A. AUBERT.

Improvement in Screw-Propellers.

No. 128,203. Patented June 25, 1872.

Fig. 4.

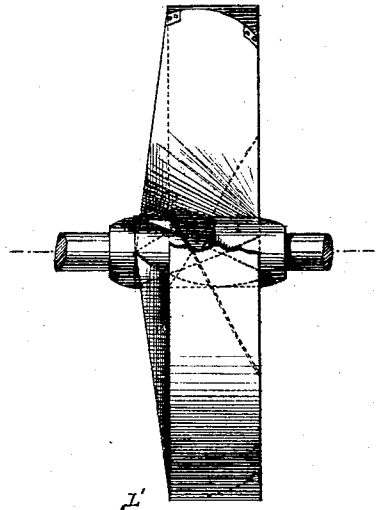


Fig. 5.

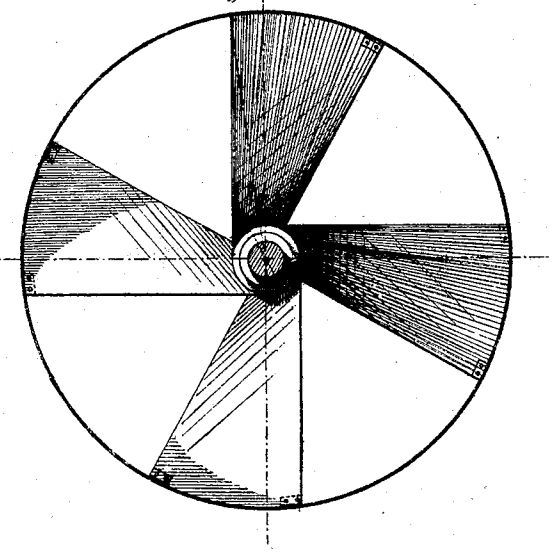


Fig. 3.

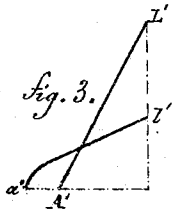


Fig. 1.

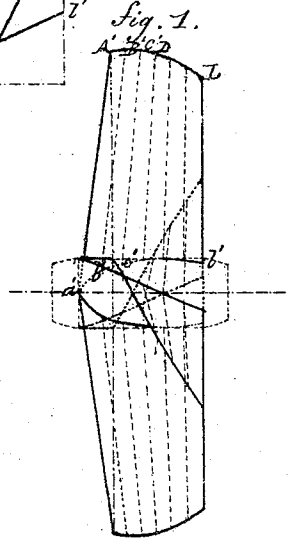
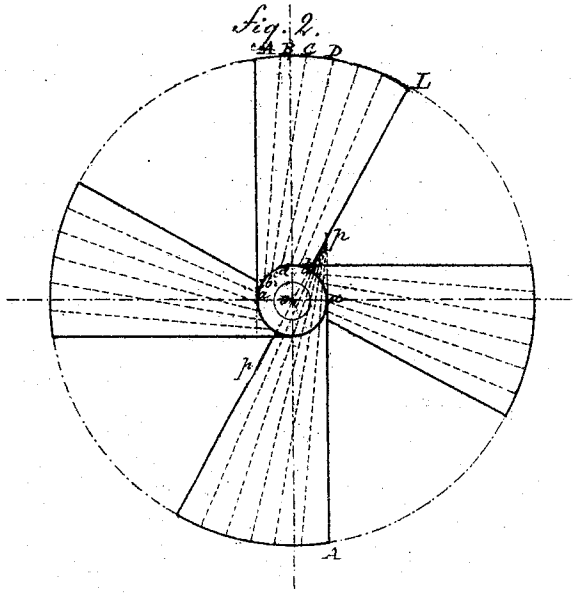


Fig. 2.



Witnesses.
C. B. Nottingham.
Thomas C. Smith

Adolphe Aubert
by atty Pollok

UNITED STATES PATENT OFFICE.

ADOLPHE AUBERT, OF NOGENT-LE-ROTROU, FRANCE.

IMPROVEMENT IN SCREW-PROPELLERS.

Specification forming part of Letters Patent No. 128,203, dated June 25, 1872.

To whom it may concern:

Be it known that I, ADOLPHE AUBERT, of Nogent-le-Rotrou, France, have invented certain new and useful Improvements in Screw-Propellers, of which the following is a specification.

The object of this invention is to combine in a screw-propeller features which satisfy the two following conditions: First, to simultaneously act upon the whole section of the column of water which serves as the resisting medium at the circumference as well as at the center, producing a uniform repulsion, and consequently creating a uniform initial velocity of propulsion upon all the points of the surface. Second, to establish a constant *vis inertiæ* and an actual co-operation of all the parts of the water which are acted on by the propeller, in order that the action of the same shall be always complete and instantaneous, whatsoever may be the condition of the water in which the propeller is immersed, independently of any sudden changes of movement to which such propeller may be subjected.

