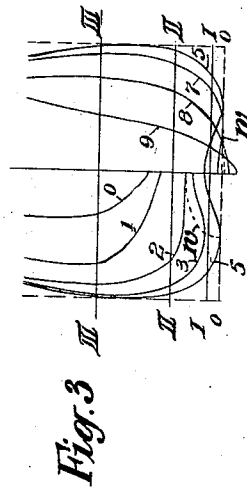
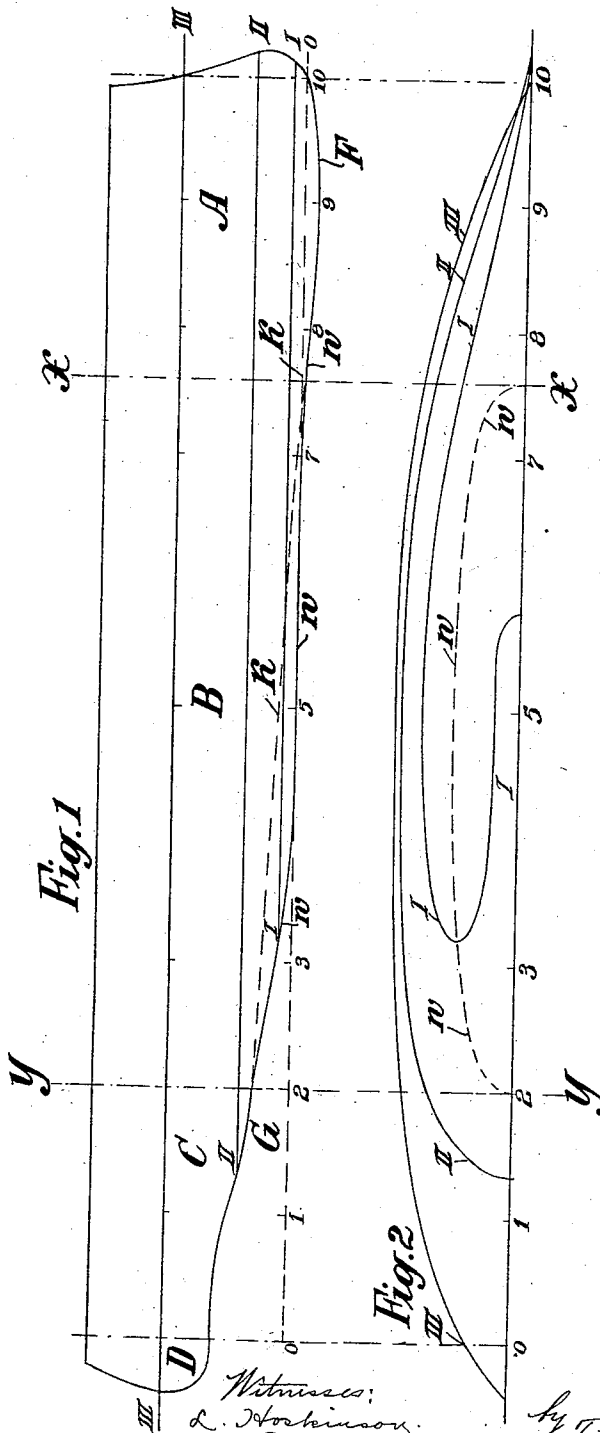


L. VON KÖPPEN.
SHIP'S HULL,
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1,060,985.

Patented May 6, 1913.



Witnesses:
L. H. Johnson.
C. S. Brown.

Inventor:
Lothar von Köppen.
by Foster Furman Nelson & Co.,
Attys.

UNITED STATES PATENT OFFICE.

LOTHAR VON KÖPPEN, OF HANOVER, GERMANY.

SHIP'S HULL.

1,060,985.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOTHAR VON KÖPPEN, subject of the Emperor of Germany, residing at Hanover, in Germany, have invented certain new and useful Improvements in Ships' Hulls, of which the following is a specification.

This invention relates to the construction of ships' hulls and has for its object to improve the speed and other qualities of vessels.

According to this invention the vessel is constructed with a downwardly wedge shaped fore part which is adapted to cleave the water as the vessel advances and at the same time leave as far as possible undisturbed the water over which the midship portion of the vessel has to pass. The wedge shaped fore part which may extend aft for approximately one-third of the length of the vessel has the downwardly directed wedge gradually reduced or flattened from the bow aft until the apex of this wedge vanishes. This flattening of the wedge is effected in the following way, the apex is gradually raised or drawn up while the sides of the wedge are drawn apart causing the angle of the apex to increase to 180°. At this stage the apex has vanished and the sides of the wedge adjacent to the apex have become substantially a flat surface, the sides of the wedge at a higher level still however lying at an angle to each other and being faired off to the midship portion of the vessel. After this vanishing of the apex of the wedge and at the commencement of the midship part of the vessel a central longitudinal recess of suitable dimensions is developed with easy transverse curves. Alternatively the bottom is formed flat or flattish with curved sides the dimensions of the recess or flat part being controlled as hereinafter described. The commencement of the formation of the recess is effected by raising the bottom of the vessel more or less abruptly simultaneously with a gradual lowering of the lateral portions, which are developed from the sides of the wedge when the flattening of the apex has taken place. Toward the stern the recess gradually vanishes by reducing the sides of the recess the central line continuing smoothly aft. Just at the point where the recess is vanishing an after

wedge shaped part commences this wedge acting to divide the water which emerges from the after end of the recess.

