(Model.)

2 Sheets—Sheet 1.

L. PERKINS.
Screw Propeller.

No. 229,270. Patented June 29, 1880.

Fig 1.

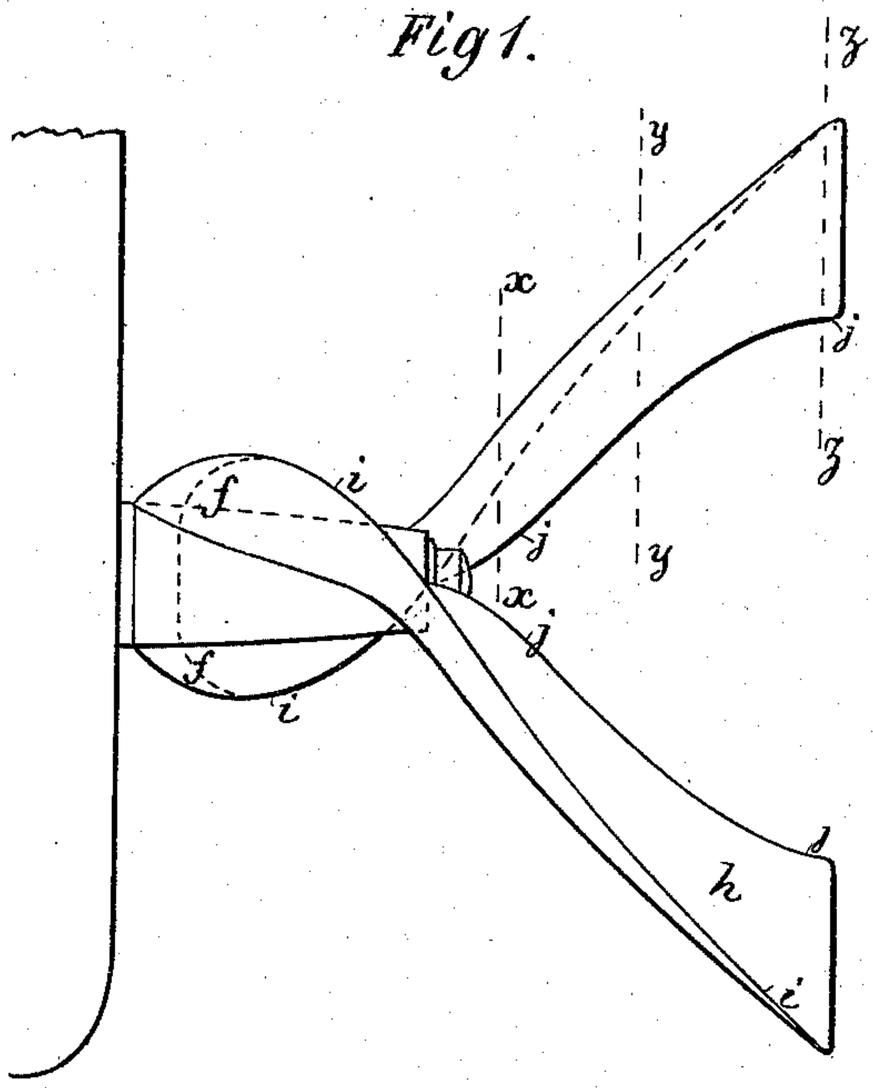


Fig 2.

