A. P. FILIPPI.

POWER TRANSMITTING MECHANISM.

APPLICATION FILED JUNE 24, 1911.

1,032,327. Patented July 9, 1912.

FIG_1_

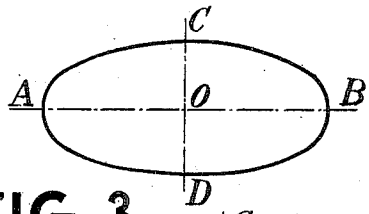


FIG_2_

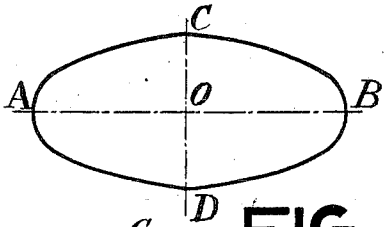


FIG_3_

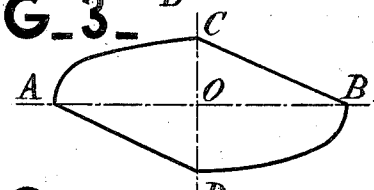


FIG_4_

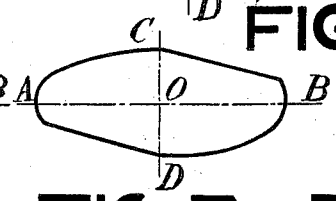


FIG_5_

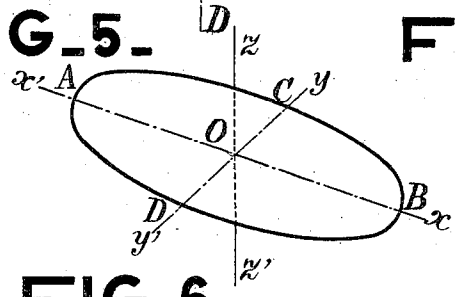


FIG_7_

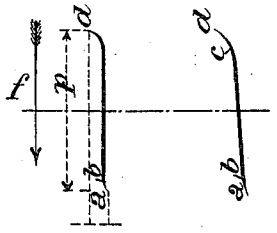


FIG_8_

FIG_6_

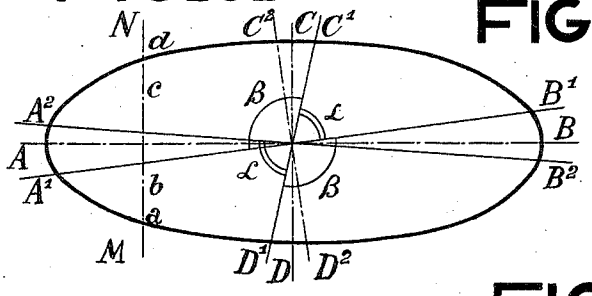


FIG_9_

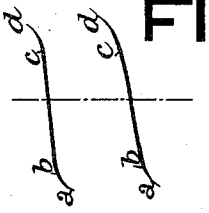


FIG_10_

FIG_11_

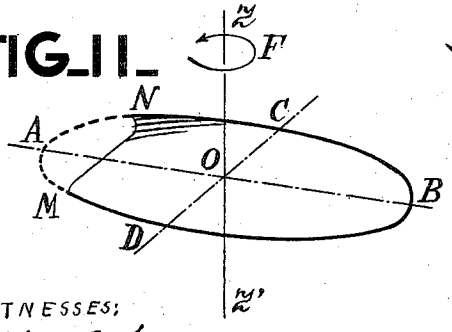
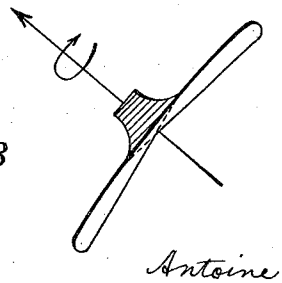


FIG_12_



WITNESSES;

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UNITED STATES PATENT OFFICE.

ANTOINE PADOUE FILIPPI, OF PARIS, FRANCE.

POWER-TRANSMITTING MECHANISM.

1,032,327. Specification of Letters Patent. Patented July 9, 1912.

Original application filed July 28, 1909, Serial No. 510,004. Divided and this application filed June 24, 1911. Serial No. 635,161.

To all whom it may concern:

Be it known that I, ANTOINE PADOUE FILIPPI, citizen of the French Republic, residing at No. 132 Avenue du Maine, Paris, France, have invented new and useful Improvements in Power-Transmitting Mechanism, of which the following is a specification.

This invention relates to propellers and more particularly to those of the type described in the specifications of my prior British Letters Patent No. 20917/07 and 1711/06, the object of the present invention being to improve such propellers and to apply the principles underlying their action to additional surfaces of contours not described in the above specifications. In the above two specifications it was proposed firstly to have the propelling surface of elliptical contour with the edges of two diametrically opposite quarters of the periphery turned slightly upward or downward and secondly to form the said surface as a part of that of an ellipsoid.

