

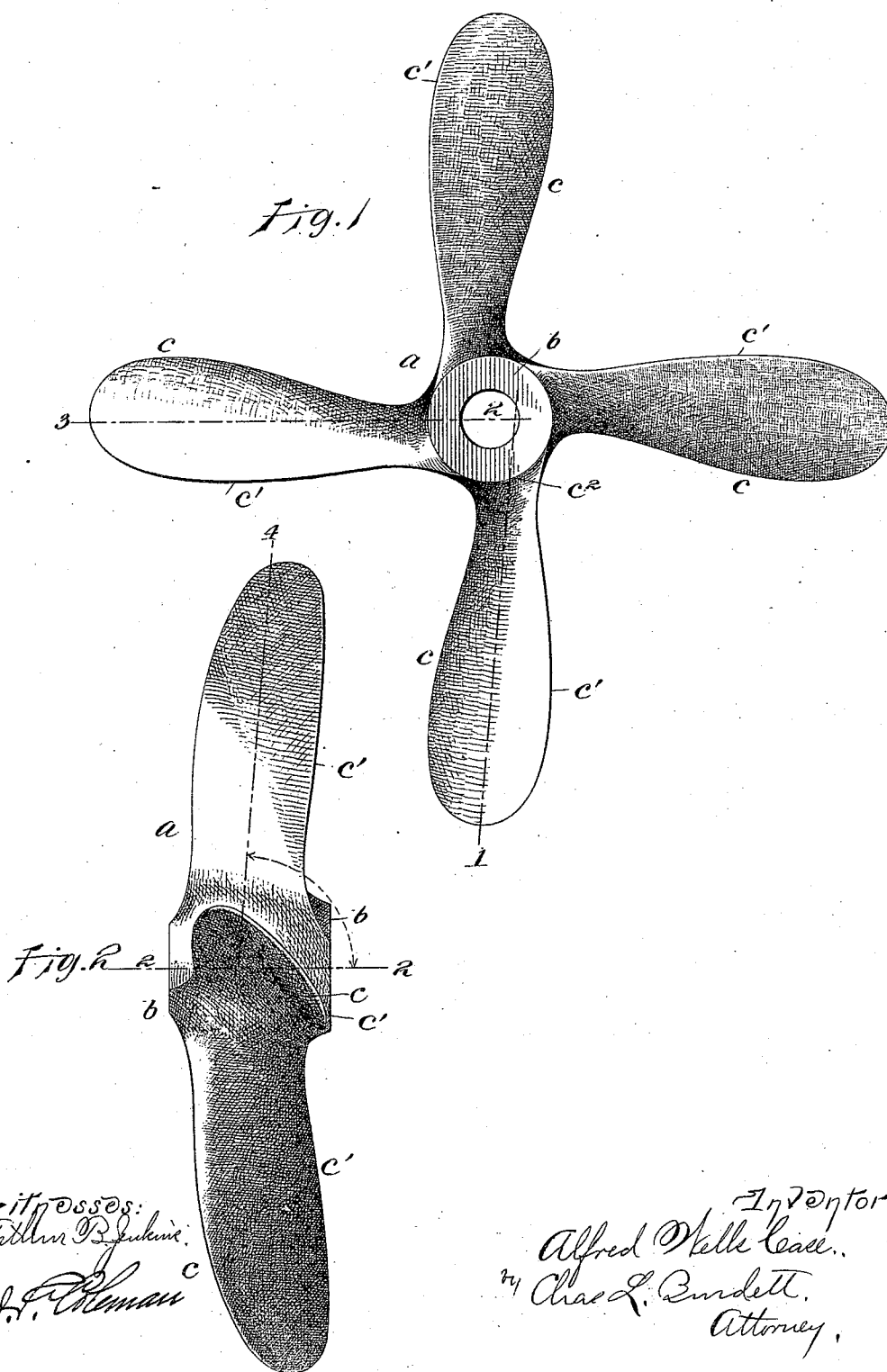
(Model.)

