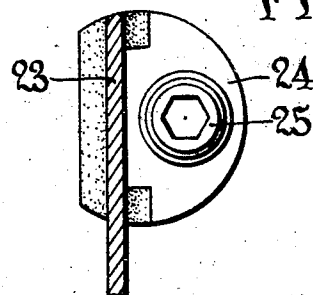


FIG. 3.



INVENTOR
Albert A. Criqui,

BY
Beau, Brooks, Buckley & Beau.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,311,896

FAN

Albert A. Criqui, Kenmore, N. Y., assignor to
Buffalo Forge Company, Buffalo, N. Y., a corporation of New York

Application December 11, 1941, Serial No. 422,531

3 Claims. (Cl. 230-117)

My invention relates in general to fans and particularly to axial flow fans of the type where the motor for driving the fan is located within the outer fan casing and, therefore, requires to be cooled.

It has been customary in fans of this type to provide a specially shaped motor housing and a smooth inner casing around the same. Radiating fins have been placed between the inner and outer casings to direct the air through the casing.

I have discovered that by dispensing with the inner casing and using a standard motor with its irregularly shaped housing, desirable turbulence in the air stream is created, thereby rendering more effective cooling of the motor. It has, therefore, been an object of my invention to provide an axial flow fan utilizing a standard electric motor of irregular housing contour without the use of an inner surrounding cylindrical casing.

Another object has been to provide an axial flow fan having air directing vanes secured to the inner surface of the outer casing and to the motor housing for supporting the motor thereby.

Another object has been to provide a fan of this nature having a centrally arranged electric motor within the outer casing and provided with means for detachably securing the motor to the vanes so that the motor may be conveniently removed or replaced.

Moreover, by utilizing a standard electric motor and by dispensing with the use of the inner cylindrical casing a great saving in cost is brought about in the manufacture of my device.

The above objects and advantages have been accomplished by the device shown in the accompanying drawings, of which:

Fig. 1 is a side, sectional elevation of my device;

Fig. 2 is an end elevation of my device viewed on line II-II of Fig. 1 with the fan removed;

Fig. 3 is an enlarged, plan view showing the manner of securing the vanes to the motor housing in the form of invention shown in Figs. 1 and 2;

Fig. 4 is an enlarged, fragmentary, sectional view of a modified form of invention;

Fig. 5 is a fragmentary, end view of the form of invention shown in Fig. 4; and

Fig. 6 is an enlarged, fragmentary, sectional elevation of another modified form of invention.

Referring to the form of invention shown in Figs. 1 to 3, inclusive, my device comprises an outer fan casing 10 which houses all of the parts

of the device. This housing is preferably cylindrical in form and is supported by standards 11 suitably secured to the housing. These standards are carried by suitable base members 12 whereby the fan may be anchored in place. The electric motor 13 of my device is arranged centrally within the outer casing 10 and has its axis arranged substantially coincident with the axis of said outer casing. The fan wheel 14 of the device is mounted upon the end of the shaft 15 of the motor. This wheel is of the usual type used in fans of this nature and is provided with a plurality of blades 16. A spinner 17 is preferably carried by the hub of the fan for deflecting the incoming air into the wheel.

The motor 13 of my device is preferably one having a standard housing which not only obviates the increased cost of motors having special housings but makes it possible to complete a unit with a motor out of regular stock without having the delay of waiting for a motor with special housing. The motor housing has the customary central or field section 20 having end, annular flanges 21 to which the motor end bells 22 are secured.

Arranged about the motor are a plurality of vanes 23 which are secured along their outer edges to the inner surface of the outer casing 10 preferably by means of welding. These vanes are equidistantly arranged, as shown in Fig. 2, and each carries attaching washers 24 which are preferably welded to the inner edge of the vane and which are so spaced as to register with the flanges 21 on the motor housing. The bottom surfaces of these attaching washers are preferably shaped to conform to the annular shape of the flanges 21 and they are secured to such flanges preferably by means of screws 25 which pass into the flanges through suitable apertures formed in the washers.

