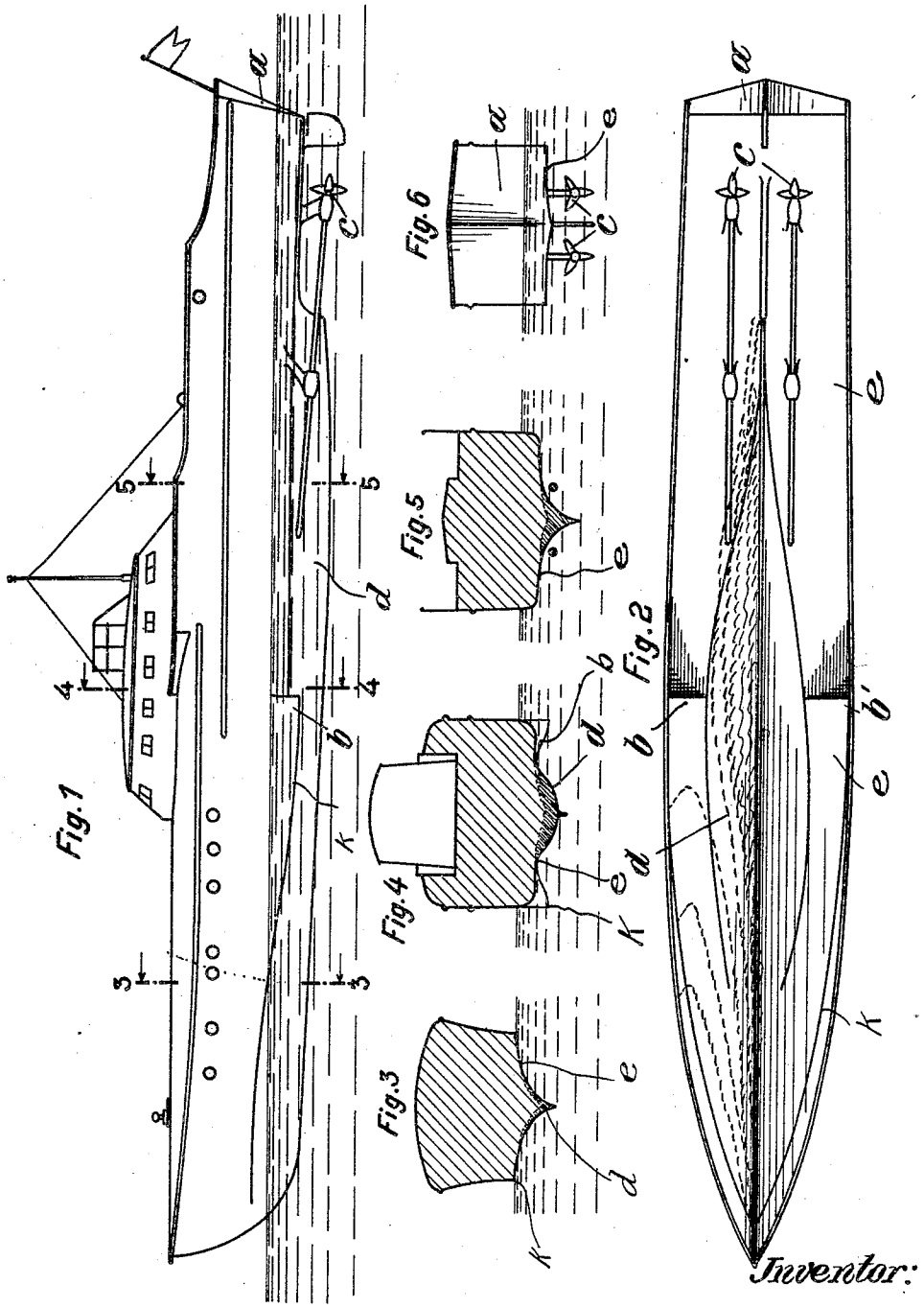
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SHIP'S HULL

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SHIP'S HULL

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My invention relates to an improvement in the construction of ships' hulls.

It has already been proposed, in order to increase the speed of ships, to provide the hull of the ship with transverse steps and to make the front half of the bottom of the ship somewhat downwardly inclined. This arrangement has been used effectively for so-called hydroplanes, which at low speed operate as ordinary displacement vessels and at high speed are lifted out of the water whereby the displacement is decreased.

