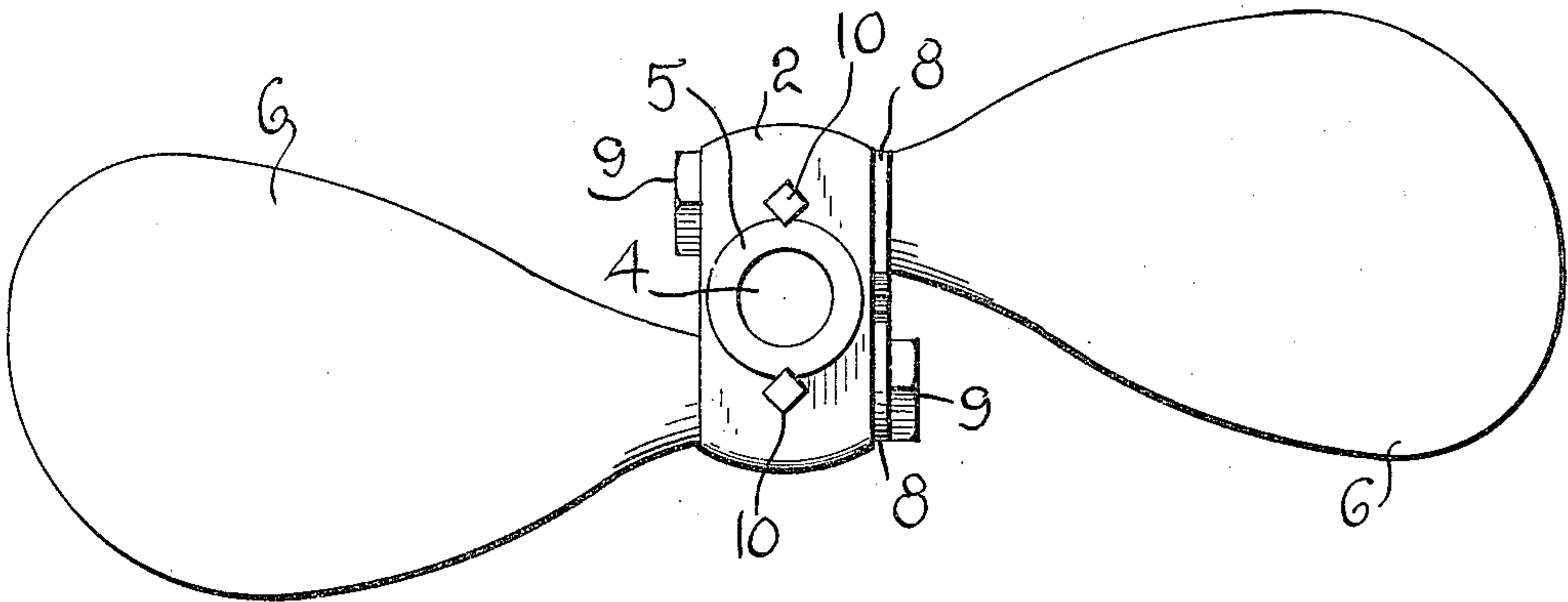


A. E. MILLER.  
PROPELLER.  
APPLICATION FILED NOV. 21, 1914.