These vanes may be curved, as shown, or otherwise suitably shaped to catch the air as it leaves the wheel and to direct it in an axial direction through the housing. By rigidly securing these vanes to the outer casing and removably securing them to the motor housing, it is possible, by removing the bolts 25, to conveniently remove the motor from the fan housing for repairs or replacement.

It will be seen from Fig. 1 that the flanges 21 of the standard motor housing project beyond the central section 20 and, therefore, will produce some turbulence in the air stream as it is being directed through the housing and around the motor. This turbulence I have found has a

beneficial result in adding to the cooling effect of the air upon the motor.

In Figs. 4 and 5 I show a modified form of invention where an attaching ring 30 is provided adjacent each annular flange 31 of the motor 32, only one of such flanges being shown for convenience of illustration. In the inner face 23 of each of these attaching rings at the edge adjacent the flange 31 is formed an annular recess 34. Each of the flanges 31 of the motor housing is formed with a reduced portion 35 which registers with and engages the annular recess 34. The motor end bell is represented at 36 and this, as is customary in the standard motor housing, is secured to the central portion of the motor housing and directly to the flange 31 by means of bolts 40. So as to secure each of the attaching rings 30 in place, attaching bosses 41 are secured to the inner surface 33 of each of the rings. One of these bosses is located opposite each of the screws 40 and each boss is apertured for the passage of the screw, whereby the ring is held in place upon the housing by the same screws 40 which secure the end bell thereto.

In this form of invention the vanes 23 are secured to the attaching rings 30 by means of the attaching washers 24 and bolts 25, as in the form of device shown in Figs. 1 to 3, inclusive.

In the form of invention shown in Fig. 6, the motor 45 has an integral ring 46 cast on each end thereof and attached thereto by means of a number of interspaced arms 50 connecting the ring with the housing of the motor. In this form of motor, which is of special design, the end bell 51 is formed with a plurality of interspaced lugs 52. These lugs register with the arms 50 and a bolt 53 passes through each of the lugs and into the registering arm for securing the end bell in place. In this special motor the outer casing has been omitted and the field laminations thereby exposed, thus forming longitudinally extending ribs 54. In this form of invention air gaps or openings 55 are formed between the arms 50 and the annular ring 46 and the body of the motor, through which air is directed toward and through the grooves of the motor laminations. In this form of invention the vanes 23 are secured in place in a manner described in connection with the other forms of the invention and by means of attaching lugs 24 and bolts 25.

These and other modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims, and I do not, therefore, wish to be limited to the exact embodi-

ment herein shown and described, the forms shown being merely a preferred embodiment thereof.

Having thus described my invention, what I claim is:

1. A fan comprising an outer casing, a motor mounted within said casing and having its body encircled by annular projecting flanges, a fan wheel carried by said motor and acting to create an air stream about the motor body, said motor being in interspaced relation with said casing and exposed therein to direct contact with the air stream, said flanges being disposed in the air stream to create turbulence therein for causing the latter to impinge upon and contact the motor body in cooling the same, a plurality of radiating vanes disposed about said motor and permanently secured to said casing, and means for detachably securing said vanes directly to said flanges whereby to support said motor.

2. A fan comprising an outer casing, a motor mounted within said casing and having its body encircled by annular projecting flanges, said flanges being held in interspaced relation with said body by a plurality of arms, a fan wheel carried by said motor and acting to create an air stream about the motor body, said motor being in interspaced relation with said casing and exposed therein to direct contact with the air stream, said flanges being disposed in the air stream to create turbulence therein for causing the latter to impinge upon and contact the motor body in cooling the same, a plurality of radiating vanes disposed about said motor and permanently secured to said casing, and means for detachably securing said vanes directly to said flanges whereby to support said motor.

3. A fan comprising an outer casing, a motor mounted within said casing, an attaching ring secured to each end of the motor body and projecting beyond the outer body surface, a fan wheel carried by said motor and acting to create an air stream about the motor body, said motor being in interspaced relation with said casing and exposed therein to direct contact with the air stream, said rings being disposed in the air stream to create turbulence therein for causing the air to impinge upon and contact with the motor body in cooling the same, a plurality of radiating vanes disposed about said motor and permanently secured to said casing, and means for detachably securing said vanes directly to said flanges whereby to support said motor.

ALBERT A. CRIQUI.