

ALPHONSE DE MAN.
TUBULAR PROPELLER RUDDER
No. 119,584. Patented Oct. 3, 1871.

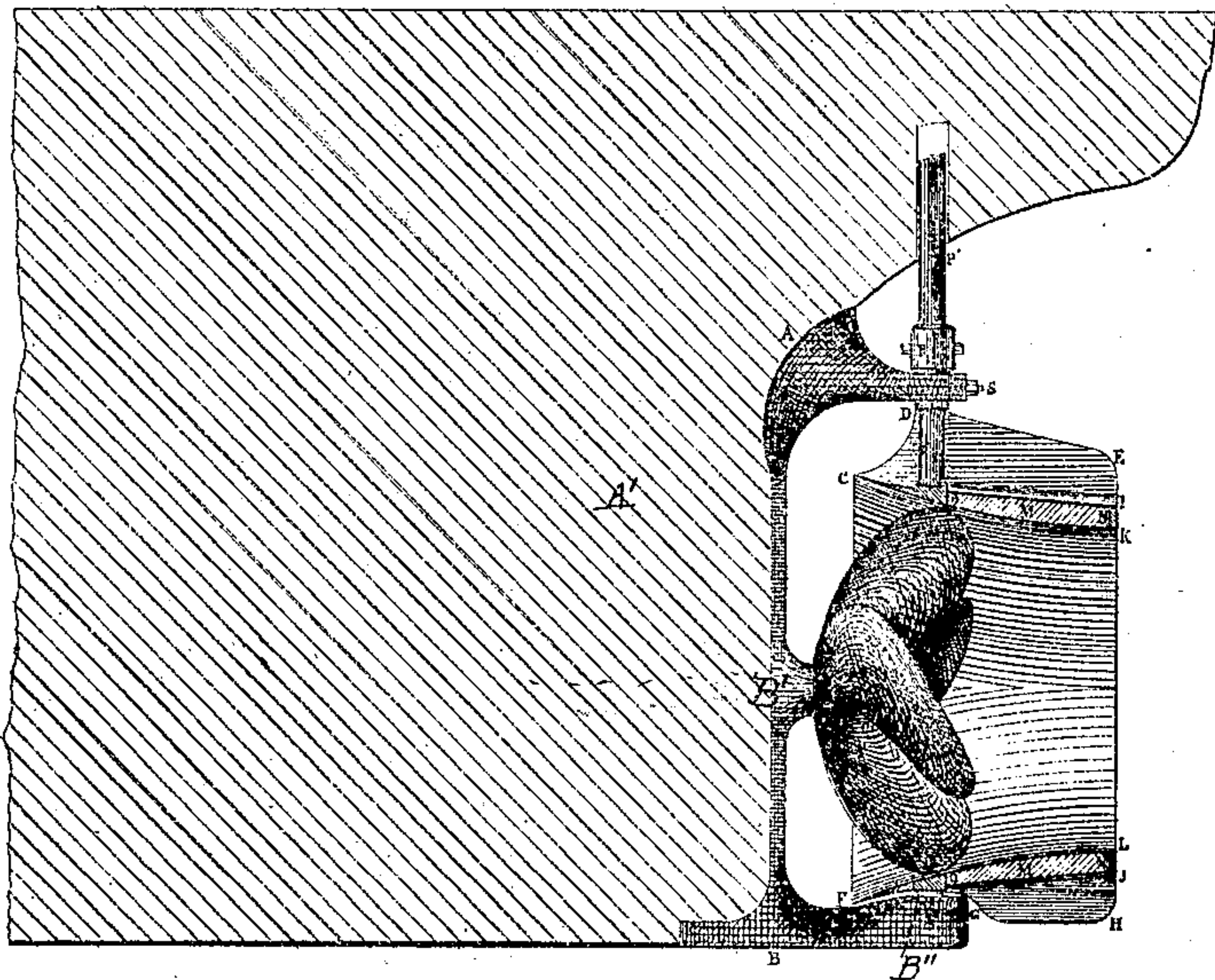


Fig I

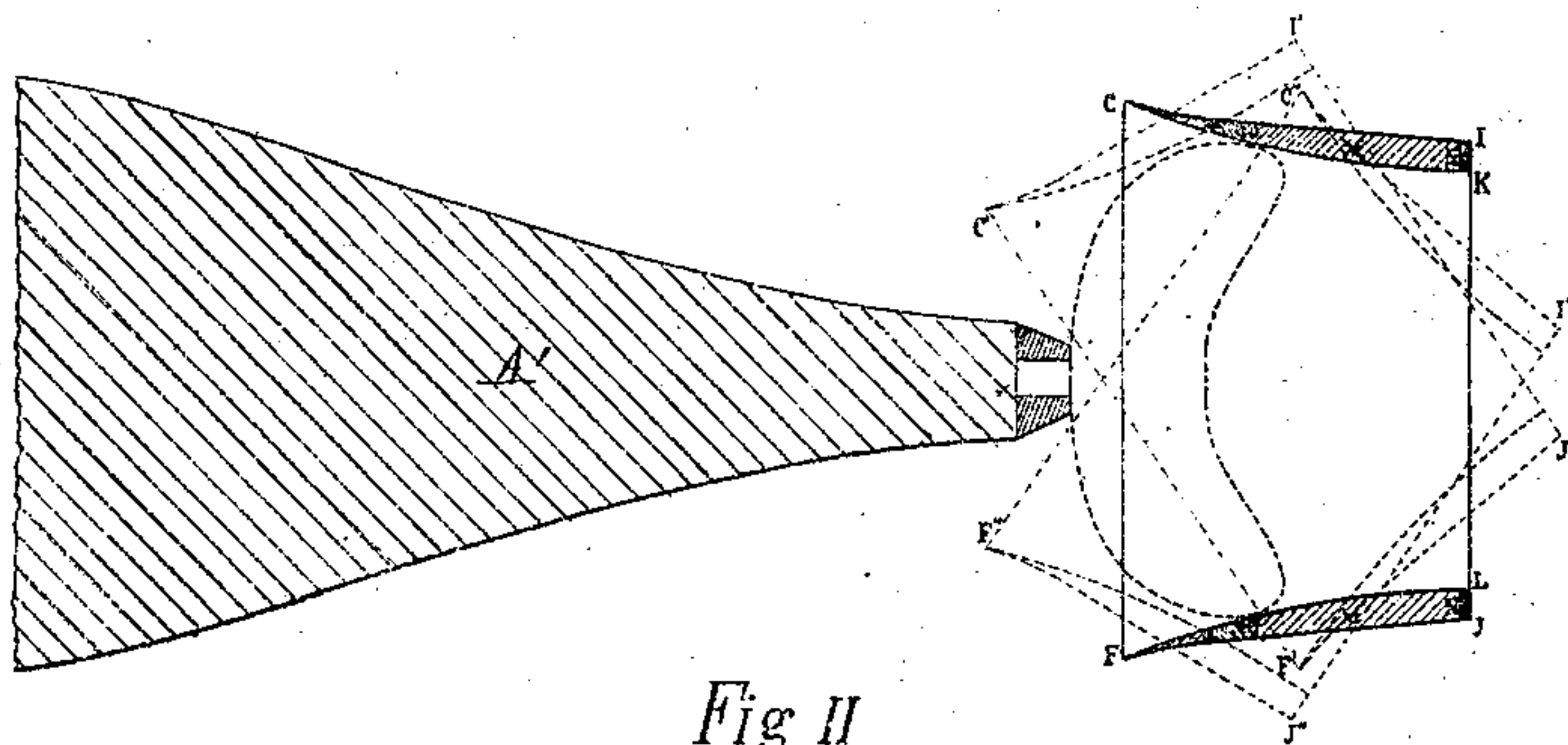


Fig II

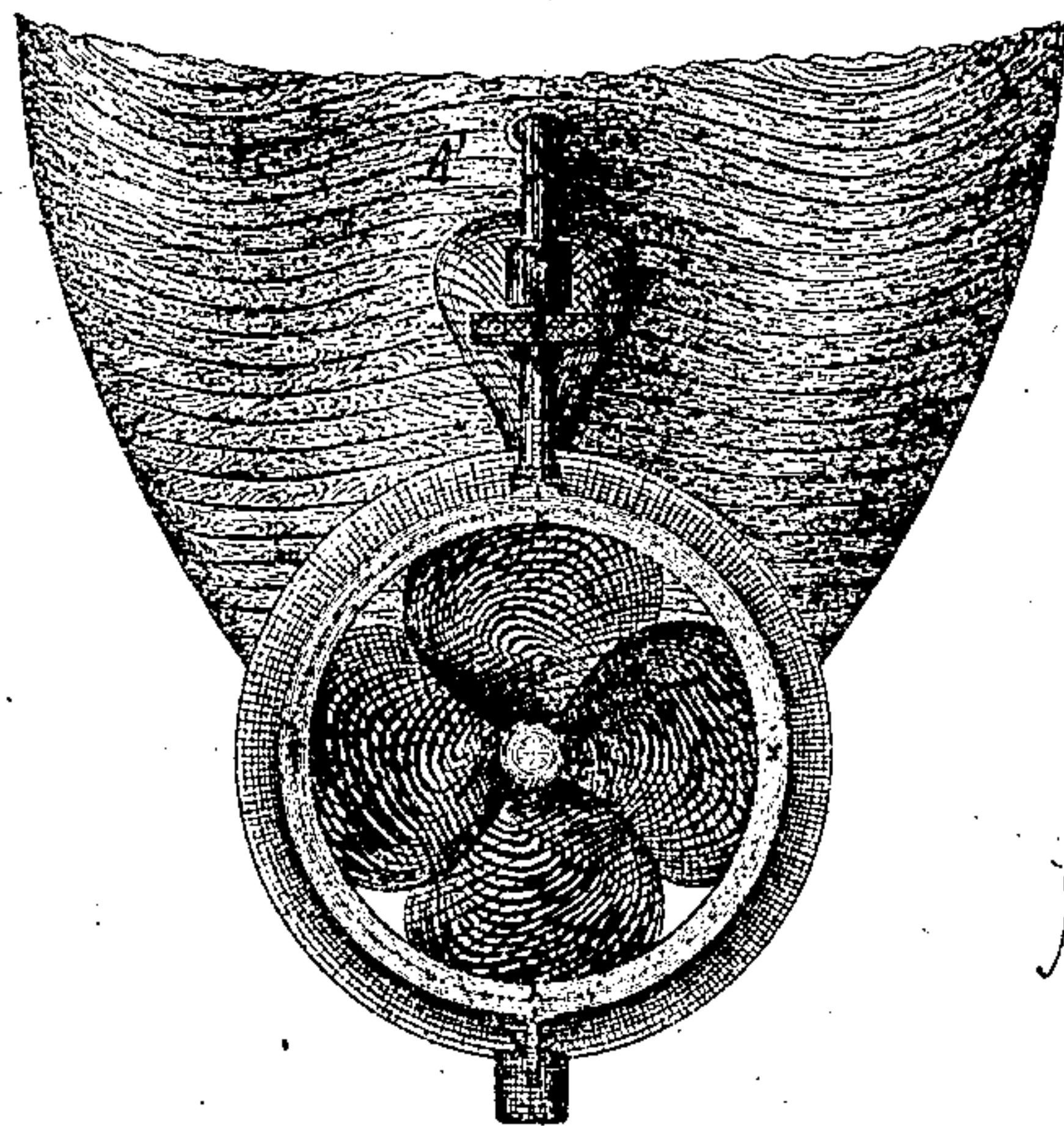


Fig III

WITNESSES

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ALPHONSE DE MAN, OF GHENT, BELGIUM.

IMPROVEMENT IN RUDDERS FOR VESSELS.

Specification forming part of Letters Patent No. 119,584, dated October 3, 1871.

To all whom it may concern:

Be it known that I, ALPHONSE DE MAN, of Ghent, in the Kingdom of Belgium, have invented a new and useful Improvement in Rudders for Vessels; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1 is a side elevation, partially in section. This view shows a vertical section through the axle of the tubular portion of the rudder, partially inclosing a propeller screw; and it also shows the outline of a section of a hull of a vessel. Fig. 2 is a horizontal section through the axle of the tubular portion