(Model.)

A. VOGELSANG.

SCREW PROPELLER.

No. 381,193. Patented Apr. 17, 1888.

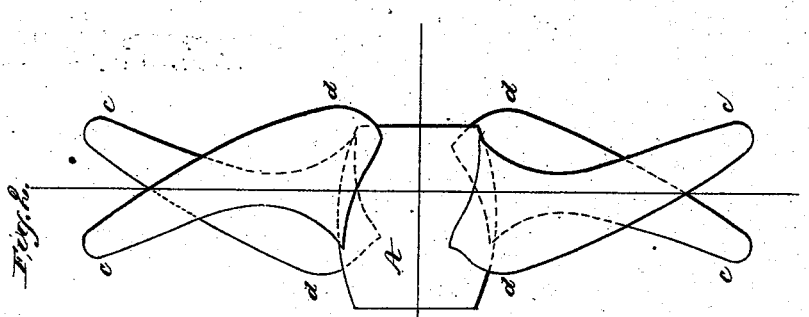

Fig. 2.

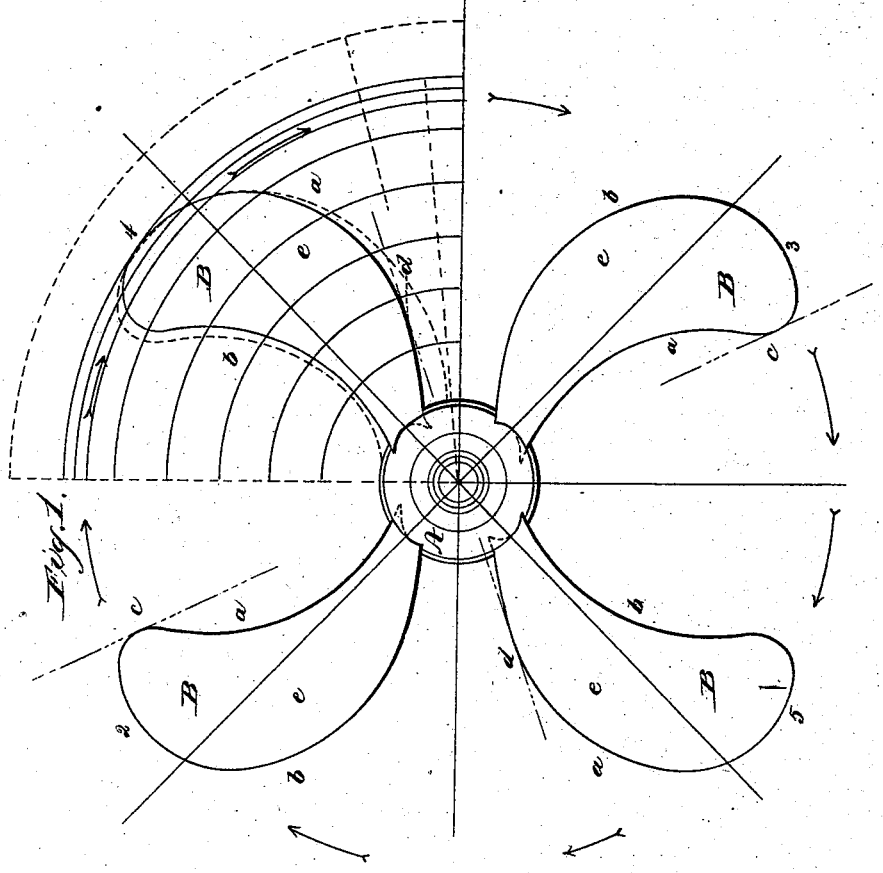

Fig. 1.

Witnesses.

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UNITED STATES PATENT OFFICE.

ALEXANDER VOGELSANG, OF NEW YORK, ASSIGNOR TO THE VOGELSANG SCREW PROPELLER COMPANY, OF BROOKLYN, NEW YORK.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 381,193, dated April 17, 1888.

Application filed November 23, 1887. Serial No. 255,965. (Model.)

To all whom it may concern:

Be it known that I, ALEXANDER VOGELSANG, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Screw-Propellers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to screw-propellers; and it has for its object an improvement on my propeller patented April 5, 1887, No. 360,833.

