J. CERVELLI.

PROPELLING AND DRIVING MECHANISM.

APPLICATION FILED OCT. 21, 1908.

970,607. Patented Sept. 20, 1910.

FIG. 2.

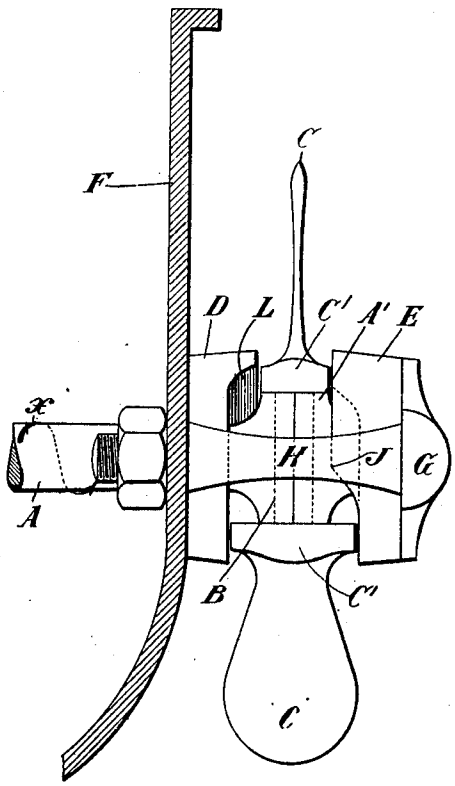
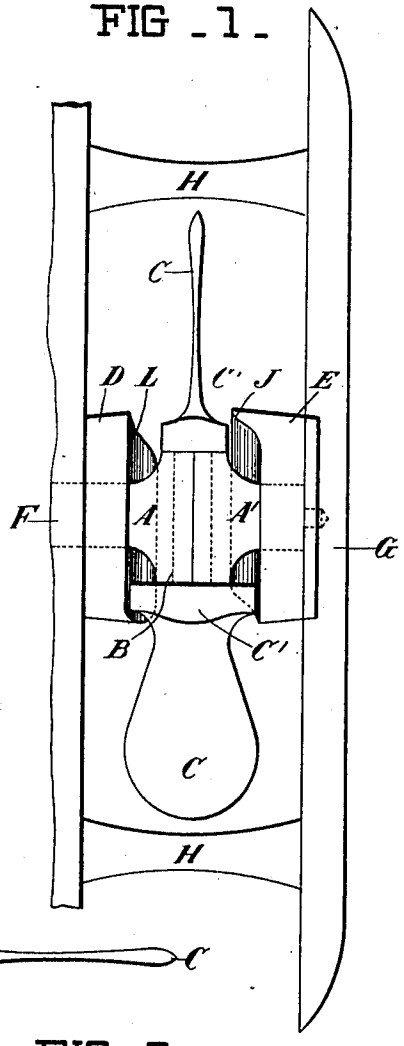


FIG. 1.



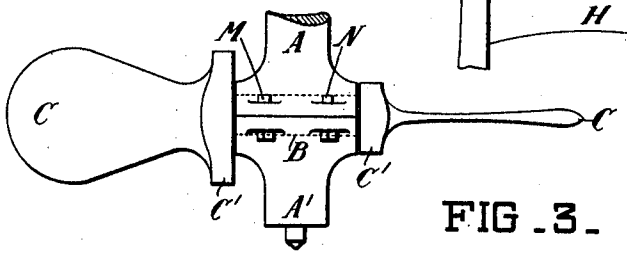


FIG. 3.

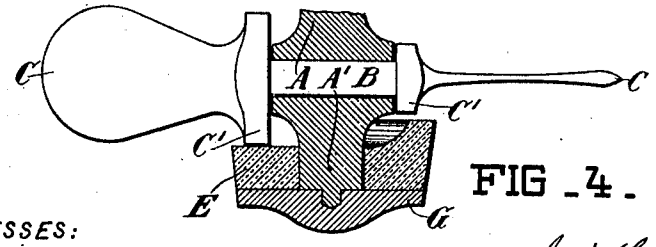


FIG. 4.