The present invention also makes use of this means, but with the special construction that the bottom of the ship, which in a way known per se has in the forward half of the ship a V-shape and in the rear half runs out flat, about in the neighborhood of the half of the length of a ship has amidships a water displacing bulge which merges into the above described bottom, increases gradually from the ends to the middle, is the widest about amidships and by the arrangement of which the keel of the ship is materially drawn down. If the arrangements known per se are combined in the manner stated with this bulge, which is hereinafter designated as a displacement body, there is obtained the advantage that the vehicle at high speeds is more stable and seaworthy and holds its course better in disturbed water, for example in waves and swells. At high speed the usual trimming of the hydroplane takes place, whereby the forward part of the ship is lifted out of the water. Where otherwise the entire forward part of the ship would be suspended above the water, in this case the displacement body with its depressed keel remains in the water like a sharp knife edge. For this reason the relative loss in displacement and in lateral surface (projection of the submerged part of the ship on the vertical longitudinal plane of the ship) is not as large by far as it would be without the added supplemental displacement body. The displacement body also prevents the ship from being thrown about or caused to slip by waves and swells, because in the first place the displacement body depresses the center of gravity and the center of buoyancy with simultaneous increase of the metacentric height and tranverse stability, and second the greater lateral surface offers a materially greater resistance to the lateral slip of the boat. At the stern the bottom is drawn somewhat downwardly and cut off sharply. Thereby the stern acts as a second step. As a result of this construction of the shape of the stern the dynamic force of the water current in the neighborhood of the stern operates so that a longitudinal trimming of the hull of the ship is produced, which acts in opposition to the longitudinal trimming by the pressure of the water upon the forward bottom of the ship and weakens this latter longitudinal trimming considerably.

A ship constructed in accordance with these principles is shown in the drawings:

Figure 1 shows a side elevation;

Fig. 2 a composite bottom view, the upper part showing the course of various water lines;

Figs. 3 to 5 are cross-sections;

Fig. 6 rear elevation of the end of the stern.

The hull of the ship at its forward bottom part is V-shaped with a sharp keel portion which is gradually widened by a displacement body *d*; the displacement body *d* expands through a region of about half the length of the vessel amidships, being widest amidships and decreases gradually toward the ends. In Figs. 3, 4 and 5 the shape of the displacement body *d* gradually merging into the original shape of the bottom is shown by closely cross-hatched surfaces. The originally V-shaped bottom of the forward part of the ship retains its shape, in general, up to the transverse step *b*—*b'*, whereby the closer the approach to the middle of the ship the flatter the V-shape it assumes and it finally runs out into downwardly bent external edgewise surfaces *k*. The displacement body *d* gradually changes into the bottom parts *e* located laterally thereof. Behind the transverse step *b*—*b'* the lateral bottom parts *e* are made flat at first with rounded edges *k*, which gradually merge into the sharp edges *k* of the rear flat bottom. At the stern *a* the ship's bottom is cut off very sharply and

about at right angles. The last quarter of the ship's bottom is depressed somewhat downwardly. About in the middle of the length of the ship are provided auxiliary transverse steps b and b', which extend on both sides and become continually lower in the neighborhood of the displacement body d.

The ship's propellers c are covered by the stern, whereby the drawing of air from the top surface of the water through the screws is made impossible, so that the screws now operate in a closed body of water without access of injurious air and attain the highest degree of efficiency.

In heavy seas and at low speed the vessel travels as a displacement ship; on a quiet sea and at high speed the vessel is forced upwardly and thus decreases the displacement, whereby the boat travels hydroplane-fashion and is stabilized by its specially shaped ship's bottom, so that the ship even in moving water, for example in ground swells, cannot slip sidewardly and retains the direction of its course.

What I claim is:—

1. A hull for a ship or boat with a steep V-shaped bottom at the front, which gradually becomes flatter toward the middle, still remaining V-shaped, and is flat at the rear, and at the end is somewhat drawn down and cut off sharply at the stern, which approximately in the neighborhood of half the length of the ship has amidships a water displacing bulge which merges into the bottom of the ship, increases from the ends to the middle, and is widest about amidships, and by the arrangement of which the ship's keel is considerably downwardly displaced.

2. A hull for a ship or boat with a steep V-shaped bottom in front, a V-bottom gradually becoming flatter toward the middle and which is flat at the rear, somewhat depressed at the end and cut off sharply at the stern which approximately in the neighborhood of half the ship's length has, amidships, a water displacing bulge which merges into the ship's bottom, increasing from the ends to the middle, being the widest about amidships, and by the arrangement of which the ship's keel is considerably depressed; and steps at about half the length of the ship, arranged transversely of the ship, the height of said steps increasing gradually outwardly from the keel on both sides of the ship, the bottom being offset stepwise by said steps.

3. A hull for a ship or a boat with a ship's bottom which is V-shaped in front and flat behind, which at the rear is somewhat drawn down and at the stern is cut off sharply, which serves the purpose of decreasing the rising of the forward part of the ship by the opposing pressure upon the rear bottom of the ship; and a water displacing bulge located approximately in the central part of the bottom which serves to act at high speeds as a supplemental displacement body, thereby increasing the stability of the vessel and which, by increasing the area of the lateral plane, prevents lateral slipping of the vessel in moving water.

4. A hull for a ship or a boat with a ship's bottom which is V-shaped in front and flat behind, which is somewhat drawn down at the rear and is sharply cut off at the stern, which serves the purpose of decreasing the rising of the forward part of the ship by means of the counterpressure upon the rear bottom of the ship; and which, approximately at the central part of the bottom, has a displacing bulge which serves the purpose of acting at high speeds as a supplemental displacement body thereby increasing the stability of the vessel, and by increasing the area of the lateral plane prevents sideward slipping in moving water; said bottom approximately at half the length of the ship having an auxiliary cross-step which serves the purpose of lifting the ship at high speeds and thereby increasing the speed itself.

In testimony whereof I affix my signature.

PIETER VAN WIENEN.