March 12, 1929. M. OERTZ 1,705,133

TWO-PART RUDDER FOR SHIPS

Original Filed Nov. 17, 1926

Fig. 1.

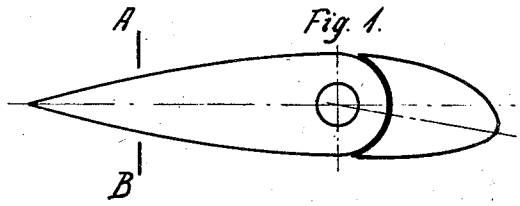


Fig. 2.

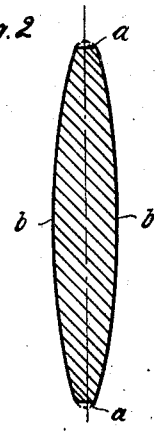


Fig. 3.



Fig. 5

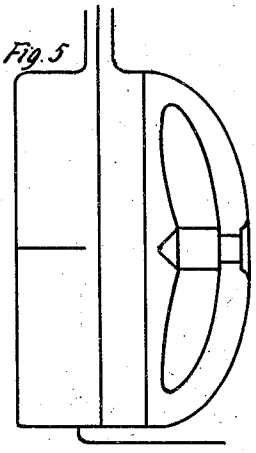
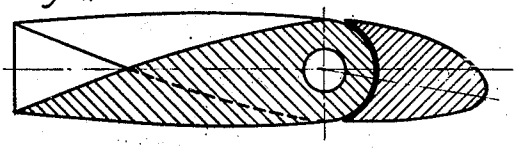


Fig. 4.



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UNITED STATES PATENT OFFICE.

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TWO-PART RUDDER FOR SHIPS.

Original application filed November 17, 1926, Serial No. 148,921, and in Germany April 15, 1926. Divided and this application filed October 4, 1928. Serial No. 310,329.

This application is a division of application No. 148,921, filed November 17, 1926.

In a previous patent the present applicant has described an invention for a two-part rudder, which, being spaced away from the ship's hull, is of a cutwater form. This apparatus is characterized by the feature that the oscillatable rear part of the rudder device is made longer than the front part, which is rigidly connected with the ship's hull, and that the cross-section of the oscillatable part at its broadest part is greater than the cross-section of the stationary front part at its broadest part, the two parts being pivoted to one another at about the position of greatest thickness, so that when the helm is deflected, a form resembling that of the supporting plane of an aeroplane is obtained.

The further developments of this invention form the subject-matter of the present application. All the constructional forms serve to improve the action of the steering gear. According to the first constructional form an improvement admits of being obtained by the inclined position of the rudder post, Fig. 1, in accordance with the inclined lateral direction of the screw-water stream.

It is known that the oblique column of water thrown by the screw, in single screw ships, always renders necessary a slight deflection of the rudder for the purpose of maintaining a course straight ahead. Efforts have therefore been made by means of guiding devices, such as guide-blades and the like fitted to the post, to impart to the screw-water-stream a guidance in the direction of its rotation. Such blade-like devices are, however, very sensitive.

In contrast thereto the applicant arranges in the simplest manner a stationary guide body which constrains the stream of water to give up its rotary direction of movement and flow towards the movable rudder body.

In relation to the direction of rotation of the water current from the screw in single screw ships, the stationary guide body, according to the new constructional form of the invention, is displaced through a small angle in its position relative to the longitudinal ship's plane. By this means even the last twisting effects of the screw race are eliminated. By the term "longitudinal ship's plane" is meant in this specification the plane intersecting the ship vertically in a longitudinal direction passing through the keel.

A further improvement in the construction may be obtained by making the entire device convex, as seen in a vertical section at right angles to the longitudinal ship's plane, that is to say, by shaping it with arcuate lateral outlines.

Figure 2 shows such a section of the entire steering gear taken at any position, for example on the line A—B according to Fig. 1, from which it can be seen that the steering gear has at the top and at the bottom substantially similar cutwater cross sections in accordance with the introduction to the specification, but towards the middle (compare Fig. 2) becomes thicker. In the case of this constructional form also every horizontal section individually has the form which is characteristic of the entire steering gear according to Fig. 1. The vertical sectional elevation at right angles to the longitudinal ship's plane therefore does not constitute a rectangle, but exhibits arcuate lateral outlines, as at *b* in Fig. 2. The upper and lower edges *a* of the rudder may also be rounded to an arc, as indicated in dotted lines in Fig. 2.