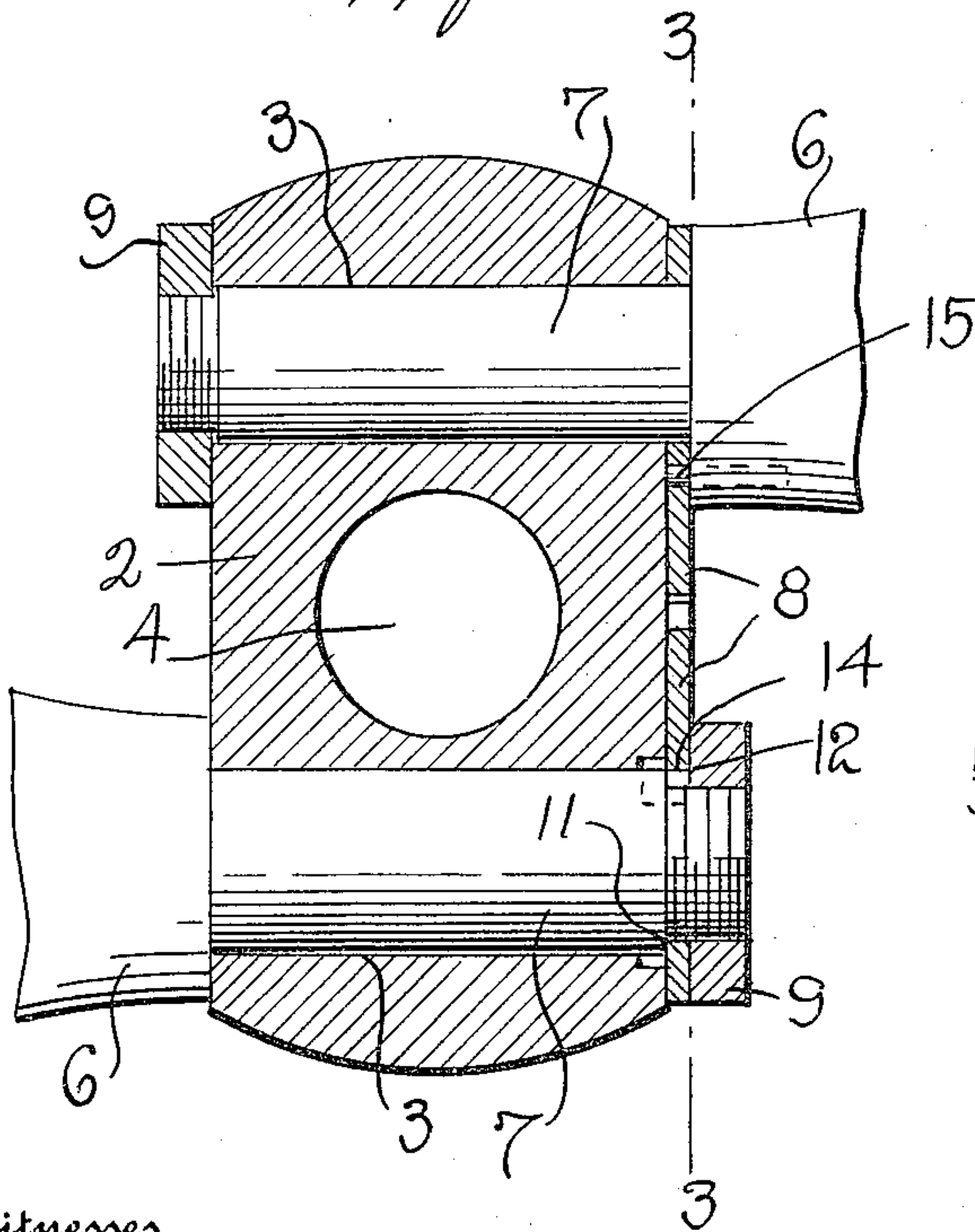
1,154,649.

Patented Sept. 28, 1915.

