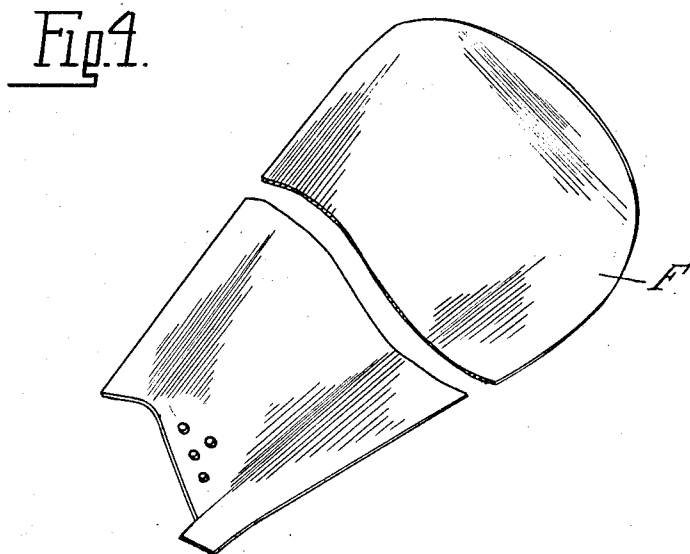
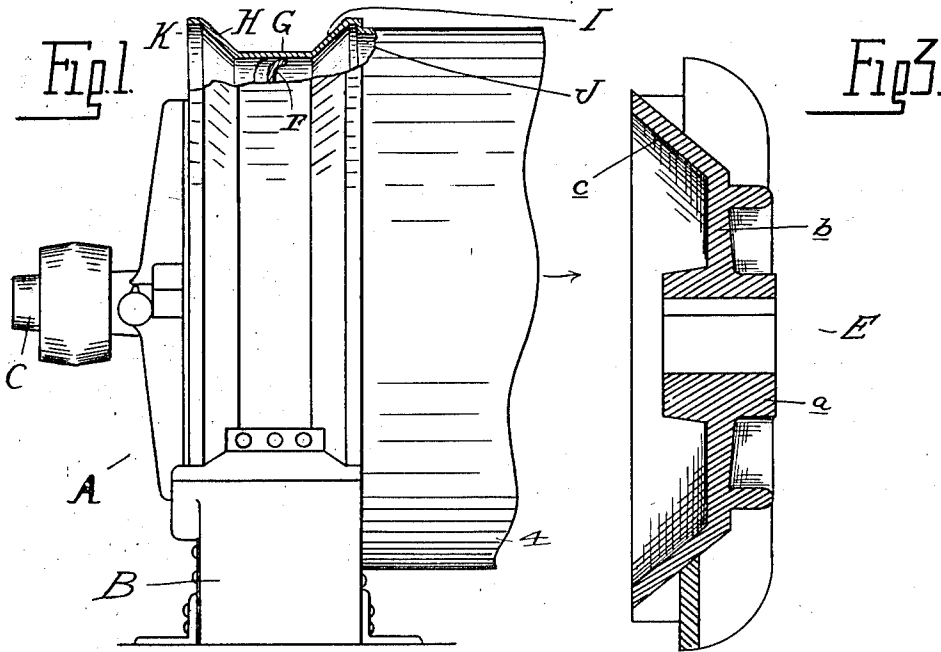


C. H. TREAT.
 AIR PROPELLING MECHANISM.
 APPLICATION FILED OCT. 15, 1908.

1,051,852.

Patented Jan. 28, 1913.
 2 SHEETS—SHEET 1.



Witnesses
R. B. Ford
W. B. Knapp

Inventor
 Charles H. Treat
 By *Whittemore & Whittemore*
attys

C. H. TREAT.
AIR PROPELLING MECHANISM.
APPLICATION FILED OCT. 15, 1908.

1,051,852.

Patented Jan. 28, 1913.
2 SHEETS—SHEET 2.

Fig. 2.

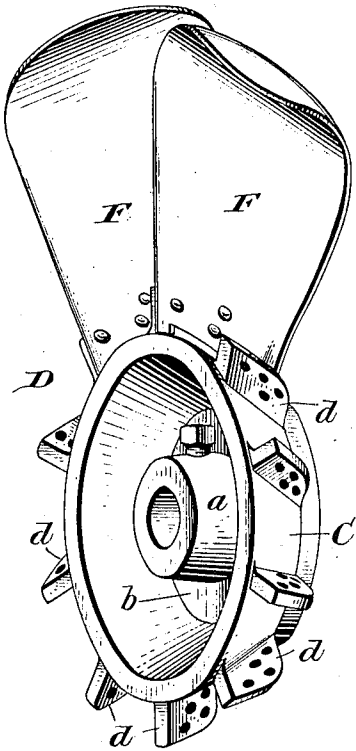
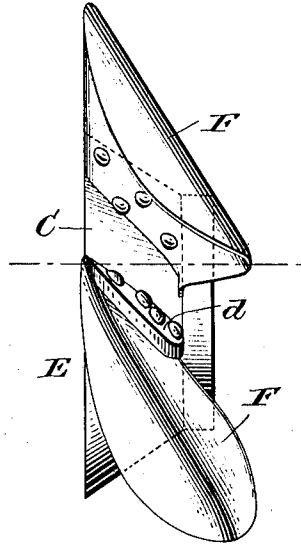


Fig. 5.



Witnesses:

James Hutchinson
John H. Strach

Inventor:

Charles H. Treat,

By Whitmore, Hulbert & Whitman Attorneys

UNITED STATES PATENT OFFICE.

CHARLES H. TREAT, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN BLOWER COMPANY, OF GREEN ISLAND, NEW YORK, A CORPORATION OF NEW YORK.

