July 19, 1955 J. HERZ 2,713,317

BOAT HAVING PIVOTABLE UNDERWATER HYDROFOILS

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Fig. 1

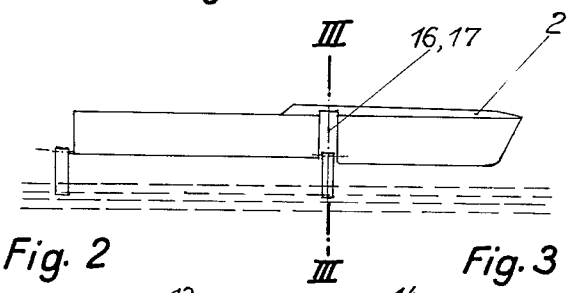


Fig. 2

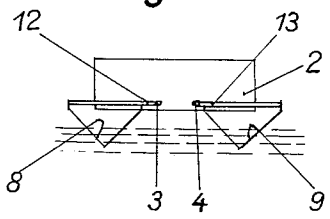


Fig. 3

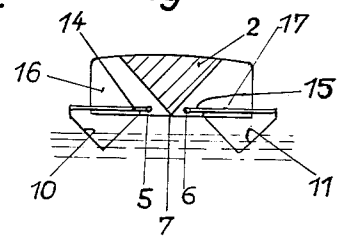


Fig. 4

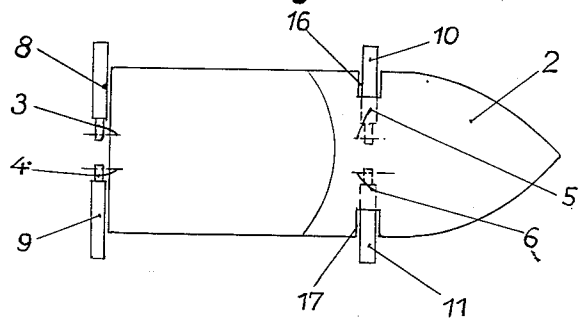


Fig. 5

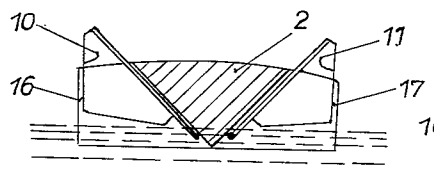
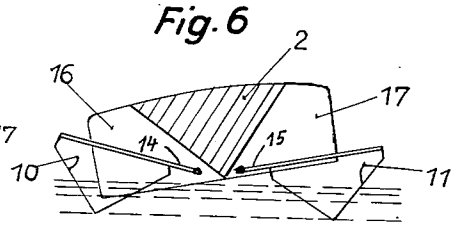


Fig. 6



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BOAT HAVING PIVOTABLE UNDERWATER HYDROFOILS

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Claims priority, application Germany January 2, 1952
10 Claims. (Cl. 114—66.5)

The known boats having underwater wings being slewable about a transverse axis show the disadvantages, that the axles of the wings overhang the border, so that the breadth of the boat when landing is enlarged, that the wings cannot be swung in its high position, when the boat is driving, and further that the boat driving on its wings cannot turn sharp curves. These disadvantages are avoided by the invention.

According to the invention the boat has two underwater hydrofoil systems lying side by side, each of which being pivotable, preferably independently of each other, about an axis lying in longitudinal direction of the boat. Transverse recesses may be provided on the sides of the boat, in which the wings may be swung. The axles of the wings preferably are arranged in the neighborhood of the keel of the boat. The wings may have a swinging arm fastened to the wing and being slewable about its axle, so as to allow the swinging of the wing wholly out of the water.

A separate slewing mechanism for each of the wing systems on the sides of the boat may be provided, said mechanism being adapted to swing each wing system independently of the other system during the boating. The body of the boat may have the shape of a normal keeled or of a gliding boat, so that, when the wings are swung up, the boat can drive as a normal or a gliding boat having a graduated bottom. Each of the wings may have a V-shape, seen from behind.

By means of these arrangements the wings can be swung up wholly or partially, also when the boat is driving with high speed on its wings, whereby the boating can be continued without stopping. By rapidly swinging up the front wings the bow of the boat can be pressed on the water in order to increase the travelling resistance and to reduce the stopping distance. In order to incline the boat turning a sharp curve, the inner wings can be swung up in as much as necessary. When the boat is landing, the wings can be swung wholly out of the water, so that the wings are protected from growth of algae and the boat gets a little breadth.

The drawing shows schematically a preferred construction of a boat according to the invention.