of the rudder, and showing in dotted lines the section of the imaginary volume engendered by the revolution of the screw, and also two different positions of the tube, also in dotted lines. Fig. 3 is a rear elevation.

Like letters refer to like parts in each figure.

The nature of this invention relates to an improvement in the construction of rudders, by means of which vessels are guided in their course through the water. The invention consists: First, in the peculiar construction of the hollow or tubular rudder, which concentrates and directs the current of water when the screw is in motion, and when said screw is still will operate as does the rudder of ordinary construction; the object of this part of my invention being to utilize the reactive power of the whole current of water to propel and steer the vessel, and at the same time to avoid the resistance which is produced by the shock of the water against the common rudder. Second, in the special form of the paddles or blades of the screw best adapted to the most successful operation of the tubular rudder. The surface and edges of these blades is of such shape as to cut or enter the water gradually and force the same in a direction nearly parallel with the axle of the shaft, at the same time producing a uniform pressure within the rudder at the center with that of the extreme circumference. The object of this part of my invention is twofold—first, by so cutting or entering the water gradually as to avoid the shock of the paddles against it, which is a cause of waste of power; second, the effect of forcing the water

with uniform pressure and in a direction nearly parallel with the axis of the shaft within the above-mentioned rudder will permit of the utilization of almost the whole power developed by the engine. Third, the combination and arrangement of the tubular rudder with the screw and the necessary mechanism for operating the same, as more fully hereinafter set forth.