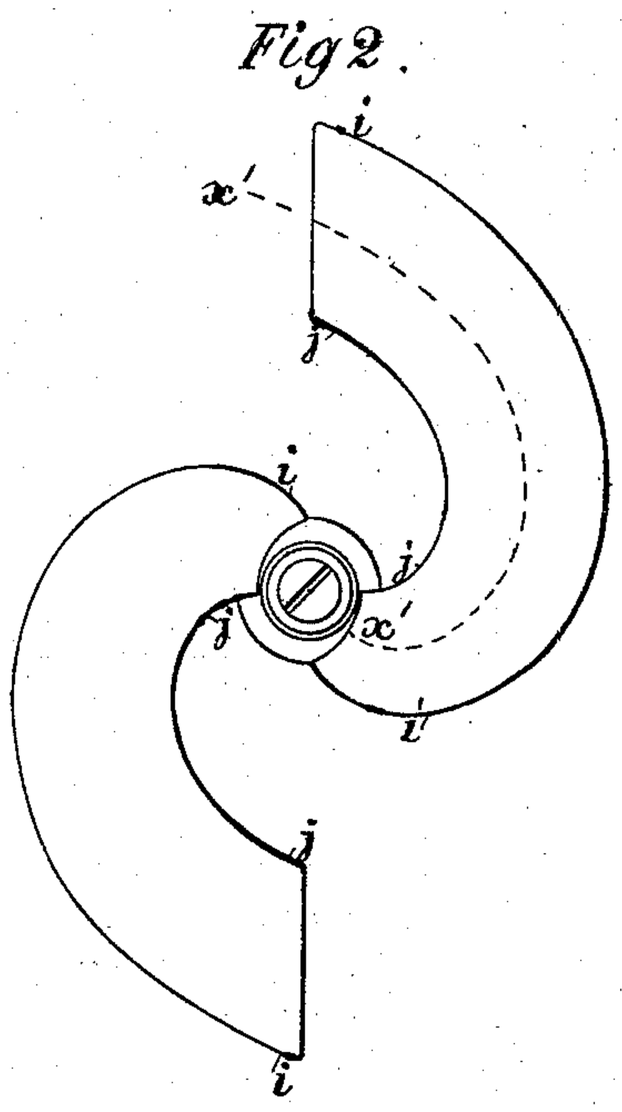


Fig 3.

