(No Model.)

E. GOEHRUNG.

PROPELLING AERIAL AND MARINE VESSELS.

No. 302,395. Patented July 22, 1884.

Fig. 3.

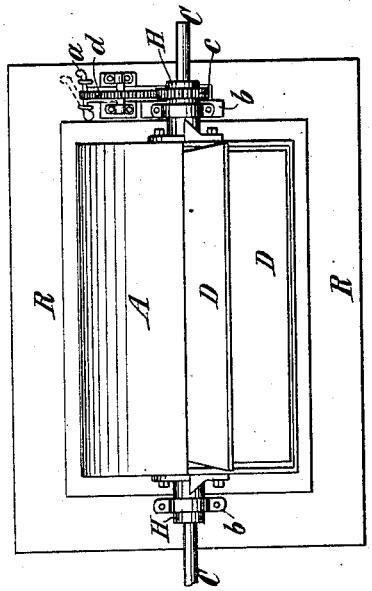


Fig. 4.

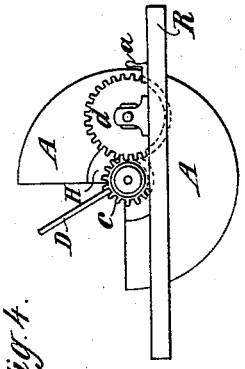


Fig. 1.

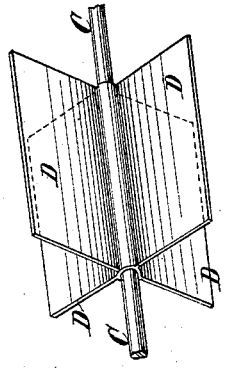
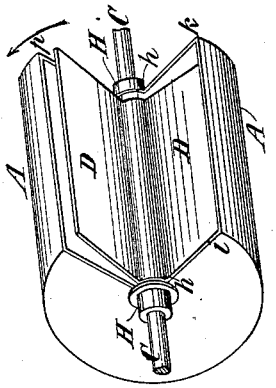


Fig. 2.



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EDUARD GOEHRUNG, OF STUTTGART, GERMANY.

PROPELLING AERIAL AND MARINE VESSELS.

SPECIFICATION forming part of Letters Patent No. 302,395, dated July 22, 1884.

Application filed April 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, EDUARD GOEHRUNG, a citizen of Germany, and residing at Stuttgart, in the Empire of Germany, have invented new and useful Improvements in Propelling Aerial, Submarine, and other Vessels, of which the following is a specification.

This invention relates to apparatus for propelling vessels in water and air. I will first describe it as applied for propelling ships and submarine vessels, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 is a perspective view of the paddle-wheel separately, and Fig. 2 a similar view of the wheel in its casing. Fig. 3 is a plan, and Fig. 4 an end view of the same when provided with means for adjusting the position of the casing.

Similar letters of reference indicate corresponding parts.

The apparatus consists of a cylindrical, spherical, ellipsoidal, or other suitably-shaped strong metallic casing, A, with a sector-shaped opening, *o h i p h k*, (one-quarter, more or less, of its perimeter,) wherein rotates a wheel whose shaft G is mounted in bearings in the ends of the casing, and having any suitable number of equidistant blades, D, of a plain, wavy, or bent form, corresponding to the internal dimensions and form of the casing A, so as to almost touch the ends and sides of the casing, from which they protrude at the opening, in order to act on the water. This casing A must be fixed to the vessel's hull as low as possible below the water-line, the wheel-axle *c* being carried through a stuffing-box in the vessel's side, and connected with the engine for driving it. The wheel-axle *c* may be placed in a vertical, horizontal, or inclined position at both sides, or with vertical or horizontal axles at the back and at the front part of the ship, for reversing. The position of the casing must be such that the water can flow in and out at the front and sides of the opening without hinderance.

The action of the paddle-wheel when completely immersed is as follows: The wheel revolving in the direction of the arrow, Fig. 2, when emerging at *i k* from the opening in the casing, forces out the water which was confined within it against the free water, thus creating a pressure which reacts against the paddles and propels the ship. The portion of water nearest the axle which has been expelled from the casing is again carried into the casing, more water flowing in at the ends of the opening to fill up the space between the blades, the quantity of water rotating in the casing remaining nearly always the same. The direction of the water on leaving the casing is centrifugal and parallel to the side *h h* *o p* of the sector-shaped opening toward which the blades are moving. If the direction of the paddle be reversed, the outward pressure of the water will be exerted in a direction parallel to *h i h k*. The position of the shaft being vertical, the pressure is in a fore-and-aft direction, which can be changed into a side pressure by altering the direction of rotation, as represented in Figs. 3 and 4. The casing A may be so mounted on a frame projecting from the ship's side as to be itself capable of partial rotation on the wheel-axis, whereby with half a turn of the casing the relative position of the opening can be so altered that the direction of propulsion will be reversed without reversing the engine and paddle-wheel.

For aerial navigation the principle of the propelling apparatus is the same as above described, the construction only being modified to combine the necessary lightness and strength. The speed of fan, however, must be greatly increased to have any effect on the air.

The casing is provided, as shown in Figs. 3 and 4, with hollow journals H, resting in bearings *b* on a horizontal or vertical frame, R, fixed to the vessel to be propelled, these journals H forming the bearings of the fan-shaft C, so that the casing A can be turned on its axis without interfering with the rotation of the fan D. Any suitable means of adjustment may be employed. For instance, a spur-wheel, *c*, on one of the journals of the casing A may gear into a spur-wheel, *d*, mounted on the frame R, and provided with a crank or other arrangement for turning it, whereby the casing can be adjusted circularly in any required position, and locked in that position by a latch, *a*, or other suitable arrangement.

By so adjusting the casing A the pressure of the air, which, as before described in the case of water, acts perpendicularly to the plane of the blade emerging from the casing, may be made to act either vertically, horizontally, or otherwise to vary the angle of the direction of motion at will.

Having thus described my invention and the manner of employing the same, I claim—

1. The combination, with a paddle-wheel for the propulsion of vessels, of a casing having an opening in its periphery, and embracing and adjustable about the axis of said wheel, to present the opening in various directions for the purpose of giving direction to the propulsion, substantially as herein described.

2. The combination, with a paddle-wheel for propulsion of vessels, and stationary bearings, of a casing embracing said paddle-wheel, and having an opening in its periphery, and provided with hollow journals which are fitted to said bearings, and which themselves form the bearings for the shaft of the paddle-wheel, substantially as herein described.

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

EDUARD GOEHRUNG.

Witnesses:
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