In the accompanying drawing, A B represents a suitable iron frame, by means of which the tubular rudder is secured to the hull of the vessel A', and this frame is provided with a suitable bearing, B', for the shaft of the screw, which bearing is directly in line with the axis of the tubular rudder. It is also provided with a suitable step, B'', to receive the pivot upon which the tubular rudder rotates. C I K and F L J indicate the outlines of the hollow or tubular rudder, composed of two tubes, C I F J representing the outside tube and C K F L the inside tube. These tubes are joined together at C F, the forward end thereby forming a sharp edge, to allow the tubular rudder to pass through the water with as little resistance as possible. From the forward end to the rear there is an increasing annular space between said two tubes. This space is marked M, and may be filled with wood or cork or other desired material, while the rear end of this space is filled with the ring N, to which the rear ends of the outer and inner tube are riveted or otherwise suitably secured. This tubular part of the rudder is wider at its forward end, to facilitate the entrance of water therein; thence toward the rear the inner tube diminishes in size to such a diameter as will be found necessary to realize the greatest action and power of the current. To prevent the less resistance to the water, the outer tube also diminishes in diameter, but not so much as the inner tube. C D E I represent the outline of a vertical flange, which may be, if desired, secured to the top of the outer tube, and in line with its axis. O J H G represent the outline of a similar flange, which may, under like circumstances, be secured to the bottom of the tubular rudder. O is an iron ring fitting between the outer and inner tubes, for the purpose of affording greater strength at that point where the rudder is secured to what may be termed the rudder-posts. A short axle or rudder-post, P, is secured in any suitable manner to the top of the tubular rudder whose con-

struction has just been described. This short axle is journaled in the bearing of the frame and held in place by the cap S. The top of this axle may be secured to the lower end of another axle, P', by any suitable coupling, R, and any convenient device may be connected with the top of the axle, by means of which it may be operated from the deck or other convenient part of the vessel. To the lower side of the tubular rudder, and in a vertical line with the axle P, there is secured a step or pivot, Q, which rotates in the socket or bearing B''; or the step or pivot may be rigidly secured to that part of the iron frame B, and may enter a proper socket in the lower side of the tubular rudder, which latter may rotate thereon. The screw shown in Figs. 1 and 3 is constructed with blades whose bases are diagonal with the shaft, whose edges nearest the hull are curved upwardly and to the rear; then outwardly, and, by a slight curvature, first upwardly and then downwardly, in equal proportions, beyond the outward end of the shaft; then by a downward return curve brought back to the bases of said blades at the rear end of said shaft. The blades themselves are likewise curved nearly uniformly from their bases to their upper edges, so as to present the hollow of the curved surface against the water in the act of propelling the vessel. The curve of the edge permits the blade to exert its force with a gradually-increasing power upon the water, while the tendency of the curve of the surface to force the water to the center is counteracted by the oblique position of the blade having a tendency to drive the water from the center, and the result is that the water

is moved to the rear in a direction nearly parallel with the axis of the shaft. In Fig. 2, C I F J is the horizontal section of the tubular rudder when said rudder is straight in line with the keel. C' I' F' J' represents the same when the rudder is thrown to the starboard side, and C'' I'' F'' J'' when thrown to the port side. The propeller-wheel, it will be seen, rotates within the tubular rudder, which latter protects the former in the same manner, but more thoroughly, than the cages in common use—more thoroughly, in that it protects the wheel from damage from an enemy's shot.

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

1. The combination, in a hollow tubular rudder, of two tubes, one inside the other, joined at their forward ends, as shown, with an annular space, M, between said tubes, the rear end of which is closed by the ring N, substantially as set forth.

2. In tubular rudders constructed as described, the solid ring O, for the purposes set forth.

3. The screw-wheel, constructed, arranged, and operated substantially as described and shown, for the purposes set forth.

4. The combination of the propeller-wheel with the tubular rudder, each of said parts being constructed, arranged, and operated substantially as set forth.

ALPHONSE DE MAN.

Witnesses:

THOS. S. SPRAGUE,
MYRON H. CHURCH.