by disposing a fin within a predetermined range of a hull (See Patent Literature 4).

Citation List

Patent Literature

[0006]

Patent Literature 1: JP 5132140 B1

Patent Literature 2: JP 3808726 B1

Patent Literature 3: Japanese Utility Model Registration No. 3097653

Patent Literature 4: JP 6041440 B1

Summary of Invention

Technical Problem

[0007]

Even in the invention disclosed in Patent Literature 4, although propulsion efficiency can be improved, for example, in the case of a fat ship with a large block coefficient (CB), regions of slow zones tend to be wide, and there is room for further improvement.

[0008]

Embodiments of the present invention has been made in view of such a problem, and embodiments of the present invention seek to provide a fin device and a ship that may be capable of improving propulsion efficiency and enabling energy saving by concentrating regions of slow zones on a propeller surface.

Solution to Problem

[0009]

According to a first aspect of the present invention, a fin device disposed on a hull provided with a side flat having a planar shape and formed in the ship length direction on a ship side is provided. The fin device has a plurality of fins at least part of which of the plurality of fins is disposed within a region surrounded by a straight line $L_1$ connecting a stern-side lowest point $P_1$ of the side flat and an intersection Q between a design waterline DWL and a propeller line PL indicating a position of a propeller, a bilge height line BHL indicating a bilge height, and the propeller line PL, wherein the region includes a first region surrounded by a straight line $L_2$ passing through an intersection $P_2$ between a rear end line SEL of the side flat and the bilge height line BHL and parallel to the straight line $L_1$, the straight line $L_1$, the bilge height line BHL, and the propeller line PL, and at least part of each of the plurality of fins is disposed in the first region, wherein the plurality of fins includes at least two fins whose positions in a horizontal direction are different, and a fin positioned on a stern-part side is disposed above a fin positioned on a bow-part side.

[0009a]

According to a second aspect of the present invention, there is provided a fin device disposed on a hull provided with a side flat having a planar shape and formed in a ship

length direction on a ship side, the fin device comprising: a plurality of fins at least part of which is disposed within a region surrounded by a straight line $L_1$ connecting a stern-side lowest point $P_1$ of the side flat and an intersection Q between a design waterline DWL and a propeller line PL indicating a position of a propeller, a bilge height line BHL indicating a bilge height, and the propeller line PL, wherein the region includes a second region surrounded by a straight line $L_3$ passing through an intersection $P_3$ between a vertical line FTL passing through a front end of a first fin disposed closest to a bow part and the bilge height line BHL and parallel to the straight line $L_1$, the straight line $L_1$, the bilge height line BHL, and the propeller line PL, and at least part of each of the plurality of fins is disposed in the second region, wherein the plurality of fins includes at least two fins whose positions in a horizontal direction are different, and a fin positioned on a stern-part side is disposed above a fin positioned on a bow-part side.

[0010]

In addition, as disclosed, a ship including a fin device disposed on a hull provided with a side flat having a planar shape and formed in the ship length direction on a ship side is provided. The ship has a plurality of fins at least part of each of the plurality of fins is disposed

within a region surrounded by a straight line $L_1$ connecting a stern-side lowest point $P_1$ of the side flat and an intersection Q between a design waterline DWL and a propeller line PL indicating the position of a propeller, a bilge height line BHL indicating a bilge height, and the propeller line PL.

[0011]

CLAIMS

1. A fin device disposed on a hull provided with a side flat having a planar shape and formed in a ship length direction on a ship side, the fin device comprising:

a plurality of fins at least part of which is disposed within a region surrounded by a straight line $L_1$ connecting a stern-side lowest point $P_1$ of the side flat and an intersection Q between a design waterline DWL and a propeller line PL indicating a position of a propeller, a bilge height line BHL indicating a bilge height, and the propeller line PL, wherein

the region includes a first region surrounded by a straight line $L_2$ passing through an intersection $P_2$ between a rear end line SEL of the side flat and the bilge height line BHL and parallel to the straight line $L_1$, the straight line $L_1$, the bilge height line BHL, and the propeller line PL, and at least part of each of the plurality of fins is disposed in the first region, wherein

the plurality of fins includes at least two fins whose positions in a horizontal direction are different, and a fin positioned on a stern-part side is disposed above a fin positioned on a bow-part side.

2. A fin device disposed on a hull provided with a side flat having a planar shape and formed in a ship length

direction on a ship side, the fin device comprising:

a plurality of fins at least part of which is disposed within a region surrounded by a straight line $L_1$ connecting a stern-side lowest point $P_1$ of the side flat and an intersection Q between a design waterline DWL and a propeller line PL indicating a position of a propeller, a bilge height line BHL indicating a bilge height, and the propeller line PL, wherein

the region includes a second region surrounded by a straight line $L_3$ passing through an intersection $P_3$ between a vertical line FTL passing through a front end of a first fin disposed closest to a bow part and the bilge height line BHL and parallel to the straight line $L_1$, the straight line $L_1$, the bilge height line BHL, and the propeller line PL, and at least part of each of the plurality of fins is disposed in the second region, wherein

the plurality of fins includes at least two fins whose positions in a horizontal direction are different, and a fin positioned on a stern-part side is disposed above a fin positioned on a bow-part side.

3. The fin device according to claim 1 or 2, wherein the plurality of fins is disposed such that vortices generated by the plurality of fins interfere with each other.

4. The fin device according to claim 1 or 2, wherein the plurality of fins is disposed so as not to exceed a ship width.

5. The fin device according to claim 1 or 2, wherein the plurality of fins is disposed substantially horizontally.

6. A ship comprising a fin device disposed on a hull provided with a side flat having a planar shape and formed in a ship length direction on a ship side, wherein

the fin device is the fin device according to any one of claims 1 to 5.

7. The ship according to claim 6 comprising a straightening device which is disposed in front of a propeller disposed in a stern part and straightens a water flow flowing into the propeller.