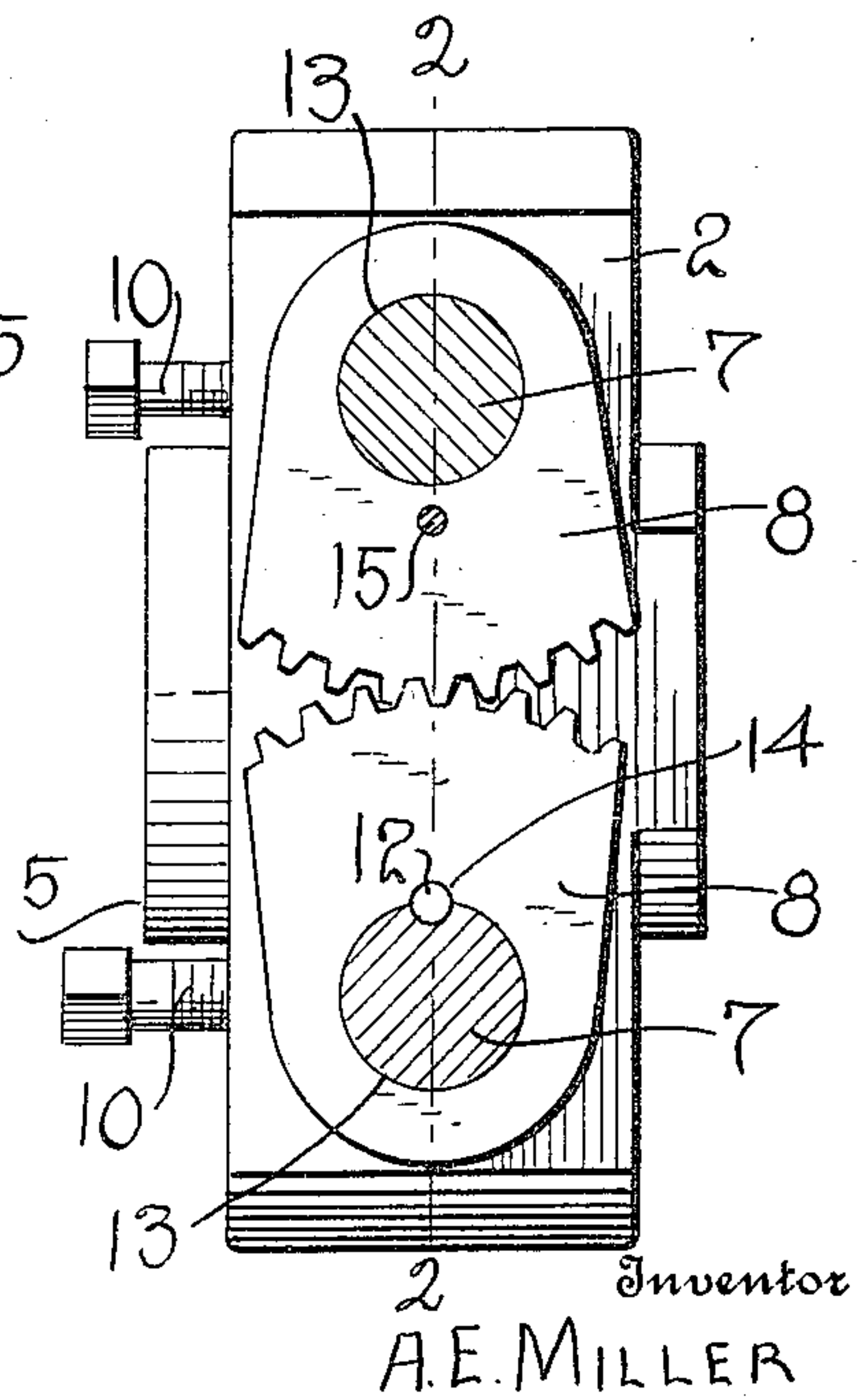
*Fig. 1*



*Fig. 2*



*Fig. 3*



Witnesses

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# UNITED STATES PATENT OFFICE.

ANTHONY E. MILLER, OF DETROIT, MICHIGAN.

## PROPELLER.

1,154,649.

Specification of Letters Patent.

Patented Sept. 28, 1915.

Application filed November 21, 1914. Serial No. 873,350.

*To all whom it may concern:*

Be it known that I, ANTHONY E. MILLER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Propellers, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to propellers and the primary object of my invention is the provision of a propeller in which the blades may be adjusted so as to secure any desired pitch thereby adapting the propeller to be used with any horse-power up to its limit.

