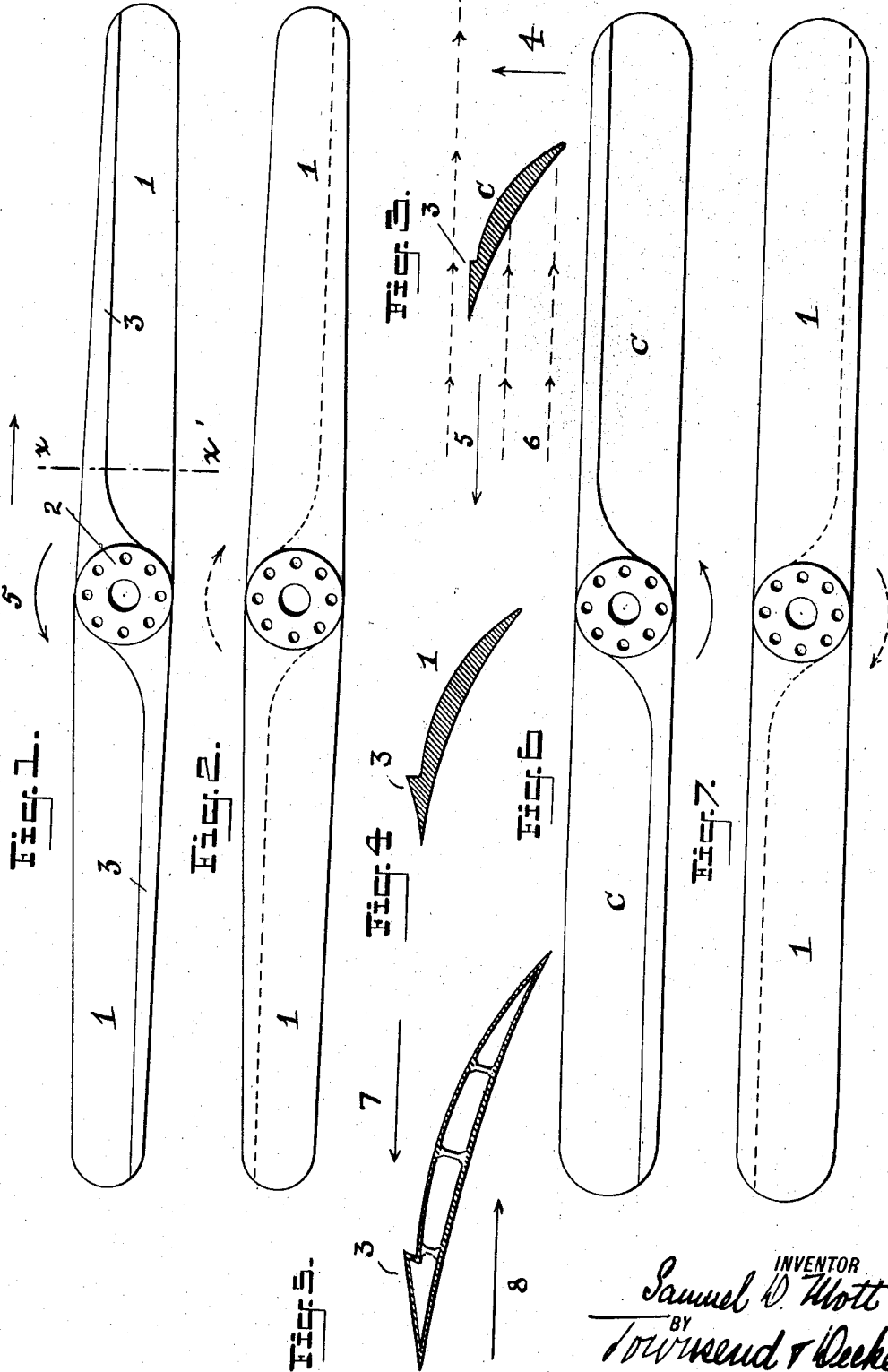


1,361,277.

S. D. MOTT.
AIR PROPELLER.
APPLICATION FILED JULY 16, 1919.

Patented Dec. 7, 1920.



INVENTOR
Samuel D. Mott
BY *Townsend & Decker*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL D. MOTT, OF PASSAIC, NEW JERSEY, ASSIGNOR OF ONE-HALF TO ARTHUR B. SULLIVAN, OF ALLENDALE, NEW JERSEY.

AIR-PROPELLER.

Specification of Letters Patent.

Patented Dec. 7, 1920.

1,361,277.

Application filed July 16, 1919. Serial No. 311,194.

To all whom it may concern:

Be it known that I, SAMUEL D. MOTT, a citizen of the United States, and a resident of Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Air-Propellers, of which the following is a specification.

My invention relates to aircraft and more particularly to the parts of the same which exert pressure on the air for propulsive action or receive pressure for the lifting effect as the machine is propelled through the air.

The invention is applicable particularly to the air propeller part of the machine although it is also applicable to the lifting planes or wings of the machine.