2 Sheets—Sheet 1.

A. W. CASE.
SCREW PROPELLER.

No. 553,953.

Patented Feb. 4, 1896.



Witnesses:
Arthur B. Jenkins.
J. F. Cheman

Inventor:
Alfred W. Case.
By Chas. L. Burdett,
Attorney.

(Model.)

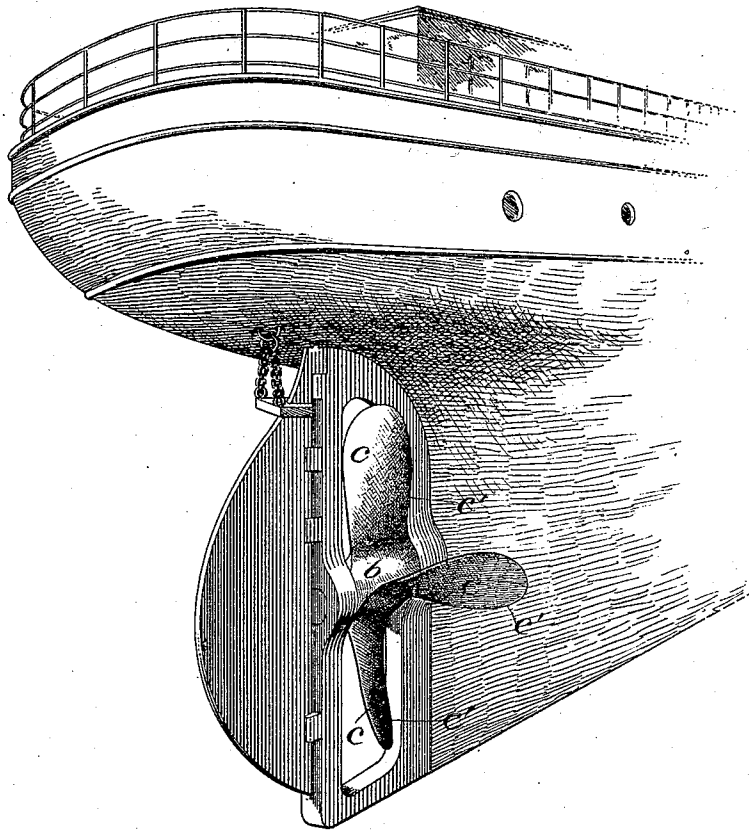
2 Sheets—Sheet 2.

A. W. CASE.
SCREW PROPELLER.

No. 553,953.

Patented Feb. 4, 1896.

Fig. 3



Witnesses:

Arthur B. Jenkins.

J. F. Herman

Inventor:

Alfred Keller Case,

Chas. L. Sundell,
Attorney.

UNITED STATES PATENT OFFICE.

ALFRED WELLS CASE, OF HIGHLAND PARK, CONNECTICUT.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 553,953, dated February 4, 1896.

Application filed September 21, 1895. Serial No. 563,279. (Model.)

To all whom it may concern:

Be it known that I, ALFRED WELLS CASE, a citizen of the United States, and a resident of Highland Park, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Screw-Propellers, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a screw-propeller of such construction as to secure a more efficient thrust upon the water in the rotation of the screw, to secure a smoothly-running screw which shall tend to reduce vibration, and also to provide one in which the outward and rearward thrust of the blades can be obtained without requiring the blade to be inclined so far forward as to encounter the stern-post, bracket, or web of the ship or boat to which the screw is fitted.

To this end my invention consists in the details of the several parts making up the screw-propeller as a whole, and including the disposition, location, and arrangement of each blade, as more particularly hereinafter described and pointed out in the claim.

Referring to the drawings, Figure 1 is a front view in elevation of a four-bladed screw constructed in accordance with my invention. Fig. 2 is a detail side view of the screw of the improved form. Fig. 3 is a perspective view of my improved screw-propeller as applied to a vessel.