The invention consists in a propelling surface formed from a plane surface, having any contour other than that of an ellipse and having its minor axis at least one fourth of its major axis, the propulsive effect being obtained by symmetrically bending the edges or portions of opposite quadrants of the surface. Instead of bending the edges of a plane surface, the same effect may be obtained by using part of various surfaces of revolution any of which can be used, other than those formed either by an ellipse or by a straight line. In all cases the axis of rotation passes through the center of gravity of the surface.

This application is a division of my copending application Serial #510004 filed July 28th, 1909.

The accompanying drawings show various modifications of propellers constructed in accordance with the present invention.

Figure 1 is a plan view of one surface from which a propeller may be formed. Figs. 2, 3 and 4 are similar views showing modified forms of surfaces. Fig. 5 is a perspective view of a surface showing the relative position of the axis of rotation and the axis of symmetry. Fig. 6 is a diagrammatic view showing the position of the axis and the lines limiting the parts of the surfaces which are either turned up or bent down. Fig. 7 is a sectional view of one form of propeller taken on the line M—M of Fig. 6. Figs. 8, 9 and 10 are similar views of modified forms of propellers. Fig. 11 is a perspective view of a propeller, parts being broken away for the sake of clearness. Fig. 12 is a perspective view of a propeller and its hub.

Figs. 1, 2, 3, 4 and 5 give some examples of plane surfaces from which a propeller can be formed. The major axis of these surfaces is A B, the minor axis is C D, and these axes meet at the point O, each surface being of such a shape that every point on its contour has a corresponding point symmetrical about O. The ratio between the two axes is such that C D is at least one fourth of A B; this being an essential characteristic of the propeller.

In order to give the surface a shape which shall have a propulsive effect it is necessary to bend or turn upward the parts of the peripheries A, A^2 C, and B, B^2 D, shown in Fig. 6, while the parts D, A, and C, B, remain unaltered or are slightly set back. The turning up and setting back (when the latter is considered to be of use) is such that any point thereon has always a corresponding point symmetrical about the point O. It follows from the symmetry of the surfaces used that the center of gravity of the surface coincides with the point O, and the axis of rotation always passes through this point, and is normal to the surface at that point.

Figs. 7, 8, 9 and 10 are sections at the line M N (Fig. 6) on the various surfaces. *a b* represent the part of the surface at the periphery D, A, which is set back. *c d* represents the part of the surface at the periphery A, A^2 C, which is turned upward. *b c*, (or *a c* when *a b* is not set back) is that part of the surface which does not undergo any deformation.

In order that the action of the propeller may be understood, reference is now made to Fig. 11, which represents a shaped surface turning about the axis Z Z′ in the direction indicated by the arrow F. The face on the same side of the surface as Z O, forms the "rear face" of the propeller, while that on the same side of the surface as A Z′ is the "front face" of the propeller. The arrow F in Fig. 11 corresponds to arrow *f* of Figs. 7, 8, 9 and 10.

The following action takes place on rotation.

1. At the rear face, the surface formed by the upturned outer edge A C projecting a distance r (Fig. 7) out from the plane of the central portion of the propelling surface retains the layer of fluid with which it meets, destroys the effect of the centrifugal force and tends to compress the fluid on the whole surface of effective breadth equal to p. This compression produces at all points on the surface, reactions whose resultant is a force applied at O, acting in the direction of the axis of rotation Z Z', and determining the propulsion in the direction Z O, whatever may be the position in space of the axis of rotation.

2. At the front face, the surface facilitates the effects of the centrifugal force, the result being that the resistance to forward motion is diminished.

The front face of propelling surface is completed by a solid of revolution forming the boss of the propeller, shown cross hatched in Fig. 12. The solid has for its axis of rotation that of the surface, and for its generatrix a curve known under the name of Huyghen's tractrix, as in the propeller described in my previous Patent No. 1711/06. The effect of this solid, according to the properties of its generatrix, is to further diminish the resistance to the forward motion of the propeller.

In the case of a propeller formed as part of a surface of revolution, and have one side concave and the other convex, it is obvious that such a surface will be propulsive on its own account, the action being the same as that described above so that it is not necessary to shape the surface in any way.

A propeller formed according to the present invention may be applied as a propeller in water, as a propeller and sustaining member in air, an impeller of centrifugal and centripetal ventilators, as an impeller and compressor of rotary pumps. It may also be applied as a receiving member to form a wind motor or a hydraulic turbine.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

A propeller having a surface formed from a part of any surface of revolution other than that generated either by an ellipse or by a straight line and said propeller having its minor axis at least one fourth of its major axis, and rotating about an axis which passes through its center of gravity, one side of said propeller being concave and the other side being convex.

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

ANTOINE PADOUE FILIPPI.

Witnesses:

H. C. Coxe,

Miguel Ferolo.