The object of my invention is to increase the efficiency of such parts by accentuating or increasing the partial vacuum which exists on the face thereof opposite the working face when the apparatus is traveling through the air at high velocity.

Briefly stated, my invention consists in providing upon the face opposite the working face and near the forward or advancing edge, an air deflecting rib whose action tends to create or increase the vacuum on the face to which it is applied thereby, in the case of the propeller blade, adding to the efficiency by reducing the head resistance and, in the case of a lifting plane, increasing the lifting effect. The air deflecting rib or projection extends longitudinally of the part or element and also has the effect of giving greater strength and stiffness to the parts while adding but little to the weight.

My invention applies to any type of air screw propeller.

In the accompanying drawings, I have illustrated in Figures 1 and 2 a propeller of the type known in the trade as the "tooth-pick" type provided with a rib or deflecting projection in accordance with my invention.

In Figs. 6 and 7 similar views are shown of a propeller known as the "Normale" type of screw much used in France.

Fig. 1 is an elevation of the propeller looking from the front of the machine, the direction of revolution being as indicated by the arc-shaped arrow.

Fig. 2 is a view of the same from the reverse side or looking from the airplane

when the propeller is used in a tractor machine.

Fig. 1 shows the side to which the rib of my invention is applied and Fig. 2 shows a reverse or working face of the propeller which exerts pressure upon the air when the propeller is turned at high velocity.

Fig. 3 is a cross-section on the line $x-x$ Fig. 1.

Fig. 4 is a similar section showing a modification in the form of the rib or projection.

Fig. 5 is a similar cross-section through a modified construction of rib and blade and may serve likewise to illustrate a lifting plane or wing of the airplane, the direction of movement of which in the air is indicated by the arrow in the figure.

1 indicates the blades of an air propeller used either as a tractor or a pusher and 2 the hub thereof. I have shown my invention applied to a two-blade propeller but it may be applied likewise to a propeller having three or four or any other number of blades. 3 indicates an air deflecting rib or projection extending substantially longitudinally of the blade, and upon the face thereof opposite that which, in the case of an air propeller blade, acts on the atmosphere when the propeller is revolved at high velocity by the motor. As will be seen the said rib or projection is upon the face of the propeller upon which there is head resistance to the travel of the airplane through the air in the direction of the arrow 4, while the opposite or working face which is revolved or forced through the air by the action of the engine moving the propeller blade in the direction of arrow 5, is the one which receives the pressure of the air exerted in the direction of the arrows 6 to pull or push the machine. The effect of the rib or projection 3 as the blade 1 swings or is forced through the air in the direction of arrow 5, which projection is near the advancing edge during such propeller action, is to accentuate the partial vacuum which exists in front of the propeller blade when it is revolved at high velocity in the direction of the arrow 5.

The effect of so accentuating or increasing the vacuum on the face of the blade to which the rib or projection is applied, is obviously to diminish or reduce the head resistance due to the progress of the machine and blade

through the atmosphere in the direction of arrow 4, thereby securing higher efficiency while at the same time adding to the strength and stiffness of the blade and in no essential way adding to the weight of the propeller.

To increase the deflecting action of the rib or projection it may take the form indicated in Fig. 4 where it is shown as slightly curved at its face near the advancing edge of the blade to more effectually deflect the air current and thereby produce a more pronounced increase of the vacuum in the region indicated by letters C.

In Fig. 5 the section represents the internal construction of a blade or wing similar to that described in my Patent No. 1,248,151, dated November 27th, 1917. In this form the plane or blade, made hollow by heating the wax mold on which the metal is deposited and pouring it out, is provided with internal struts or reinforcements extending from wall to wall as shown. The arrow 7 indicates the direction of movement of the blade or wing when used as a lifting plane or wing. Evidently the effect of the air deflecting rib in this case is to increase the lifting effect of the air operating in the direction of the arrow 8 upon the working surface by creating or tending to create a partial vacuum over the opposite surface, the lifting effect being obviously the resultant of the difference of pressures on the two surfaces respectively.

Instances have occurred where this partial vacuum or cavitation has bulged up and ripped the fabric from top of airplane wings, and, it is obvious, that the higher

the velocity of translation of plane, or revolution of screw, the more efficient and effective is my invention.

What I claim as my invention is:—

1. In an aircraft of the character described, a pressure element having means for increasing the vacuum on the face opposite the working face consisting of a longitudinal rib or projection near an advancing edge thereof and upon a face opposite the working face.

2. In an apparatus of the character described, an air propeller having its blades provided with a vacuum producing projecting rib near the advancing edge of the blade and on the face thereof opposite the working face.

3. In an apparatus of the character described, an air propeller the planes or blades of which are provided with vacuum producing devices consisting of an air deflecting projection near their advancing edge and upon the face thereof opposite the working face.

4. In an apparatus of the kind described, a lifting wing or thrusting surface provided with a vacuum producing projecting rib near the advancing edge thereof and upon the face opposite the working face or thrust surface for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 15th day of July, A. D. 1919.

SAMUEL D. MOTT.

Witnesses:

F. B. TOWNSEND,
IRENE LEFKOWITZ.