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PROPELLING AND DRIVING MECHANISM.

970,607. Specification of Letters Patent. **Patented Sept. 20, 1910.**

Application filed October 21, 1908. Serial No. 458,837.

To all whom it may concern:

Be it known that I, JOSÉ CERVELLI, a subject of the King of Italy, and resident of Buenos Ayres, in Argentina, have invented new and useful Improvements in Propelling and Driving Mechanisms, of which the following is a full, clear, and exact specification.

The invention relates to mechanism designed to be employed for the propulsion of ships, submarines and aerostats as well as to the production of motive power by means of a current of air or water; the said mechanism comprising, in combination with a rotary main shaft, at least one rotary trunnion perpendicular to the geometrical axis of the said shaft, and supported in a bearing carried by the latter and having two blades placed at an angle of 90° to each other, provided with adjusting members, arranged to coöperate with at least one stationary cam to be mounted upon the object before being provided with the mechanism so as to produce, for each half revolution of the propeller shaft a rotary angular movement of 90° of the blade trunnion and thereby a reversal of position of the blades between positions parallel and transverse respectively to the propeller shaft.

Figures 1 and 2 of the accompanying drawings, given by way of example, represent two different views of one way of carrying out the invention. Figs. 3 and 4 show details of the same, among others one portion of the propeller shaft with the blade trunnion in elevation and in section respectively.

The propeller shaft comprises two parts A, A′ which at the point where they join each other are shaped so as, together, to constitute a journal or bearing the axis of which is perpendicular to the geometrical axis of the propeller shaft and the halves of which are connected together by bolts M, N Fig. 3. This journal or bearing serves as a support for a rotary trunnion B also perpendicular to the geometrical axis of the propeller shaft. The trunnion B carries at its ends two blades C placed at an angle of 90° to each other and provided with adjustment bases C′ which are confined between two cams D, E, one of which (D) is directly fixed to one part F of the object carrying the mechanism and traversed by the propeller shaft, while the other cam E is fixed to a supporting bar G carried by the said part F by means of two bars H. The two cams D, E have lateral interior shoulders J, L which practically occupy the half of the periphery of the cams, the latter between them forming a kind of guide-way for the bases C′ of the blades C during the rotation of the propeller shaft.

Suppose, for example, that the described mechanism is to serve for the propulsion of a ship. In this case the propeller shaft A, A′ receives the energy of the ship's motor which communicates to it a continuous rotary motion. In this rotary motion the shaft A, A′ also rotates the trunnion B and with it the blades C. The adjustment bases of the blades C, in their revolution, in turn meet the interior shoulders of the stationary cams D, E so that for each half revolution of the motor or propeller shaft A, A′ each of the blades C performs an angular movement of rotation of 90° upon the trunnion B, one of the blades taking a position parallel to the geometrical axis of the propeller shaft which was previously occupied by the other blade which in turn becomes transversely adjusted with relation to the said axis. The consequence is that for each half revolution of the propeller shaft a complete reversal of position of the blades takes place between positions which are parallel and transverse respectively to the said shaft. In fact, for example referring to Fig. 2 and supposing that the propeller shaft A A′ turns in the direction of the arrow x, the lower blade C presenting itself flatwise or in a position parallel to the geometrical axis of the said shaft and immersed in the water, the right hand end of its base C′ comes into contact with the shoulder J of the cam E which compels the said blade to turn with the trunnion B so that the base C′ of the said blade gradually comes more and more into a position transverse to the geometrical axis of the propeller shaft in order to be able to engage in the narrower part of the guide way between the cams D, E and to cause the blade to take a position with its cutting edge forward; at the same time the

upper blade also fixed to the trunnion B and presenting its edge forward answers the movement of the first blade in order to finally assume its flat position and to present itself with its full width to the resistance of the medium in which the mechanism works and, consequently, becomes placed in its travel beneath the propeller shaft in condition to exert force upon the said medium, which force becomes converted into a movement of translation of the vessel carrying the mechanism.