In the following description I shall explain the manner in which I produce a propeller which I have found to answer these conditions, upon which depend both the precision and regularity of the operation of my screw-propeller, the distinguishing feature of which lies in the employment, within a cylindrical casing, of blades of a peculiar construction bearing certain fixed relations to the surrounding cylinder, as hereinafter described.

The geometric formation of the helical surface of the blades is different from that heretofore practiced. Two new laws underlie the generation of this surface. In the first place the rotation of the generatrix in its horizontal projection is effected, not around the center of the hub, but upon an eccentric point, in such a way that the directrix upon the hub shall have a sharper turn than the exterior directrix upon the cylindrical casing, the generatrix passing from a direction tangential to the hub to a direction radial thereto and traversing a plane upon the hub about the same linear distance or length as that which it traverses upon the exterior casing. In the second place, this generatrix in its vertical projection does not descend perpendicularly to the hub, nor is it inclined at a fixed angle thereto, but it moves according to a variable pitch from the front to the rear. To this end the cylindrical envelope is shorter than the blades, and this difference determines the obliquity in front, an obliquity which diminishes toward the rear until it disappears, the generatrix at that point being perpendicular to the axis of the hub. By this mode of generation I obtain a helical surface of a special character, for not only is the surface undevelopable, but it is in itself at all points unsymmetrical. This variation, due to the irregularity of progression in the two movements of the generatrix, in order to produce a blade with surface adapted to be incased in a cylinder, constitutes the main feature of my invention.

The mode of producing this peculiarly-shaped surface will be readily understood by reference to the accompanying drawing, in which Fig. ure 1 is a diagram representing a vertical projection of the tracing of the propeller. Fig. 2 is a diagram representing a horizontal projection of the same. Fig. 3 represents the development of the directrices. Fig. 4 is a side view of the propeller with a portion of the cylindrical casing removed. Fig. 5 is a top view of the same.

After the diameters of the hub and casing are ascertained I take on a tangent, A *a*, to the hub, a point, *p*, in such manner that a right line leading from this point through the center *o* of the hub will intercept on the circumferences of the hub and casing lengths of arc which bear a certain relation to each other, the arcs A L *a l*, for instance, being such (as shown in the drawing) that their corresponding angles are in about the relation of 1 to 2. The arc A L is then divided into a certain number of equal parts, and lines are drawn between the points of division of the arc and the point *p*, which lines will also divide the arc *a l*. The lines A *a* B *b* C *c* D *d*, &c., thus obtained are the horizontal projections of the generatrix. This being done, that line is preferably selected as the last or terminal generatrix, of which the projection L *l* will be radial—that is, will pass through the center *o*.

The tracing of the vertical projection of the surface can be readily ascertained in view of the above. I commence by dividing the hub and cylinder lengthwise into an equal number of parts. The intersections of the different

horizontal lines drawn through these points of division with the vertical lines drawn from the points A B C . . . L and *a b c . . . l* will give the vertical projections of the latter A′ B′ C′ . . . L′ *a′ b′ c′ . . . l′*. By joining these points, by continuous tracings the vertical projections of the directrices will be obtained. The lines A′ *a′* B′ *b′* . . . . L′ *l′* are the vertical projections of the generatrices of the surface. As is seen by the development of the directrices in Fig. 3, the directrix on the cylindrical casing A′ B′ C′ is alone a helix, while the directrix on the hub is a curve very abrupt at its lower end. The blades, preferably four in number, are made of iron, cast in one piece with the hub, and are fixed to the cylindrical casing by means of feet, stays, or angle-irons, riveted or otherwise suitably fastened to both, as shown in Figs. 4 and 5. In this way there is obtained an irregular surface of a peculiar conformation, of which the elements at the circumference and at the hub are not analogous, and of which, according to the arrangement of the directrix on the hub, the proportions may be modified, and in the same way the relations of the arcs intercepted on the hub, and the casing may also be modified in order to produce the desired effect.

The details of construction of the propeller may be somewhat modified without departure from the principle of my invention; the number of blades may be varied, as also the form of the cylindrical casing.

What I claim as my invention, and desire to secure by Letters Patent, is—

A screw-propeller, composed of blades, the surface of each of which is formed and produced by two independent directrices in the manner herein described, in combination with a cylindrical casing inclosing said blades, substantially as shown and set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

A. AUBERT.

Witnesses:
C. LAFOND,
L. DARNANVILL.