

Rudder for ships

This invention relates to a rudder according to the preamble of claim 1.

A rudder for water vehicles is known from the German publication laid to public inspection 25 55 098. The rudder is placed below the hull and comprises a rudder blade with a rudder post and a fin positioned swivellable on the rudder blade. The fin is swivellable by control elements. The rudder blade is supported due to a rudder trunk bearing.

For this solution, it is disadvantageous that the fin control is not protected against external influences such as pressure, strokes or impact shock.

The object of the invention is to improve the rudder in such a manner that the fin control is protected against external pressure, strokes or impact shock.

This aim is achieved by a rudder with the characterizing characteristics of claim 1 in relation with its preamble characteristics.

Due to the protecting elements according to the invention, the fin control is effectively and easily protected against external influences.

Strokes or impact strokes are practically absorbed by the protecting elements so that no damaging of the fin control is possible.

Moreover, the purpose of the additional leading elements is to lead the water flow, in particular when according to a preferred embodiment of the invention the protecting leading elements are configured as guide plates or spoilers. These elements are preferably fixed to a fixed ship part. Due to this embodiment, the leading elements lead the water of the propeller outgoing flow so as to pass by the control elements so that whirls are then avoided in the area of the control elements.

Since a very high pressure can arise in the area of the protecting elements due to the propeller drive, it is favourable when they are fixedly anchored on the hull so that the guiding sheets do not have any negative influence onto the rudder property even in case of a strong water flow caused by the ship propeller.

This effect is improved if the protecting guiding elements are curved or formed favourably for the water flow. The flow property of the ship is then improved on the whole because swirls are reduced to a minimum in the rudder area.

Moreover, a cheap fixing solution results when the protecting guiding elements are formed L-shaped, namely with a first leg which is designed as a fixing leg and a second leg which is designed as a guiding leg. The fixing leg bent by 90° can be for example welded on the hull. Due to the enlarged fixing surface, a multitude of welding points or a solid fixing can be realized.

According to a further advantageous improvement of the invention, the bearing is configured as a rudder trunk bearing configured as a cantilever bearing which is fixedly connected with its end with the hull and which is provided with an inner

bore for receiving a rudder post. This solution has shown to be a solid and proved construction.

Basically the fin motion is depending on the rudder motion so that the fin is always swivelled opposite to the rudder. In an alternative of the invention, the fin control device is designed in such a way that the fin is swivellable independently from the control of the rudder blade. Thus, for example very quick and precise turning maneuvers. Due to the slight inertia of the fins with respect to the rudder, they can carry out very quick changes of direction.

If the fin is moved by means of hydraulic adjusting elements or of other sensitive devices, the protecting plates can be optimally used.

Further advantageous configurations of the invention are characterized in the subclaims.

An embodiment will be explained in more detail with reference to the drawings, whereby further advantageous improvements of the invention and advantages thereof are described.

Fig. 1 shows a perspective illustration of a rudder.

Fig. 1b shows a graphical illustration of a guiding sheet.

Fig. 2 shows a side view of the rudder.

Fig. 3 shows a further perspective illustration of the rudder.

Fig. 4 shows an enlarged view of the fin control device.

Fig. 5 shows a first enlarged perspective illustration of the protecting guiding element.

Fig. 6 shows a second enlarged perspective illustration of the protecting guiding element.

The same parts are indicated with the same reference numerals in the figures.

Fig. 1 shows a rudder 1 according to the invention for ships. The rudder 1 comprises a rudder blade 2 and a fin 3 linked thereon. The rudder blade 2 is connected as a hinge with the rudder fin over its length, whereby there are several intermeshing hinge studs 8 through which one or several hinge bolts which cannot be seen go through.

The rudder 1 or the rudder blade is swivellable over a bearing 4 which can be designed in a known way, for example as a rudder trunk bearing. The rudder blade 2 is rotatable around a rudder post 5 which extends from the hull 6 into the profile of the rudder blade 2.

The rudder as a fully balanced rudder is preferably provided with a cone coupling 7 as it is shown in fig. 2. The shown rudder is designed as a so-called balance profile rudder.

Furthermore, the rudder is provided with a fin control device S comprising control elements 10a, 11a, 12a. This device is placed outside the rudder blade 2, namely at proximity of the bearing between the hull 6 and the rudder blade 2.

The fin control device S moves the fin 3 in opposite direction to the motion of the rudder blade so that the rudder acts like bent

by maneuvers and thus develops a better rudder effect. The fin control device S is made of a fin bracket 10, a hull bracket 12 and a connection bolt 11 which allows a rotation of the fin bracket 10. The wished fin motion develops by retaining the fin bracket 10 in the area of the connection bolt 11.

