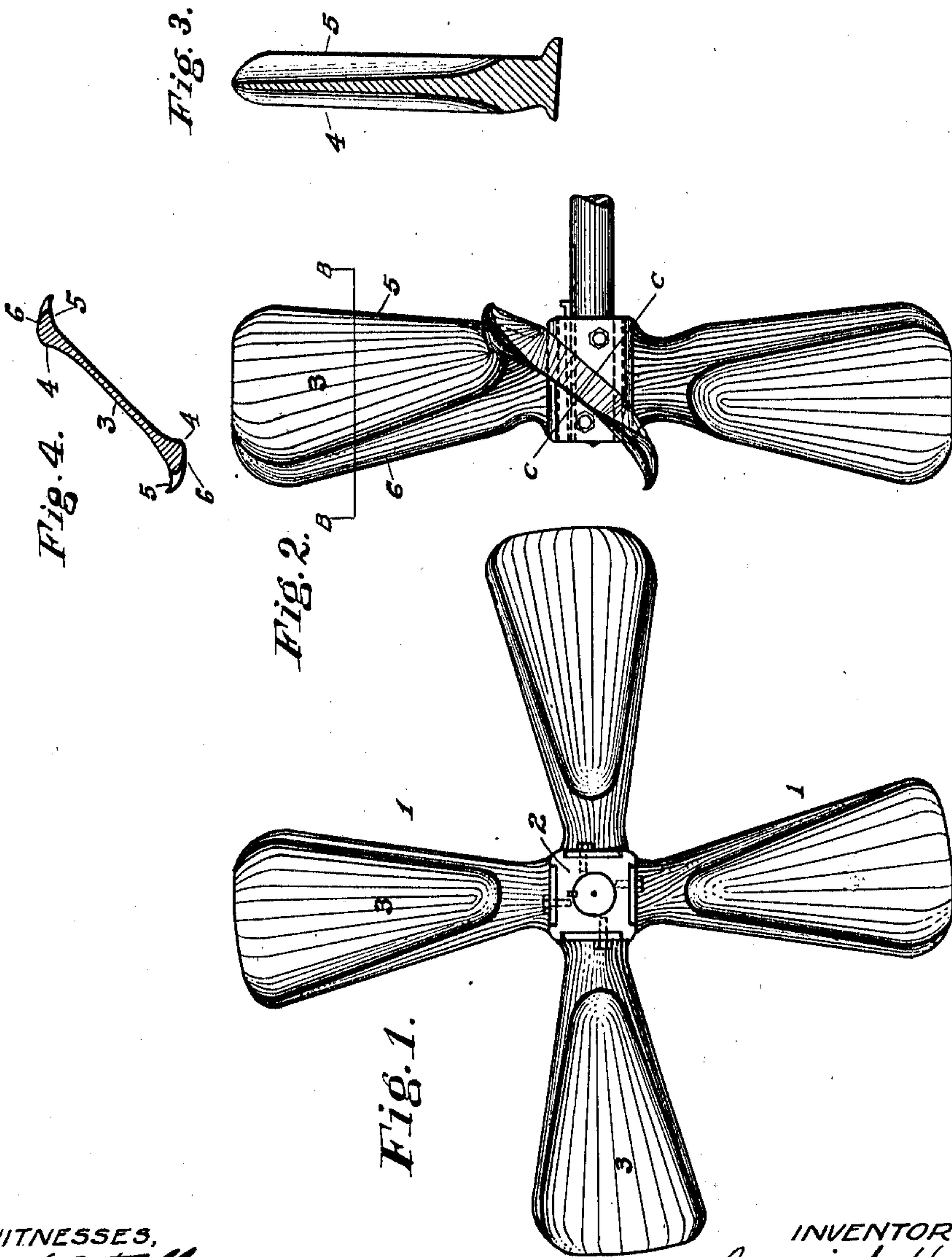


J. HAYES.
PROPELLER.

APPLICATION FILED SEPT. 28, 1910.

993,679.

Patented May 30, 1911.



WITNESSES,
H. G. Fulbr
S. Middelke

INVENTOR,
Jeremiah Hayes
By Samuel Mump
Attorney

UNITED STATES PATENT OFFICE.

JEREMIAH HAYES, OF EVERETT, WASHINGTON, ASSIGNOR OF ONE-HALF TO JOSEPH HAYES, OF SEATTLE, WASHINGTON.

PROPELLER.

993,679.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed September 26, 1910. Serial No. 583,846.

To all whom it may concern:

Be it known that I, JEREMIAH HAYES, a subject of Great Britain, residing at Everett, in the county of Snohomish, State of Washington, have invented a new and useful Improvement in Propellers, of which the following is a specification.

My invention relates to an improvement in propellers, and comprises the novel parts and combinations of parts hereinafter described and claimed.

The object of my invention is to produce a propeller which shall be more efficient than the usual propeller, particularly in the reduction of the slip.

In the accompanying drawings I have shown my invention embodied in the form which is now preferred by me.

Figure 1 is a face view of the propeller. Fig. 2 is a side elevation of the propeller. Fig. 3 is a longitudinal section of one blade, taken approximately on the line C, C, of Fig. 2. Fig. 4 is a transverse section of a blade on the line B, B, of Fig. 2, looking outwardly.

I make the blades of my improved form of propeller such that the planes of the working faces are at substantially the same angle from end to end. This angle might vary in different propellers, because of different conditions and different results desired, but as an average angle I have adopted and herein show them placed at an angle of 45° with the plane of revolution. The working faces of the blades I make substantially flat over most of their extent. Along the front or advancing edge of the blade surface, I round the face out slightly, making it concave, as is shown at 4 in Fig. 4; the other or following edge I similarly concave, but to a greater extent, as is shown at 5 in Fig. 4.

I prefer that opposite faces of the blades be shaped alike, from which it follows that the curved edge sections 4 and 5 are at opposite edges of the blades on opposite sides thereof. That is, the curved section 4 on

one side of the blade is opposite the curved section 5 on the other side of the blade.

I prefer to make the blades of a tapering thickness from their inner ends to their outer, as is shown in section, Fig. 3. I also prefer that the blades be slightly inclined from a radial position, this inclination being backward and forward in the direction in which it is expected to mainly turn. This inclination is, therefore, in a direction which is about normal to the working face. It is due to this inclination that the blades appear to be placed slightly unsymmetrical, in Figs. 1 and 2.

I prefer to make the propeller with detachable blades, as shown, although this is not an essential feature of my invention. Fig. 3 represents one of the blades detached from the hub 2.

I claim:

1. A propeller having blades in which the working face is slightly curved concavely along the advancing edge, and then is substantially flat to near the following edge from which point it concavely curves to the following edge in a greater degree than near the advancing edge.

2. A propeller having blades with faces at the same angle from inner to outer end and with the portions of the faces adjoining the edges concaved slightly.

3. A propeller having blades in which the central portion has substantially straight faces concaved slightly along the leading edge and concaved to a greater degree along the following edge.

4. A propeller having the faces of its blades flat throughout most of their width, but with the edge portions slightly concaved, said blades having a substantially constant edge thickness throughout their length but of increasing thickness in its central parts from the outer to the inner end.

JEREMIAH HAYES.

Witnesses:

SCHUYLER DURYEE,
C. DUDLEY LEE.