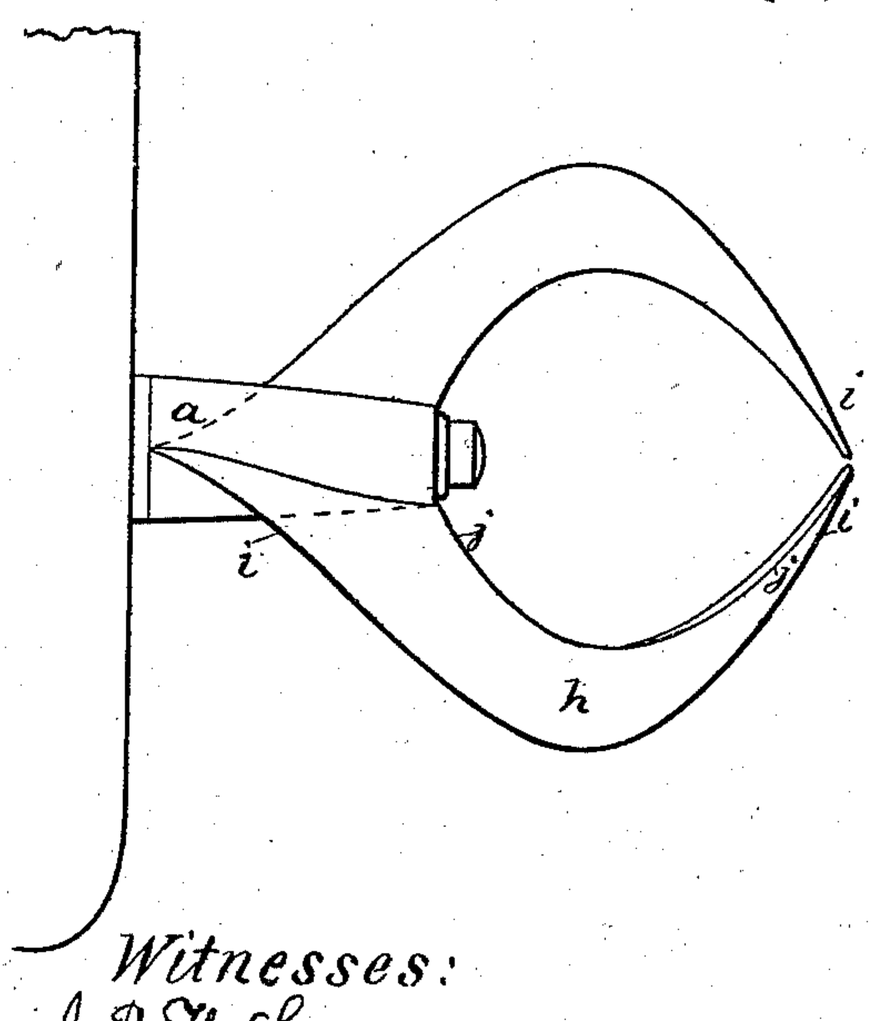
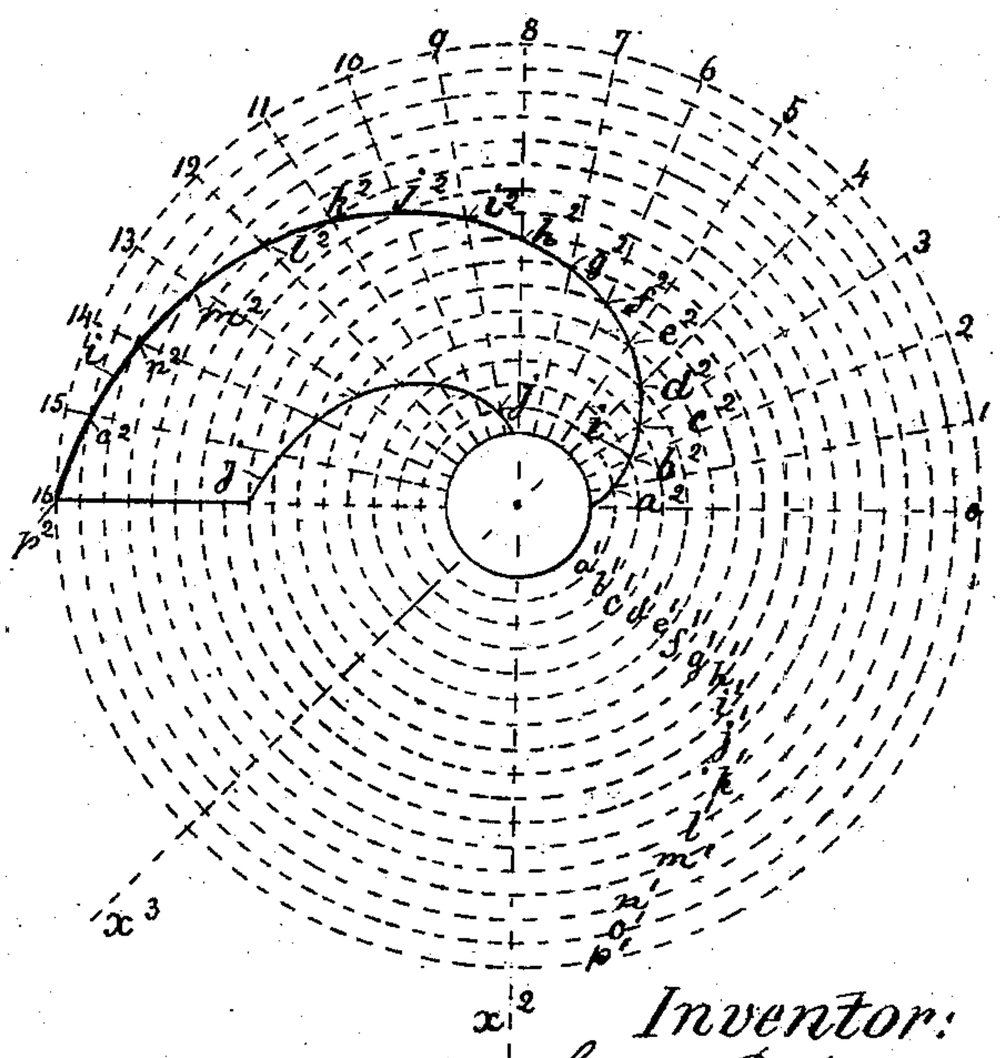


Fig 4.



Witnesses:
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(Model.)

2 Sheets—Sheet 2.

L. PERKINS.
Screw Propeller.

No. 229,270. Patented June 29, 1880.