In the further development of my invention by practical demonstration on seagoing vessels I have discovered that better results are obtained from a screw-propeller in which the leading point of the cutting-edge of each blade is in advance of the part of the next preceding blade (in the direction in which the vessel is moving) in the same radius than from a screw-propeller in which the leading point of the cutting-edge of each alternate blade only is in advance of the part of the next preceding blade in the same radius.

The invention will be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is an end view of my improved propeller with the lines of construction drawn on one blade, and Fig. 2 is an elevation or side view showing the relation of the leading point of the cutting-edge of one blade to the others and the overlapping of two adjacent blades.

Reference being had to the drawings and the letters thereon, A represents the hub, from which radiates a series of blades, B, which may be disposed equidistant around the hub in pairs arranged diametrically opposite to each other, as shown at 2 3 and 4 5 in Fig. 1; or they may be grouped in pairs, as in my former patent. The cutting or entering edge of each blade is indicated by the letter *a* and the trailing or leaving edge by *b*, while the leading or advanced point of each cutting-edge intersected by a line tangential to the center of the hub is indicated by the letters *c d*. The leading point *c* of the blades near the circumference or periphery of the blade is in advance of that part of the preceding blade in the same radius, and the leading point *d* of the blades is in advance of that part of the preceding blade in a corresponding radius. The blades, (when arranged in pairs,) which are diametrically opposite to each other on the hub, have their cutting or entering and their trailing or leaving edges made to conform to each other. The contour of one of the edges of each blade may be composed of lines radiating from different centers, or right lines and curved lines combined, and the opposite edge of each blade may be in the form of an ogee or cyma, or it may be a curved line struck from one center and reaching from the end of the blade to the root at the hub; or the lines may be angular where they radiate from the hub and intersect a curved line from the end of the blade. The principal feature in the construction is that the leading points *c* or *d* of the cutting-edges of two succeeding blades are in advance of each other, or are situated at different distances from the center of the screw—that is, the leading point of the cutting-edge of one blade is near the circumference or periphery of the blade, as shown at *c*, and the leading point *d* of the next preceding blade is near the hub. The leading point of each blade always falls in a plane that is in advance of the preceding blade in the direction in which the vessel is moving when the screw is viewed from a side elevation.

In the propeller shown in my former patent the leading point of the cutting-edge of each alternate blade only is in advance of the cutting-edge of the intermediate blade; or, in other words, the blades having their leading points of the cutting-edge near the circumference or periphery of the blade are in advance of the part of the next preceding blade in the same radius, while the leading points of the cutting-edges which are near the hub on the next preceding blades are in the same plane.

The roots of the blades are disposed upon the hub at an angle to the longitudinal axis of the hub, and the centers of the working-surfaces of each pair of blades are curved in opposite directions, while the centers of the blades which radiate at right angles through

the axis of the screw cut the blades, so that the major portion of the blades is on the convex side or trailing edge of one pair of blades and the convex side or cutting-edge of the opposite pair of blades, as shown at *e* on each blade.

The pitch of the blades may be uniform from the hub to the periphery or ends of the blades, or it may be of an expanding or a variable pitch, or the blades may be flat and set at a suitable angle to the shaft; but in either construction all of the blades must be either right or all left screws.

One blade of each pair overlaps or crosses the plane of rotation of the adjacent blade of the next pair of blades, as shown in Fig. 2, and a transverse vertical line through the blades and the hub strikes each blade at the point of intersection or crossing of the blades.

The construction lines and the dotted lines showing the development of the blade are well understood and require no description in detail.

By the construction shown each blade presents a leading point on the cutting-edge in advance of the same part of the preceding blade in the same radius, so that the same speed is obtained in either direction in which the screw may be revolving, and in the revolution of the screw no blade of the series enters the water which has been disturbed by the preceding blade, but cuts into quiet water. Instead of forming the blades integral with the hub, as shown, they may be made separate therefrom and be attached to the hub in any approved manner.

Having thus fully described my invention, what I claim is—

1. A propeller in which the cutting-edge of each blade moves or lies in an advanced plane of the part of the next preceding blade in the same radius and in the plane of rotation of the screw, substantially as described.

2. A propeller in which the leading parts of two successive blades are situated at different distances from the hub in a plane which is normal to the axis of the propeller-shaft and the blades diametrically opposite each other are alike, substantially as described.

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

ALEXANDER VOGELSANG.

Witnesses:
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