(No Model.)

F. MARINGER.

SCREW PROPELLER.

No. 262,681. Patented Aug. 15, 1882.

Fig. 2.

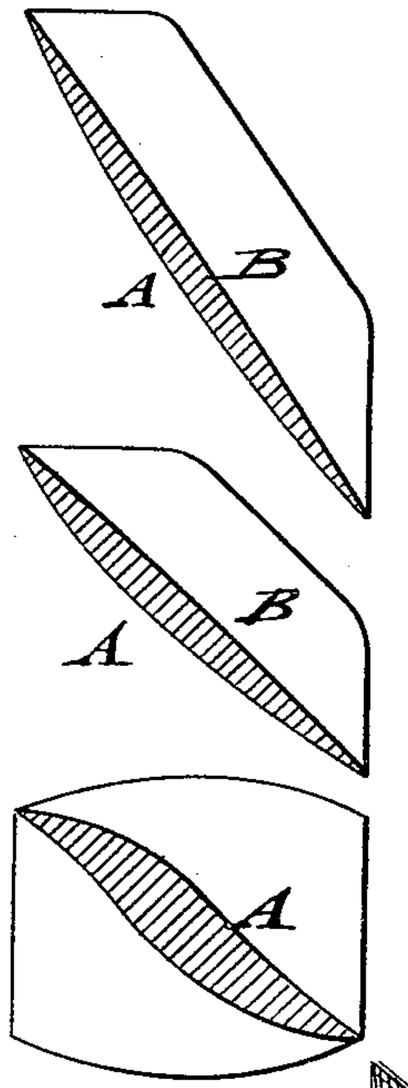

Fig. 3.

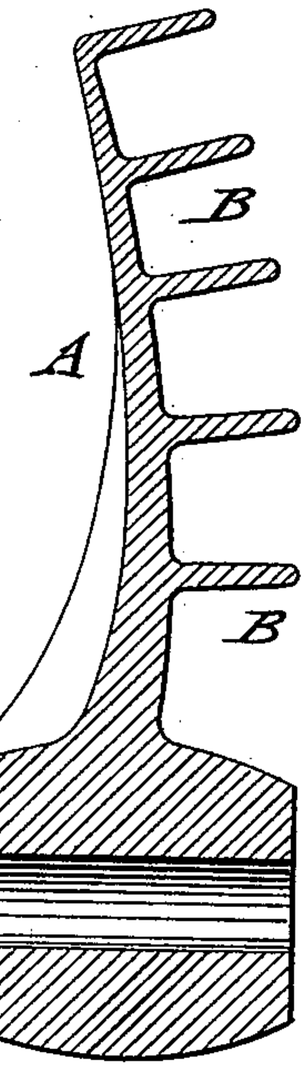

Fig. 1.

Fig. 4.

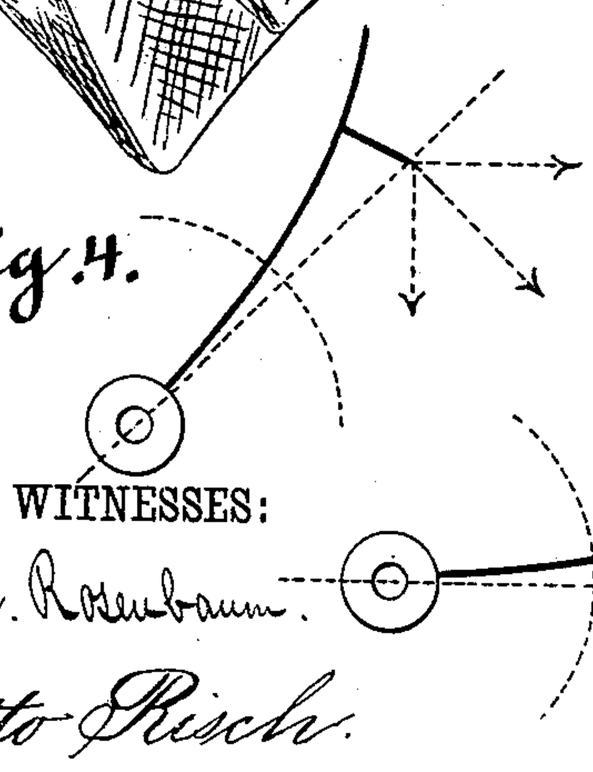

Fig. 5.

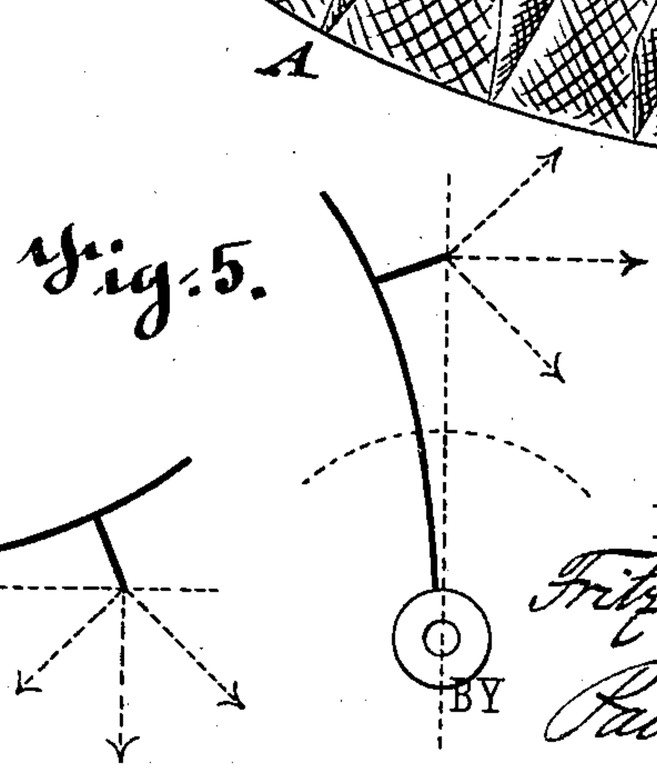

Fig. 6.

