[0009]

Patent Document 1: Japanese Patent Application *Kokoku* Publication No. 1995-121716

Patent Document 2: Japanese Patent No. 3491890

Patent Document 3: Japanese Utility Model Registration Application *Kokai* Publication No. 1993-7599

Patent Document 4: Japanese Utility Model Registration Application *Kokoku* Publication No. 1995-34795

SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0010]

An object of the present invention is to provide a ship propulsion device and a ship provided therewith, the ship propulsion device formed of a screw propeller using a fin-equipped propeller boss cap and having a better workability and less weight than a ship propulsion device using a propeller boss cap equipped with fins having prior-art fin shapes and a ship provided with the ship propulsion device.

MEANS FOR SOLVING THE PROBLEM

[0010a]

According to the first aspect of the present invention, there is provided a ship propulsion device in which a fin is provided on a propeller boss cap mounted on a rear side of a propeller boss of a screw propeller, wherein: when viewed from a rear side along the propeller axis, a front end of a root of the fin is disposed between rear ends of roots of a pair of propeller blades, when viewed from a lateral side, the front end of the root of the fin is disposed behind the rear end of the roof of a propeller blade, a diameter of a front end portion of the propeller boss cap is set as a reference diameter, and a rear half of the fin is formed into such a shape as to fall into a circular truncated cone having, as its bases: a circle that is situated at a middle position between the front end and a rear end of

a root of the fin, that has a diameter 2.0 times as large as the reference diameter, and that is centered on a rotation center of the propeller, and a circle that is situated at a position of a rearmost end of the fin, that has a diameter 1.5 times as large as the reference diameter, and that is centered on the rotation center of the propeller, both circles being in the plane of the fin that is perpendicular to a segment line connecting the front and rear ends of the root of the fin.

[0011]

In a ship propulsion device to achieve the above object, according to a ship propulsion device in which a fin is provided to a propeller boss cap mounted on a rear side of a propeller boss of a screw propeller and the fin is disposed between but behind propeller blades, a diameter of a front end portion of the propeller boss cap is set as a reference diameter, and a rear half of the fin is formed into such a shape as to fall into a circular truncated cone having, as its bases, a circle that is situated at a middle position between a front end and a rear end of a root of the fin, that has a diameter 2.0 times, or more

preferably, 1.8 times as large as the reference diameter, and that is centered on a rotation center of the propeller, and a circle that is situated at a position of a rearmost end of the fin, that has a diameter 1.5 times, or more preferably, 1.3 times as large as the reference diameter, and that is centered on the rotation center of the propeller.

[0012]

Note that the wording, "at a middle position," means "to include the middle position and also to be in the plane of the fin that is perpendicular to a segment line connecting the front and rear ends of the root of the fin." Also, the wording, "at a position of a rearmost end" means "to include the position of the rearmost end and to be in the plane of the fin that is perpendicular to a segment line connecting the front and rear ends of the root of the fin."

[0012a]

According to the second aspect of the present invention, there is provided a ship propulsion device in which a fin is provided on a portion of a propeller boss of the screw propeller which is behind the propeller blades, wherein: when viewed from a rear side along the propeller axis, a front end of a root of the fin is disposed between rear ends of roots of a pair of propeller blades, when viewed from a lateral side, the front end of the root of the fin is disposed behind the rear end of the root of a propeller blade, a diameter of the propeller boss at the rear ends of the roots of the propeller blades is set as a reference diameter, and a rear half of the fin is formed into such a shape as to fall into a circular truncated cone having, as its bases: a circle that is situated at a middle position between the front end and a rear end of a root of the fin, that has a diameter 2.0 times as large as the reference diameter, and that is centered on a rotation center of the propeller, and a circle that is situated at a position of a rearmost end of the fin, that has a diameter 1.5 times as large as the reference diameter, and that is centered on the

rotation center of the propeller, both circles being in the plane of the fin that is perpendicular to a segment line connecting the front and rear ends of the root of the fin.

[0013]

In the ship propulsion device to achieve the above object, according to the ship propulsion device, instead of providing the fin to the propeller boss cap, the fin is provided to each of portions on the propeller boss of the screw propeller which are behind the propeller blades, and the reference diameter is set as a diameter defined by a rear end of a root of each of the propeller blades on the propeller boss.

[0014]

In addition, according to the ship propulsion device, a front half of the fin is formed into such a shape that a distance from the front end of the root of the fin to a frontmost end of the fin in a direction along which the front and rear ends of the root are connected is set to be 0.0 to 0.3 times as large as the reference diameter, a diameter of a circle passing over

an outermost portion of the fin is set to be 1.0 to 2.5 times, or more preferably, 1.0 to 2.3 times as large as the reference diameter, and a diameter of a circle passing over an outermost portion of the fin at the middle position of the fin is set to be 1.0 to 2.0 times, or more preferably, 1.0 to 1.8 times as large as the reference diameter.

[0015]

Some prior-art fins are each formed into a shape in which front and rear halves thereof are substantially symmetrical about a center line. However, a flow behind propeller blades contracts rapidly. Thus, it is preferable for the rear half of the fin to have such a shape that a rear edge side thereof is cut off, as it can reduce the resistance of the fin while maintaining a fin effect on the contraction behind the propeller. Accordingly, as compared to the prior-art fin shapes, the machining is simple, thereby allowing lower manufacturing cost and also lighter weight. In addition, it is also effective for improving the propeller efficiency. From the finding of these facts through the tank experiments and so forth, the shape should be as above. Furthermore, as a result of an analysis of the flow over the fin surface based on a CFD (Computation Fluid Dynamics) computation, it was found that a rear edge side of an outer circumference of the fin produced resistance and that cutting such a portion led to an improvement in propeller efficiency.

[0015a]

According to the third aspect of the present invention, there is provided a ship comprising the ship propulsion device as described herein.

[0016]

The ship for achieving the above object is designed to include the above ship propulsion device. Accordingly, it is possible to provide a ship including a ship propulsion device having a better workability and less weight than a ship