In contradistinction to the way in which the fore end of the recess is developed the after end vanishes by smoothly continuing the contour of the top of the recess with an upward tendency while the sides are reduced till the recess ceases to be apparent. At this stage the after wedge commences, the line or contour of the apex being a smooth longitudinal continuation of the contour of the recess. Thus the water flowing from the recess is acted on by the wedge and divided so as to be distributed in a manner advantageous to the movement of the vessel and the action of the propellers. The draft of the after wedge is less than the draft of the fore wedge though the vertical measurement from the water line to the lowest point of the after wedge may exceed the similar measurement to the center line of the after end of the recess. By carrying this after wedge shaped part gradually upward as the rudder post is approached the stern of the vessel is gradually raised out of the water over which the midship portion has passed without there being any undue tendency to draw this water upwardly or conversely to drag down the stern into this water. This wedge shaped part is preferably only carried aft for a certain distance say to at or about the position of the rudder post. From the rudder post aft the stern is formed flattish when regarded longitudinally but suitably curved transversely the longitudinal flattish portion being continued for a suitable distance and then carried upward in an easy curve. This portion of the stern from the rudder post aft thus practically constitutes a submerged counter of such shape that it will tend to be acted upon favorably by the following wave.

Preferably the stem of the vessel rakes aft so that the foremost portion of the wedge extends slightly in advance of the stem head. Similarly the stern above the water line is preferably curved forward.

In a ship constructed in accordance with this invention the forward wedge shaped portion which is comparatively slender serves to cleave the water as the ship advances producing a reduced bow wave which

is thrown farther aft than usual the water being so divided that the ship tends to go through without rising. Coming to the midship portion the water divided by the wedge passes to either side and comparatively undisturbed water is left over which the flat-tish or recessed bottom of the midship portion can glide. The wedge shaped part of the stern assists in the easy flow from beneath the vessel of the water as the vessel advances and coöperates with the submerged counter in preventing any undue tendency for the stern to sink and the bow as a result to rise up. The formation of bow and stern is such that the rising and falling tendencies of these parts are as nearly balanced as possible being assisted in this by the action of the propellers. At the same time the formation of the stern enables an easy run to be given to the vessel and prevents undue drag on the water tending to follow the vessel.

It will thus be seen that the improved vessel comprises the advantages of a vessel constructed to cleave and pass through the water with one which is adapted to glide over the water.

In the accompanying drawings, Figure 1 is a sheer plan of a vessel constructed in accordance with this invention. Fig. 2 is a water line plan. Fig. 3 is a body plan.

On the several figures of the drawings horizontal sections are indicated by Roman characters I, II, III, and the several transverse sections shown on the body plan are indicated by corresponding Arabic numerals in Figs. 1 and 2.

For the purpose of the present description it will be convenient to consider the vessel as divided into three parts longitudinally, the division between the several parts being indicated respectively by the lines X—X and Y—Y. The parts into which the vessel is thus divided are herein termed the fore body A, the midship body B and the after body C. The after body is shown as provided with an extension or counter D which is partly submerged, as indicated on the drawings.

The bottom of the fore body A is constructed as a downwardly directed wedge the apex of which appears most prominent at F, adjacent the forward end of the fore body. This apex is gradually drawn up or flattened out as it passes aft, as indicated by the section lines 9, 8, 7 of Fig. 3 and at or about the plane X—X it emerges into the flattened portion of the midship body, which flattened portion rises from forward aft and is preferably recessed. This recess results from the development of rounded bilges *w*, the lowest part of which run at first horizontally and subsequently toward the stern rise up to the neighborhood of the plane

Y—Y, the keel line *z*, however, rising steadily and continuously from the line X—X to the line Y—Y. The recess thus produced is clearly shown in the drawings. At or about the plane indicated by the line Y—Y, that is to say where the recess terminates, there is developed the stern wedge G by drawing up the lateral portions of the bottom as represented. It is essential that the flattened or recessed portion which is protected in front by the wedge shaped fore part of greater draft, should terminate in a stern portion of higher level, that is to say of less draft, this stern portion being preferably wedge shaped. There is thus a general tendency of the latter or flattened recessed portion to rise from the bow to the stern.

The transition between the fore wedge and the recess may be comparatively sudden in so far as the raising of the floor is concerned. The side portions, however, of said wedge must be as before described, faired off, so that they will tend to direct the water laterally or divert it into two streams, neither of which will have a tendency to enter the central recess. On the other hand, the transition between the after end of the recess and the after wedge is relatively gradual and smooth, the object being to insure a smooth flow of the water from the after end of the recess, this water being divided by the after wedge in a manner favorable to its passage to the propellers.

The shapes of the stern and submerged counter are such that the water drawn or tending to follow after the vessel acts on the stern in an advantageous manner.

I claim—

1. A ship's hull comprising a midships section the bottom of which is shaped to provide a longitudinally extending recess the longitudinal central line of which rises continuously from its forward to its rear end, the latter being in advance of the stern post, and a downwardly directed wedge shaped portion that closes the forward end of said recess.

2. A ship's hull comprising a midships section the bottom of which is shaped to provide a longitudinally extending recess the longitudinal central line of which rises continuously from its forward to its rear end, the latter being in advance of the stern post, and the maximum area of the recess being approximately amidships, and a downwardly directed wedge shaped portion substantially closing the forward end of said recess.

3. A ship's hull comprising a midships section the bottom of which is shaped to provide a longitudinally extending recess, the longitudinal central line of which rises

continuously from its forward to its rear end, the latter being in advance of the stern post, and a downwardly directed wedge shaped portion substantially closing the forward end of said recess, the apex angle of which increases aft until the apex vanishes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOTHAR VON KÖPPEN.

Witnesses:

L. VAN DER RAUN,
J. M. BOWCOCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."