Fig. 1 is a side view,

Fig. 2 is a rear view,

Fig. 3 is the section III—III of Fig. 2,

Fig. 4 is a horizontal plan,

Fig. 5 is a section III—III of the boat in enlarged scale, when the boat is in the position of rest, and

Fig. 6 is a section III—III of the boat in enlarged scale, when the boat is turning a sharp curve.

According to Figs. 1–4 a boat **2** is provided with four separate longitudinal axles **3, 4, 5, 6** arranged in the neighbourhood of the keel **7**. V-shaped narrow hydrofoils **8, 9, 10, 11** with swinging arms **12, 13, 14, 15** fastened to each of said wings are pivotable about the axles **3, 4, 5, 6** independently of each other during boating by separate mechanisms provided in the boat, so that the boat turning a sharp curve can be inclined to the inner side of the curve, as shown in Fig. 6. In order to make

it possible to swing up the front hydrofoils **10, 11** about the axles **5, 6** the body of the boat is provided with recesses **16, 17**, as shown in Figs. 1 and 3–6. When the boat is slowly cruising or is in the position of rest, all hydrofoils **8–11** can be swung upwards and inwards, so that the lower portions of the hydrofoils are situated within the profile of the boat and do not dip in the water, as shown in Fig. 5.

I claim:

1. In a boat structure of the type described, in combination, a boat hull having opposite sides and a bottom and having a longitudinal axis; at least one hydrofoil means mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond one side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving said hydrofoil means between its operative and inoperative positions.

2. In a boat structure of the type described, in combination, a boat hull having opposite sides and a bottom and having a longitudinal axis; at least two hydrofoil means arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving each hydrofoil means between its operative and inoperative positions.

3. In a boat structure of the type described, in combination, a boat hull having opposite sides and a bottom and having a longitudinal axis, said hull being formed with a pair of opposite transverse recesses; at least two hydrofoil means arranged in said recesses on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted into its respective recess laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving each hydrofoil means between its operative and inoperative positions.

4. In a boat structure of the type described, in combination, a boat hull having opposite sides, a bottom and a keel and having a longitudinal axis; at least two hydrofoil means arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull, each hydrofoil means comprising a hydrofoil member and an arm member connected thereto projecting inwardly beyond its respective hydrofoil member toward the keel of said hull and pivotally connected to said hull adjacent to said keel at a point spaced inwardly from its respective hydrofoil member; and means for moving each hydrofoil means between its operative and inoperative positions.

5. In a boat structure of the type described, in combination, a boat hull having opposite sides, a bottom and a keel and having a longitudinal axis; at least two hydrofoil means arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between

an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull, each hydrofoil means comprising a V-shaped hydrofoil member and an arm member connected thereto projecting inwardly beyond its respective hydrofoil member toward the keel of said hull and pivotally connected to said hull adjacent to said keel at a point spaced inwardly from its respective hydrofoil member; and means for moving each hydrofoil means between its operative and inoperative positions.

6. In a boat structure of the type described, in combination, a boat hull having opposite sides and a straight bottom and having a longitudinal axis; at least two hydrofoil means arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving each hydrofoil means between its operative and inoperative positions.

7. In a boat structure of the type described, in combination, a boat hull having opposite sides and a stepped bottom and having a longitudinal axis; at least two hydrofoil means arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving each hydrofoil means between its operative and inoperative positions.

8. In a boat structure of the type described, in combination, a boat hull having opposite sides and a bottom and having a longitudinal axis; a pair of front hydrofoil means and a pair of rear hydrofoil means, the hydrofoil means in each pair being arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving each hydrofoil means between its operative and inoperative positions.

9. In a boat structure of the type described, in combination, a boat hull having opposite sides and a bottom and having a longitudinal axis, said hull being formed with a pair of opposite transverse recesses intermediate its ends; a pair of front hydrofoil means arranged in said opposite transverse recesses and a pair of rear hydrofoil means arranged at the rear end of said hull, the hydrofoil means in each pair being arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for moving each hydrofoil means between its operative and inoperative positions.

10. In a boat structure of the type described, in combination, a boat hull having opposite sides and a bottom and having a longitudinal axis, said hull being formed with a pair of opposite transverse recesses intermediate its ends; a pair of front hydrofoil means arranged in said opposite transverse recesses and a pair of rear hydrofoil means arranged at the rear end of said hull, the hydrofoil means in each pair being arranged on opposite sides of said longitudinal axis and each being mounted on said hull for turning about an axis parallel to the longitudinal axis of said hull between an operative position projecting laterally beyond the respective side of said hull and projecting downwardly below the bottom of said hull, and an inoperative position retracted laterally entirely within the side of the hull and entirely above the bottom of the hull; and means for independently moving each hydrofoil means between its operative and inoperative positions.

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