Fig 5.

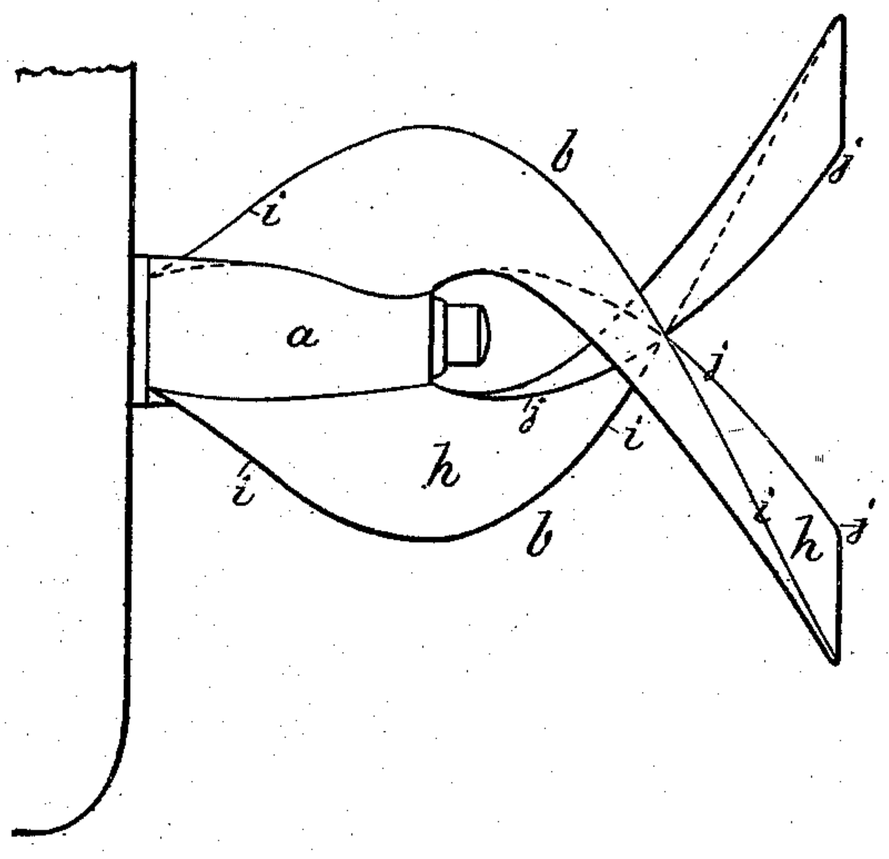

Fig 6.