As fig. 3 illustrates, a ship propeller 13 is placed in close vicinity of the rudder 1, namely below the hull 17 and between the hull 6 and the rudder 1. Thus, the rudder 1 is flown through by a stronger water flow during the ship motion.

According to the invention, protecting elements L are fixed on a ship part, namely in particular on the hull 6 itself, laterally from the control elements 10a to 12a. Preferably, a single protecting guiding element L which covers the fin control device S does exist for each side, as the figures show.

Preferably the protecting guiding elements are designed as guiding sheets or spoilers which are fixed on a fixed ship part or on the hull 17 and which are thus fixedly anchored.

The guiding sheets L protect the control elements 10a to 12a against damage, for example due to pressure or impact shock.

As fig. 3 illustrates, the guiding sheets L can be bent favourably to the water flow. They are for example formed round around the fin control device S so that the water flow passes by it. This causes little swirls which results in an increased efficiency.

As fig. 1b shows, in which a single guiding sheet L is shown, this guiding sheet is formed L-shaped. It is provided with a first leg 14 which is designed as a fixing leg and which is provided

with a second leg 15 which is designed as guiding leg. The guiding leg serves as a protecting plate.

As fig. 5 and 6 show, the guiding sheet can also be plate-shaped. It must not be relatively long either. At the lower end of the guiding sheet L, this sheet is fixed for example to a fixed side bracket 16, whereby the view in fig. 6 is from below.

The invention is not limited to this example. The rudder can also have another bearing connection.

The bearing is for example configured as a rudder trunk bearing which is fixedly connected with the hull with its end and which is provided with an inner bore which receives a rudder post. However, other embodiments of the rudder are also possible.

The fin control device can also be designed in such a manner that the fin is swivellable independently from the control of the rudder blade. Electric or hydraulic solutions can thus be used.

The protecting guiding sheets are preferably placed and configured in such a manner that, for a rudder blade position for a straight course of the ship, the protecting guiding elements are aligned with the side walls of the rudder blade 2 or are situated in the extension of the side walls of the rudder blade 2 so that there cannot come to flow turbulences in the propeller outgoing flow in the transition area between the protecting guiding elements and the side walls of the rudder blade 2.

List of reference numerals

1	Rudder
2	Rudder blade
3	Fin
4	Bearing
5	Rudder post
6	Hull
7	Cone coupling
8	Hinge stud
9	-
10a,	
11a,	
12a	Control elements
10	Fin bracket
11	Connection bolt
12	Hull bracket
13	Ship propellers
14	First leg
15	Second leg
16	Side bracket
17	Hull
S	Fin control device
L	Protecting guiding elements

Claims

1. A rudder (1) for ships comprising:
 - a bearing;
 - a rudder blade (2) that is pivotable at the bearing;
 - a fin (3) hinged to the rudder blade (2);
 - a fin control device (S) that can be secured outside the rudder blade (2) near the bearing between a ship body (6) and the rudder blade (2), wherein the fin control device (S) comprises control elements (10a, 11a, 12a); and
 - protective guide elements (L) that can be secured to a section of the ship to a side of the control elements (10a, 11a, 12a), wherein
 - the protective guide elements (L) are designed as baffle plates or spoilers; wherein
 - the protective guide elements (L) can be secured to a fixed section of the ship, specifically rigidly anchored to the hull (17); and
 - wherein
 - the protective guide elements (L) are L-shaped, with a first leg (14) designed as an attachment leg, and a second leg (15) designed as a guide leg.
2. The rudder according to claim 1, characterized in that the protective guide elements (L) are bent in a way conducive to the flow of water.
3. The rudder according to one of the preceding claims, characterized in that the bearing (4) is a cantilever bearing designed as a rudder trunk bearing, the free end of which is rigidly joined with the ship body (6), and which is provided with an inner borehole that accommodates a rudder shaft (5).

4. The rudder according to one of the preceding claims, characterized in that the fin control device (S) is designed in such a way that the fin (3) can be swiveled independently of rudder blade (2) control.
5. The rudder according to any one of the preceding claims 1 to 3, characterized in that the fin control device (S) further comprises hydraulic actuator elements.
6. The rudder according to one of the preceding claims, characterized in that the rudder (1) as a fully suspended rudder is equipped with a conical coupling (7).
7. The rudder according to any one of the preceding claims 1 to 5, characterized in that the rudder (1) as a fully suspended rudder is designed as a balance profile rudder.
8. The rudder according to one of the preceding claims, characterized in that the protective guide element (L) is arranged and designed in such a way that, when the rudders are set for the ship to travel straight ahead, the protective guide elements are flush with the lateral walls of the rudder blade (2), or lie in the extension of the lateral walls of the rudder blade.
9. A ship with a rudder according to one of the preceding claims, characterized by a ship propeller (13) arranged between the ship body (6) and fins (3).