In the accompanying drawings, the letter *a* denotes a screw-propeller comprising a hub *b* and a number of blades *c* projecting therefrom, each blade having its working surface located in such position with reference to the hub *b* and the axis of the screw that a line 1, common to the working surface of the blade at its center, if prolonged shall not pass through the axis of the hub; and as a result of this substantially the whole of the working surface of the blade will be located at an angle with any radius 3, which extends from the root of the blade. Each blade preferably has its working surface formed by a straight generatrix and conforming to any desired pitch.

The working surface of the blade at the leading edge *c'*, and for a distance backward therefrom extending beyond the center line,

rakes backward from a radial line 3 drawn through a point, as *c*², at the root of the blade; and this angular location of the blade, as described, so places it with reference to the hub as to enable an outward and rearward thrust upon the surrounding mass of water to be obtained. The blade is also forwardly inclined, although the leading edge *c'* does not necessarily overhang the front end of the hub. This feature of forward inclination is illustrated by the location of the center line, 4, in Fig. 2 of the drawings, which extends from the center of the working surface at the root of the blade outward through the center of the surface to the tip of the blade. The angle which this line 4 makes with the axis 2 is the angle of forward inclination.

When so constructed, the wheel will easily fit within a narrow space at the stern of a boat with no danger of the leading edge *c'* of the blade striking the stern-post, bracket or web, the blade in a prior wheel of this class, which has an extreme inclination forward, having in some instances been a detriment to the ready fitting of a wheel which embodies the features of improvement residing in that location of the blade which produces a backward and outward thrust when an attempt has been made to fit such a prior wheel to a boat in replacing an old type of propeller-wheel.

The main feature of my invention resides in the peculiar location of the working surface of the blade on a line at an angle with a radius of the wheel, as herein described, the working surface of the screw being preferably formed, as stated, by a straight generatrix and conforming to any desired pitch.

The working surface of my improved blade as I have constructed wheels is formed on an expanding pitch substantially straight from root to tip and with the backward rake and forward inclination at the ratio of two inches to each foot in length of the blade. The back of the blade is curved or made full to an extent sufficient to give proper strength by thickening the center when the leading and following edges are worked fine to produce the proper impact and avoid drag.

My invention is not limited to a wheel in which the blade shall have its working surface formed by a straight generatrix, nor is an

expanding pitch and the exact ratio of compound inclination important, these features, as stated, being variable at will and depending upon the size of the wheel and work to be performed.

Each blade is offset at the root, so that the generatrix does not extend through the axis of the hub when the center line of the blade is prolonged inward, and this particular location of the working surface with reference to a radial line and including the compound slope—that is, the backward rake and forward inclination referred to—distinguish the improvement from prior blades.

In the accompanying drawings a propeller has been shown with four blades; but this particular number of the blades and the precise proportions of each blade are not essential features of the improvement, which resides, as stated, in the peculiar construction and location of each blade as a whole, whereby as a result of the compound inclination the advantages of the outward and rearward thrust and the arrangement of the blade within a limited space lengthwise of the propeller are obtained.

From tests which have been made with a screw-propeller constructed in accordance with the within invention it has been found

that there is an almost entire absence of vibration, a gain in speed over wheels of other types, and a reduction of the amount of coal consumed, and, further, that the blade constructed as described is particularly effective in stopping a boat promptly and in backing. The tests have shown that a vessel under a certain headway could be brought to a complete stop and backed quicker in a less distance when going at a given rate of speed than with screws of the prior art.

I claim as my invention—

A screw-propeller having a hub and a series of blades arranged about and projecting from it, each blade inclined forward in the direction of forward motion of the vessel as described, and also having its working surface at its center line offset and located in a plane raking backward at an angle from a radius passing through the root of the blade and in the plane of rotation of the screw, whereby a rearward and outward thrust upon the water is obtained in a forward rotary movement of the wheel, all substantially as described.

ALFRED WELLS CASE.

Witnesses:

CHAS. L. BURDETT,
ARTHUR B. JENKINS.