WITNESSES:

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FRITZ MARINGER, OF DÜSSELDORF, PRUSSIA, GERMANY.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 262,681, dated August 15, 1882.

Application filed June 3, 1882. (No model.) Patented in Germany July 2, 1881, No. 18,245.

To all whom it may concern:

Be it known that I, FRITZ MARINGER, a subject of the King of Prussia, residing at the city of Düsseldorf, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Screw-Propellers, of which the following is a specification.

A common objection to different constructions of screw-propellers heretofore in use has been that the speed of the vessels could not be increased in proportion to an increased power of the engine, or, in other words, that the propelling power of the screw cannot be increased in proportion to the increase of the power of the engine. Another objection has been that the water which is acted upon by the screw is made to diverge more or less in a lateral direction, whereby power is lost, instead of pressing the body of water in a compact form in a backward direction in line with the axis of the vessel.

The object of this invention is to overcome the objections mentioned by constructing a screw-propeller by which a greater pressure is exerted upon the water, so that an increase of force in axial direction is obtained, and by which the body of water set in motion by the screw is forced back in a compact mass in the form of a rotatory body.

The invention consists of a screw-propeller having concavo-convex blades of parabolic form, said blades increasing in width from the hub toward the circumference, and being provided at their convex surface with spirally-arranged parallel wings at right angles to the faces of the blades.

In the accompanying drawings, Figure 1 represents a rear elevation of my improved screw-propeller. Fig. 2 shows vertical transverse sections of the blade, respectively at the hub, at the middle part, and at the periphery of the same. Fig. 3 is a vertical longitudinal section through one of the blades, and Figs. 4, 5, and 6 are diagrams illustrating the action of the blade on the water in different positions of the blade.

Similar letters of reference indicate corresponding parts.

The improved screw-propeller is constructed with concavo-convex blades A, of parabolic form, the edges of which are parts of parabolas that are obtained by the intersection of the parabolically-curved surface of the blade, with two parallel planes, arranged at right angles to the axis of the screw. It follows from this arrangement that the front surface of the blades is convex in longitudinal as well as in transverse section. The width of the blades A is increased from the hub toward the circumference, while the thickness of the same is diminished. The convex surface of the blades is provided with spirally-arranged parallel wings B, which project at right angles from the body of the blades, as shown clearly in Fig. 3. Owing to the spiral shape, the wings B enter successively into the water at a more or less oblique angle to the axis of rotation, and, as I believe, exert an increased pressure upon the water. This pressure is still more increased by the thrust of the blades on the water, whereby the force of the propeller in axial direction is greatly augmented. By the wings of the blades the body of water forced in backward direction is held together in the form of a rotatory body around the axis of the propeller.

The effect of my improved construction of screw-propellers is shown graphically in Figs. 4, 5, and 6. If one of the blades is in the position shown in Fig. 4, each point of the same has a motion vertical to the direction of the radius of the screw drawn through that point. This motion in its effect on the water can be divided into a vertical and horizontal motion, also the force which is exerted by each point. The first component will serve to augment the propelling force, the second for retaining the body of water. If the blade is in the position shown in Fig. 6, it will move the water in a lateral direction, while the wings press vertically upon the water. In continuing the motion the vertical pressure of the blade upon the water is augmented, while that of the wings is diminished until, when the blade arrives at a horizontal position, as in Fig. 5, the force of the blade arrives at its highest point, while that of the wings arrives at the lowest point. In continuing the motion the action of the blade gradually decreases, while that of the wings increases. The result will be great uniformity

in the motion and effect of the propeller, and consequently a steadier motion of the vessel, which has been corroborated by practical tests.

I have so far described the action of the blades as regards the augmentation of the force of the blade in an axial direction. The retention of the water results, however, mainly from the increasing width of the blades, as that part which first enters into the water is of greater size than that near the hub, which enters the water last. As a consequence, the water, which is compelled to pass through the spaces between the wings, is gradually compressed and retained. This is to be ascribed mainly to the spiral arrangement of the wings on the blades, which wings form, by the rotation of the blades through the water, helical planes in the same way as each blade, whereby their effect is correspondingly increased.

The screw-propeller shown in the drawings is a right-hand propeller, and revolves in the direction of the arrows shown in Fig. 1, so that consequently the convex edges of the blades are nearest the vessel, and consequently the points *a b c d e* of its edge enter the water first.

The advantage of my improved screw-propeller is that with increased engine-power a considerably-higher speed is obtained, which is increased in proportion to the size of the wings, while by the rotention of the water in a rotating body around the screw an even motion of the vessel is insured.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A screw-propeller having concavo-convex blades of parabolic form and spirally-arranged parallel wings at right angles with the faces of the blades, substantially as described.

2. A screw-propeller having concavo-convex blades of parabolic form that increase in width from the hub to the circumference, said blades being provided with spirally-arranged parallel wings at right angles to the faces of the blades, substantially as described.

3. The blades of a screw-propeller, having their front surfaces longitudinally and laterally convex, increasing in width from the hub to the circumference and provided with spirally-arranged parallel wings at right angles to the faces of the blades, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRITZ MARINGER.

Witnesses:

CARL ELFES,

JAN MEURY,

Both of Düsseldorf.