It will be observed that only one of the blades acts usefully at one and the same time, namely, that which is working below the horizontal plane passing through the propeller shaft, and that the alternate useful effect of the two blades becomes converted into a movement of translation always in the same direction. It will, moreover, be understood, that the blade traversing the space above the said horizontal plane during a large portion of the travel passes through the medium with the cutting edge forward so as to avoid the effects of resistance.

When the mechanism is designed to produce a movement of translation in ships, it can be placed so as to be completely submerged in the water. As regards ships, submarines or aerostats it is advantageous to provide them on each side with one or more mechanisms of this kind, the mechanism or mechanisms on one side being placed relatively with that or those on the other side so that the pivoting movements of the blades shall be opposed in the revolutions of the latter in order that they may become neutralized as regards the lateral or axial strains which are exerted.

When the mechanism is to be employed for producing motive power by utilizing the energy of currents of water (rivers) or of air (winds), it can also be arranged as represented in Figs. 1 and 2, the current of water or air then acting by pressure upon the blades. In all cases the propeller shaft may, if desired, be provided with several blade trunnions. In ships, boats, etc., where the mechanism serves for propulsion, it can be placed at any suitable part of the ship, boat, etc., and so as to be completely or partially submerged. It affords great advantage over the paddle wheels of steam boats inasmuch as it occupies a very small space and can work equally well in deep or shallow waters. If it is arranged so that the propeller shaft is located above the water line, no infiltration of water will take place into the journal or bearing of the blade trunnion and facility is insured for inspection and repairs. The cost of the mechanism is, besides, very low, it is of compact construction, simple and strong, and allows of attaining a great velocity (when employed for propulsion). When applied to the two sides of a boat the mechanisms can be utilized simultaneously or separately or, by causing them to work in opposite directions, they can serve the purpose of a rudder.

I am aware that propelling mechanism is already known wherein the shaft carries blades arranged at 90° to one another and adapted to turn around a geometrical axis perpendicular to the axis of the said shaft. But the construction hereinbefore described and illustrated in the accompanying drawing is novel and is destinguished from those hitherto known by the fact that the blades, the trunnion of which turns in a bearing in two parts formed by the propeller shaft itself, are provided at their bases with lateral bosses placed between two stationary cams arranged in proper relation to one another and forming a single guiding way for the blades, formed in such a manner as to guide the bosses of the blades in a constrained manner on either side with a view of correctly and surely causing at each half revolution of the propeller shaft a movement of rotation of 90° of the blade-trunnion and therefore a reversal of the position of the blades between positions which are respectively parallel and transverse to the propeller shaft. This construction is very simple and strong as regards the movement of the blades themselves, and insures a perfect guiding of the latter without it being necessary to insure by auxiliary means, (such for example as by artificial axial thrust), the contact between the bosses of the blades and the controlling cam or cams. By the use of the bosses the blades, besides, become more solid or strong, as they are strengthened at this part. Moreover, the mounting and dismounting is much facilitated as the blades are formed in one piece with their trunnions.

What I claim is:

Mechanism designed to be employed for the propulsion of ships, submarines and aerostats, as well as for the production of motive power by means of a current of air or water, which mechanism comprises a rotary driving or propelling shaft, a bearing in two parts formed by the said shaft itself, a trunnion located in said bearing perpendicularly to the axis of the said shaft, blades rigidly connected to said trunnion, placed at an angle of 90° to each other and provided at their bases with lateral bosses, and two stationary cam-plates arranged with relation to one another so as to form an annular guiding groove for the blades of such a form as to guide the bosses thereof in a constrained fashion on either side throughout their revolving motion, with the object of correctly and surely causing at each half revolution of the propeller shaft a movement

of rotation of 90° of the blade-trunnion and consequently a reversal of the position of the blades between positions which are parallel and transverse respectively to the propeller shaft, substantially as hereinbefore described.

In witness whereof I have hereunto signed my name this 2d day of June 1908, in the presence of two subscribing witnesses.

JOSÉ CERVELLI.

Witnesses:
FRANCISCO PETA,
ERNESTO BUDIN.