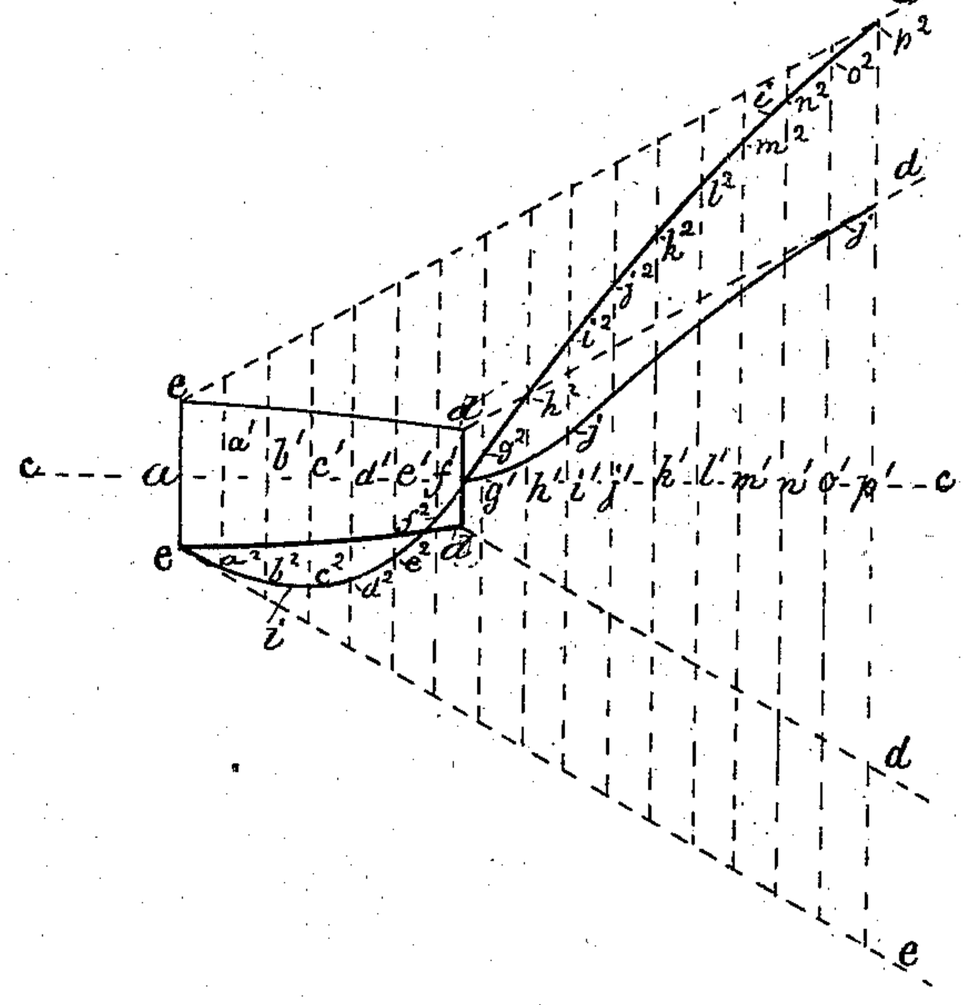

Fig 7.

Fig 8.

Fig 9.

Fig 10.

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UNITED STATES PATENT OFFICE.

LOFTUS PERKINS, OF SEAFORD STREET, GRAY'S INN ROAD, COUNTY OF MIDDLESEX, GREAT BRITAIN.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 229,270, dated June 29, 1880.

Application filed April 12, 1880. (Model.) Patented in England June 8, 1878.

To all whom it may concern:

Be it known that I, LOFTUS PERKINS, of Seaford Street, Gray's Inn Road, in the county of Middlesex, Kingdom of Great Britain, have invented a new and useful Improvement in Screw-Propellers, (for which I have obtained a patent in Great Britain, No. 2,301, bearing date June 8, 1878,) of which the following is a specification.

My invention relates to improvements in the construction of revolving screw-propellers; and the objects of my improvements are to avoid the formation of a vacuum behind the propeller and to counteract the loss of propulsive power caused by the centrifugal force which is developed by the operation of all screw-propellers. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved propeller, having two blades, one blade being shown in its highest and the other in its lowest position. Fig. 2 is a stern view of the same. Fig. 3 is a side elevation, showing the propeller turned at a right angle to the position shown in Fig. 1. Fig. 4 is a diagram of one of the propeller-blades and the construction-lines of the same. Fig. 5 is a side elevation of the propeller having its two blades set at an angle of forty-five degrees to the position shown in Fig. 1. Fig. 6 is a diagram, in elevation, of one of the propeller-blades and the construction-lines of the same. Fig. 7 is a longitudinal central section of one of the propeller-blades straightened out, the section being on the line $x' x'$ of Fig. 2. Figs. 8, 9, and 10 are transverse sections of one of the propeller-blades, taken respectively in the lines $x x$, $y y$, and $z z$ of Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

a represents the hub, and *b b* the blades, of the propeller. The propelling-surfaces *h h* of the blades are of a screw form, being generated by a straight line revolving around the axis *c c* of the propeller, and traveling at a uniform rate along the axis, and at the same time gradually increasing its end distances from the axis. Thus two equal conical screw-surfaces are formed, which, according to requirements, may be made with more or less pitch longitudinally and laterally.