A further improvement in single screw ships may now be employed on the rudder body, in such a way that the movable rudder body is not unitarily constructed but consists of two angularly displaced rudder elements, the rear edges of which exhibit the greatest lateral convexity, approximately in the centre of the rudder at the level of the propeller shaft, and towards the top and bottom again approaches the longitudinal ship's plane, these rudder elements, seen in horizontal and vertical section, admitting of having the fundamental forms according to Figs. 1 and 2.

The adapting of a rudder to the screw-water-stream by shaping it with twisted surfaces is already known. As contrasted with this formation, wherein it is not a question of a stationary, thick guiding body formed like a cutwater in front, the applicant displaces two cutwater rudder elements relatively to one another in combination with a stationary cutwater-shaped guide body in such a way as to obtain the best possible effect.

According to the present application, the form shown in Fig. 3 gives a view of the rudder body from the rear, while a horizontal section through the entire steering gear at the level of the propeller shaft gives the form shown in Fig. 4. The figures show, in a man-

ner which will be immediately obvious to the technical man, the entire arrangement, more particularly the form of the movable rudder body.

Fig. 5 shows the corresponding side elevation.

The present invention has the particular advantage of being capable of being readily fitted to ships that are already finished, since for the rudder post only a sheath is required, which is constructed in accordance with the fundamental idea of the present invention, and the back piece of the rudder may also be easily shaped or sheathed to cutwater form.

Any sheathing of the stationary rudder post in this manner already brings with it a thickening which would come under the protection of the patent, as it is obviously not a question of maintaining exact dimensions, but these may be different from one case to another according to the nature of the ship. In the case of a simple sheathing of the rudder post for the purpose of better distribution of the incident water, a considerable effect is already obtained, which the applicant has been the first to recognize.

The apparatus in all the methods of construction described, is obviously adapted not merely for lateral steering but also for depth steering in submarine vessels. For this kind of steering also the same is completely new in all methods of construction and can be particularly advantageously employed.

It is also obvious in the ideas of the present invention, to combine the features of the invention from one case to another for the best result or to employ them individually. Since each feature of each constructional form characterized in the individual claims is completely new in itself and is important for the attaining of a better action of the entire apparatus, the protection should expressly extend both to the use of the individual features by themselves according to the individual claims, and also to any desired combination of the individual features with one another, since after the disclosure of the present invention it is a simple matter for a technical man to choose the combination, for example between lateral and depth rudders, barrel shape or oblique position of the guiding body, which is most suitable for the particular purpose.

What I claim is:

1. A two-part cutwater-shaped rudder comprising a front part or fixed guide body and an oscillatable rear part, the oscillatable rear part of which is made longer than the front part which is rigidly connected with the ship's hull, the pivoting of these two parts being effected at about the position of the maximum thickness, so that when the rudder is deflected, a form resembling that of the supporting surface of an aeroplane is produced, characterized by the feature that said guide body is so arranged that its center line makes a small angle with the longitudinal ship's plane.

2. A two-part cutwater-shaped rudder as claimed in claim 1, characterized by the feature that the entire apparatus has arcuate lateral boundaries in a vertical section at right angles to the longitudinal ship's plane.

3. A two-part cutwater-shaped rudder as claimed in claim 1, characterized by the feature that the movable rudder body consists of two angularly displaced rudder elements, the rear edges of which have their greatest lateral convexity at the level of the propeller shaft and come nearer to the longitudinal ship's plane again in an upward and downward direction.

4. A two-part cutwater-shaped rudder as claimed in claim 1, characterized by the feature that the entire device is constructed as a depth rudder, the guide body of which being so arranged that its center line makes a small angle with the horizontal plane extending through the axis of the propeller.

5. A two-part cutwater-shaped rudder as claimed in claim 1, characterized by the feature that the entire device is constructed as a depth rudder having at its upper and lower surface arcuate outlines in a vertical section at right angles to the longitudinal ship's plane.

6. A two-part cutwater-shaped rudder as claimed in claim 1, characterized by the feature that the entire device is constructed as a depth rudder the movable rear body of which consisting of two angularly displaced rudder elements, the rear edges of which have their greatest lateral convexity at the level of the propeller shaft and come nearer again to the horizontal plane extending through the axis of the propeller towards the lateral outlines.

In testimony whereof I affix my signature.

MAX OERTZ.