A further object of the invention is to provide a very simple propeller structure including a head in which the blades are rotatably mounted, and means whereby the blades may be held in their adjusted positions.

A further object is to provide means whereby the blades may be adjusted in exact relation with each other so that both of the blades will have exactly the same pitch, whatever that pitch may be.

Further objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein,

Figure 1 is a face view of my adjustable propeller; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2.

Corresponding and like parts are referred to in the following description and designated in all parts of the accompanying drawings by like reference numerals.

Referring to these figures, it will be seen that the blades are mounted upon a head 2 which is solid except for the bores 3 extending transversely through the head for the reception of the shanks of the propeller blades and the bore 4 which extends transversely through the head at right angles to the bores 3 and which is for the reception of the propeller shaft (not shown). This bore 4 is surrounded on one face of the head with an outstanding flange 5. Each propeller blade is formed with a body portion 6 forming the blade proper, and with a reduced shank 7 having a diameter just equal to the diameter of one of the bores 3 into which the shank is to be inserted. At the base of the shank, the blade is formed with a sector plate 8 having a series of arcuately disposed

teeth upon its edge. The extremity of the shank extends through the head 2 and is screw threaded upon its exterior end for the reception of the nut 9. The propeller blade is held in its adjusted position by means of this nut 9 and also by means of a set screw 10 which extends through from the face of the head and engages the shank of the propeller. Of course, in the case of one of the propeller blades, the sector plate 8 must be disposed upon the same end of the shank 3 as the nut 9 and hence, in this case, the blade is shouldered as at 11 to bear against the face of the head, and the reduced end of the shank is formed with a lug 12 formed by inserting a pin longitudinally of the shank so that the pin will project beyond the circumference of the reduced portion of the shank. The sector plate is, of course, formed with a central opening 13 through which the shank passes and with a radially extending notch 14 in which the pin or lug 12 is received, thus holding this sector plate securely in engagement with the shank for unitary rotation. In the other blade, the sector plate is held adjusted with relation to the shank by means of a pin 15 driven through the sector plate and into the base of the blade.

It will be seen now that the blades may be adjusted to any desired angle or pitch by loosening the set screws 10 and loosening the nuts 9 and then rotating the blades. The sectors will, of course, cause a reverse rotation of the blades but the rotation of one blade a predetermined angular extent will, of course, cause a rotation of the other blade to an exactly similar extent. After the desired pitch has been obtained, the nuts 9 are tightened and the set screws 10 again inserted and the wheel is ready for use. In case a left hand wheel is wanted, the blades may be transposed or reversed in the head 2 which will permit the propeller to be rotated in an opposite direction.

Having described my invention, what I claim is:—

1. An adjustable propeller comprising a head adapted to be attached to a driving shaft and having transversely extending bores, oppositely disposed propeller blades having shanks insertible into said bores and rotatable therein, gears mounted each on one of the shanks and intermeshing with each other whereby to communicate the rotation



of one blade to the other blade, and means for holding the blades set in any rotatably adjusted position.

2. An adjustable propeller comprising a  
5 head adapted to be attached to a driving shaft, oppositely disposed propeller blades having shanks rotatably mounted in said head whereby the blades may be rotated upon their longer axes, intermeshing sector  
10 gears fixedly mounted upon said shanks, and set screws passing through the head engaging the shanks and holding the blades in their angularly adjusted positions.

3. An adjustable propeller comprising a  
15 head adapted to be attached to a driving

shaft and having transversely extending bores, oppositely disposed propellers having reduced shanks insertible into said bores and rotatable therein, sector gears mounted on the shanks and intermeshing with each other, nuts engaging the ends of the shanks and bearing against the head, and set screws holding the shanks in their adjusted positions.

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

ANTHONY E. MILLER.

Witnesses:

EDWARD T. FOGARTY,  
WILLIAM R. MILLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."