AIR-PROPELLING MECHANISM.

1,051,852.

Specification of Letters Patent.

Patented Jan. 28, 1913.

Application filed October 15, 1908. Serial No. 457,882.

To all whom it may concern:

Be it known that I, CHARLES H. TREAT, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Air-Propelling Mechanisms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates particularly to a disk fan, and has for its object the production of a propeller of this character capable of moving a column of air at substantially uniform axial velocity with minimum expenditure of power, and with this end in view the invention consists primarily in the novel construction of the fan proper provided with a large imperforate central section and relatively short blades adapted to propel the air at their inner and outer ends at nearly the same velocity, thus producing the uniform movement desired.

The invention further consists in the detail construction of the fan, in means for preventing leakage of the air backward between the extremities of the fan blades and the casing; further, in the peculiar construction of the casing; and, still further, in the novel arrangement and combination of parts as will be presently described.

In the drawings,—Figure 1 is an end elevation of a fan casing containing my invention; Fig. 2 is a detached perspective view of the fan proper, with some of the blades removed; Fig. 3 is a vertical central section through the fan center; and Fig. 4 is a detached perspective view of the fan blade. Fig. 5 is an edge view of the structure illustrated in Fig. 2.

In the drawings thus briefly described, A represents the casing, mounted upon a suitable support B.

C represents the fan shaft journaled in suitable bearings upon the support, and D is the fan proper. In construction, it comprises a relatively large central blade-supporting section E and relatively short blades F mounted upon the periphery of the central section and suitably secured thereto at an angle to the axis of the fan shaft. The blade supporting section preferably consists of a hub section *a*, a circular disk section *b* of considerable diameter, and a frusto-conical blade-supporting section *c*, formed by a

flaring annular flange projecting from one side of the disk *b* at an obtuse angle to the section proper. Upon the supporting section *c* are arranged a series of spaced transverse lugs, as *d*, in angular relation to the axis of the shaft to support the blades in the proper position. Preferably, though not necessarily, the entire fan center as described is made in a single piece and the blades attached at their butt ends to the lugs on the blade support by rivets or other suitable securing devices, as shown in Fig. 2. The blades are preferably of the construction shown in Fig. 4, each being helical in form to produce a better propulsion of the air, and the outer extremity of each blade is offset forwardly of the fan proper and extends in close proximity to the casing, the offset portions acting to prevent or cut off any back flow or leakage of the air between the blade extremities and the casing. In order that the helical form of the fan blade will be maintained, the transverse lugs *d* described are formed each in the form of a helix to correspond in configuration to the contour of the blade butt. As thus constructed, the fan proper,—by reason of its abnormally large central section and its relatively short blades,—is enabled to propel the air at substantially uniform axial velocity, while the imperforate fan center and the forwardly projecting blade ends prevent back flow of the air in high resistance work, thereby materially increasing the efficiency of the propeller.

In Fig. 1 I have shown a novel form of fan casing, by means of which I am enabled to materially increase the efficiency of the fan. In construction, the casing comprises a cylindrical body section G, in which the fan proper is mounted, having an abruptly flared outlet I, preferably terminating in a discharge conduit J of greater diameter than the casing body. In practice, I find that the best results are secured by making the angle of the flare between forty to fifty degrees, and the increase of the diameter of the discharge conduit ten to thirty per cent. above the diameter of the body section of the casing. The fan is also preferably located within the casing body so as to be immediately adjacent the flared outlet, whereby the air will be propelled from the fan directly into the enlargement. I also

obtain beneficial results by abruptly flaring the mouth or inlet of the casing, and providing an inlet section adjoining the mouth of substantially the diameter of the discharge conduit. The reference-letter H designates the flaring mouth section, and K the inlet section. In instances where the fan is to discharge directly into a room the conduit section in which the flared outlet terminates may be omitted, and with the abruptly flared discharge outlet superior results be still attained.

What I claim as my invention is,—

1. In a propeller fan, a single-piece fan center comprising a hub, an imperforate disk surrounding the hub, an annular flange encircling the disk and projecting from one side thereof at an obtuse angle to the series of spaced transverse lugs upon the flange, and blades secured to said transverse lugs.

2. In a propeller fan, a hub, a central imperforate vertical disk section of considerable diameter surrounding the hub, a frusto-conical blade-supporting section secured to the periphery of the disk and projecting outwardly at an angle therefrom, a series of spaced transverse lugs carried by said conical section, and relatively short fan blades secured to said lugs.

3. In a propeller fan, a hub, a central imperforate vertical disk section of considerable diameter surrounding the hub, a frusto-conical blade-supporting section secured to the periphery of the disk and projecting

outwardly at an angle therefrom, a series of spaced transverse lugs carried by said conical section, and relatively short helical surfaced blades secured to said lugs so that the adjacent edges of the blades overlap, and each of said blades having a transversely bent outer end, and a casing surrounding said blades in close proximity to the transverse ends, for the purpose described.

4. In a propeller fan, the combination with a casing, of a fan proper positioned therein having helical surface blades the adjacent edges of which overlap and the outer ends of which project transversely in close proximity to the casing, the adjoining ends of the transverse portions extending to a common radial plane and projecting forwardly of the fan body.

5. In a propelling fan, the combination with a casing, a fan positioned therein comprising a plurality of blades, the outer extremities of which are provided with transversely extending portions in close proximity to the wall of the casing, the adjacent ends of said portions extending to a common plane radial to the axis of the fan to form a substantially continuous flange around the periphery of the fan.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES H. TREAT.

Witnesses:

NELLIE KINSELLA,
JAMES P. BARRY.