The edge-lines of the blades are spiral and parallel, or as nearly parallel as they can be well made, and these spiral edge-lines *i i*, *j j* lie in the frustums of two cones, (indicated in Fig. 6 by lines *e e*, *e e* and *d d*, *d d*,) which make angles of about thirty degrees with the axis *c c*, or thereabout, and these frustums are the basis upon which the propeller-blades are constructed, being of different sizes for different vessels, and their angles of inclination toward the axis *c* will vary according to the speed it is desired to give to the vessel. Thus, after the size and shape of the outer conical frustum, *e e*, *e e*, has been determined upon, the round cross-surface is divided by a number of parallel equidistant circles, $a' b' c'$ to p', and by the same number of equidistant radii, 1 2 3 to 16. The point of intersection a^2 of 1, and $a' b^2$ of 2, and $a^2 c^2$ of 3 and c', and so on up to p^2 of 16 and p', are the points through which the outer edge-line, *i i*, of the blade *b* passes. The inner edge-line, *j j*, is made by a similar mode of procedure with the inner conical frustum, *d d*, *d d*.

The truncations of the two cones form the ends of the hub *a* of the propeller; but in order to avoid extraordinary length of the hub the truncation of the outer cone may be moved farther back, as indicated by the line *f f* in Fig. 1, without departing from the principles of my invention.

The space traveled by the blades forms a hollow cone with a free or unobstructed center, and by means of this formation a novel and very advantageous operation of the blades is gained, to wit: The impact upon the portions of the water opposite the surfaces *h h* of the blades begins with the smaller diameter of the said surfaces and continues to the free ends of the blades, and thus, whereas ordinary propeller-blades lose their hold upon or impact against the confronting water as it becomes more and more affected by the action of the centrifugal force developed by the action of the blades, the blades of my propeller, by means of their longitudinal curvature, always confront

the same portions of water at the moment they are acted upon by centrifugal force, and in consequence of this the water thrown out by my propeller-blades follows a conical course, while the water thrown out by the ordinary propeller-blades follows a radial course. It will therefore be evident that the ordinary propeller must throw out a much larger quantity of water than my propeller in order to be as effective; and as the speed of supply to the propeller is limited a vacuum is formed behind the ordinary propeller when it is revolved too rapidly, and no gain is experienced from an expenditure of greater driving-power; and, further, while the ordinary propeller throws the water radially from its blades and closely to the vessel, thereby greatly preventing the confluence of undisturbed water between the vessel and propeller, my propeller is surrounded by undisturbed water, which enters the range of the blades not only between the vessel and propeller, but all along the same between the blades, thus completely preventing a vacuum behind the propeller.

The practical tests to which my propeller has been submitted have proved the correctness of my plan of construction, a gain of one mile per hour being shown over the greatest speed obtained from the most approved constructions heretofore adopted.

It must be borne in mind that the blades of my propeller should be of the same width throughout their length beyond the rear end of the hub in order that they shall operate upon an equal quantity of water at all times, as by this means a vacuum is avoided and a maximum speed secured.

It is evident that the same benefits as set forth can be secured to a greater or less degree by changing the number of the blades of the propeller, and while I prefer to use two, I do not limit myself to any certain number of blades.

The blades are shown as rounded on their rear sides, and as being gradually increased in thickness from their outer ends to their hub. This is a good form of construction; but it may be varied as circumstances may require.

In the operation of my propeller a continuous uniform push is produced in revolving, this being due to its never working in a vacuum.

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

1. A screw-propeller the blades of which are generated by a straight line revolving around the axis of a cone and traveling at a uniform rate along said axis, and at the same time gradually increasing its end distances from said axis, the edges of said blades being spiral and parallel, or nearly so, and lying in the frustums of an external and internal cone, thus forming two equal conical screw-surfaces, substantially as and for the purpose described.

2. A screw-propeller constructed with a conical hub and having a number of blades extending therefrom longitudinally and radially in the form of a conical screw, with parallel side edges, or nearly so, the propelling-surfaces of which blades present at every point the same width and are at right angles to the line of impact, substantially as and for the purpose described.

Witness my hand in the matter of my improved propeller this 11th day of December, A. D. 1879.

LOFTUS PERKINS.

Witnesses:

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9 *Alexandra Villas, Hornsey Park, London, N.*