March 5, 1929. E. J. D. MICHIELS 1,704,400

HAND DRIVEN PROPULSION RUDDER FOR CRAFTS AND THE LIKE

Filed July 13, 1927

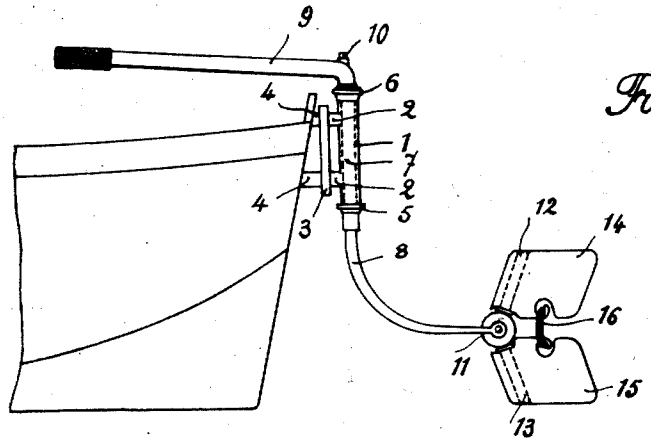


Fig. 1.

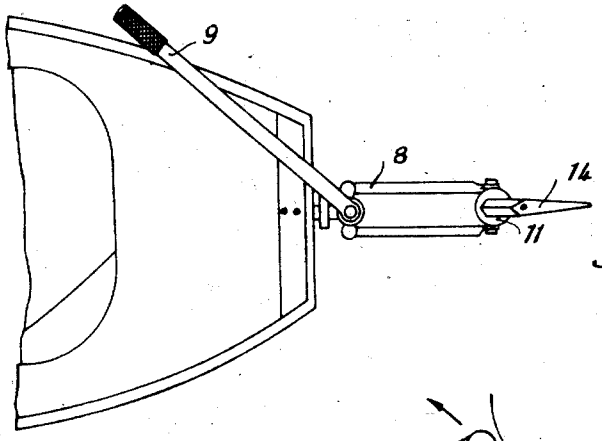


Fig. 2.

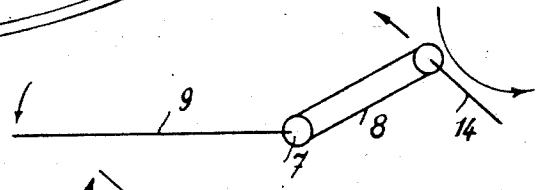


Fig. 3.

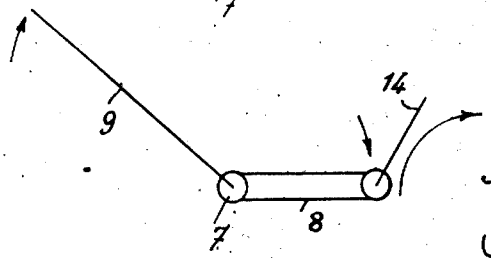


Fig. 4.

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UNITED STATES PATENT OFFICE.

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HAND-DRIVEN PROPULSION RUDDER FOR CRAFTS AND THE LIKE.

Application filed July 13, 1927, Serial No. 205,484, and in France March 5, 1927.

This invention relates to improvements in hand-driven propulsion rudders for crafts, especially small boats, and its object is to provide improved apparatus of the kind which when in action produces in the water a series of reactions similar to those given by a fish-tail, and which are of maximum propulsion effect.

An object is to provide apparatus combining with improved propelling and steering qualities the advantages of compactness and of minimum weight, which may be readily manufactured and installed at small expense, which may be readily operated by hand at minimum effort, which is adapted for use on boats or crafts of many kinds, can be readily dismounted after use and subsequently remounted and reused, without appreciable effort and even by inexperienced people.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevation of a preferred form of my apparatus arranged for use at the stern of a boat.

Fig. 2 is a plan of the same.

Figs. 3 and 4 are diagrams illustrating the theory of operation of the apparatus

A cylindrical sheath 1 of drawn steel is provided with two lateral projections 2 for attaching the sheath to the stern of the craft by means of skate and slide 3, the suitable position whereof, perpendicular to the water-level, is regulated by suitable cross-pieces 4. Ball-bearings 5 and 6 are fitted in the extremities of the tube 1 and a tubular concentrically arranged axle 7 extends through the sheath 1, and has a fork 8 and is arranged for oscillating freely under impulsions imparted by a hand lever 9. This lever is adjustable with regard to direction and height and constitutes the operating hand-lever of the device. Its attachment on the upper end of the tubular axle 7 is effected with the aid of a bolt 10.

The fork 8, bent suitably, is terminated by a member 11 equipped with two axles 12 and 13 arranged at an angle with respect to each other and situated in a plane perpendicular to the main axle of the said member serving for the fixation of the fork 8. On these axles 12, 13 oscillate blades 14 and 15 respectively, of suitable material, for example, wood. The blades are provided in their respective opposing lower and upper sides with recesses and hooks which partly close said recesses and permit connection of the blades together by suitable means such as india-rubber ring 16, and to assure thereby the situation of the axles 12, 13 in the same plane, as indicated in Fig. 1.

This initial plane is hence assured by the constant action of the india-rubber 16, and also by the direction given to the axles 12, 13 or the angle between them and ensures a certain initial position of the blades 14, 15.

The arrangement hence is such as to permit a turning aside of the blades with regard to the initial plane, proportionate to their removal from this plane if oscillating the whole in the same direction, counterbalancng the continuous action of the india-rubber 16. This turning aside is of moment in the operation of the apparatus because it causes the same to create a pocket or sack canalizing the water during the reaction effort and assures efficiency of the apparatus.

If, after adjustment of the lever 9, for example into the position indicated in Fig. 2, a motion toward the left is imparted, by the right hand, to the said lever, the fork 8 and the assembly of the elements—axles and blades, constituting the fish-tail, oscillating around the axle 7, will be directed toward the right and water will exert an effort on the right face of each blade, 14, 15, obliging them to oscillate toward the left around their respective axles 12 and 13, since the surface of each blade is in rear of the axles permitting their oscillation. The action of water producing this turning aside of the blades will have the effect of transmitting a shifting effort forwardly, to the piece 11, which effort is the stronger the more rapid is the motion imparted to the lever 9, the india-rubber 16 equilibrating automatically the resistance of the tail of the fish, in proportion to the strength of the effort produced by the reaction, and limiting the adjustment of the blades 14 and 15 so as to correspond to the value of the effort to be transmitted. The boat will hence receive an impulsion toward the front through the medium of the element 11 of the fork 8, the axle 7 and the elements of fixation 3. At the cessation of the stroke imparted to the lever 9 by the helmsman, the blades 14 and 15 are always acted upon by the india-rubber and reassume their initial position in the plane of the axles 12 and 13, and if at this moment the helmsman imparts an oscillation

toward the right to the lever 9, the fish-tail will adjust itself toward the left and the same series of phases will be produced in the contrary direction, the effort being transmitted to the craft, always in the same way.

The oscillations being transmitted continuously by means of the lever 9, the fish-tail will transmit to the craft an ininterrupted series of efforts toward the front, which will assure a propulsion of the craft at a rate proportioned to the movements and effort of the helmsman, as will be understood. The velocity is only limited by the resistance of the craft to propulsion and the physical effort of the pilot. It should however be remarked that owing to the slight resistant surfaces of the blades and to the difference of the arms of the leverage the effort required to propel the boat at a fair rate of speed is quite insignificant. Moreover, the steering of the craft may be easily accomplished because the fish-tail acts, at rest, absolutely like a rudder. It will be apparent that it is also very easy to displace the direction of the efforts by effecting a series of continuous reactions deviated more or less either to the right or to the left of the craft. It was observed that fishes themselves proceed in this manner and the present invention is, in fact, based on the observation of the phenomena characterizing the advance of fishes in water.

The apparatus as described and shown, can of course undergo different modifications, the foregoing description being restricted to a single executional form only of the invention. The fish-tail could, for example, be horizontal, the steering being in such case assured by a supplementary vertical blade or membrane. Moreover the blades 14 and 15 could be each replaced by an armed membrane arranged to play the same rôle. Finally, the india-rubber 10 could be replaced by a spring or by a simple leaf of india-rubber connecting the blades as will be apparent.

What I claim is:—

1. In a craft, a sheath, means to attach said sheath removably and adjustably at the stern of the craft, an axle in said sheath, a lever at the upper extremity of said axle, a fork at the lower extremity of said axle, blades at the free extremity of the fork and means to produce a turning aside of these blades with regard to the initial plane when oscillating the whole in the same direction.

2. In a craft, a sheath, means to attach said sheath removably and adjustably at the rear of the craft, an axle in said sheath, a horizontal lever at the upper extremity of the axle, to constitute the operating lever of the device, a fork at the lower extremity of the said axle, a plurality of blades at the free extremity of this fork, means to maintain said blades in the same initial plane and to permit the turning aside of one blade with regard to the other during steering effort.

3. In a craft, a sheath, means to attach the same removably and adjustably to the rear of the craft, an axle in said sheath, a hand-lever attached to the upper extremity of said axle, rudder blades and means on which said blades are articulated, attaching the same to the lower extremity of said axle, and elastic means to connect the said articulated blades, to permit a turning aside of the blades with respect to each other and to maintain the same in the same initial plane after cessation of the ruddering effort.

4. Propelling and steering apparatus for boats, comprising a pair of blades arranged in superposed relation with their edges in the same plane, and having pivotal axes, yieldable means active to normally maintain said blades in a common plane and permit their turning therefrom, and means to impart propelling strokes to said blades in such manner that they are first separated and turned aside by the resistance of the water, and then form between them a pocket to guide the water.

In witness whereof I affix my signature.

EUGÈNE JULES DÉSIRÉ MICHIELS.