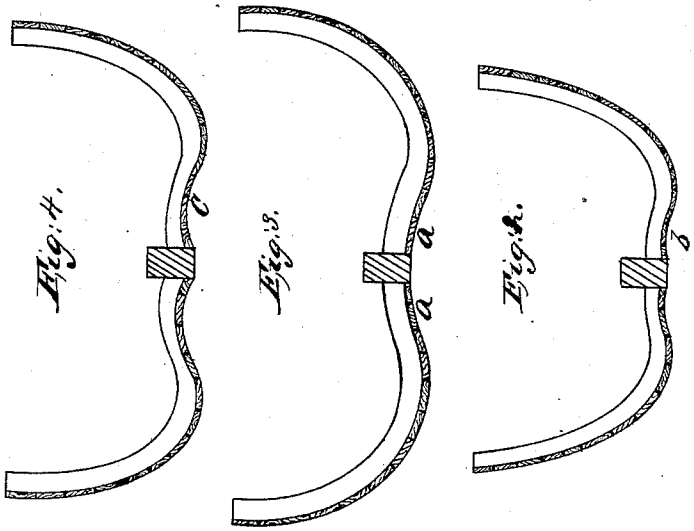
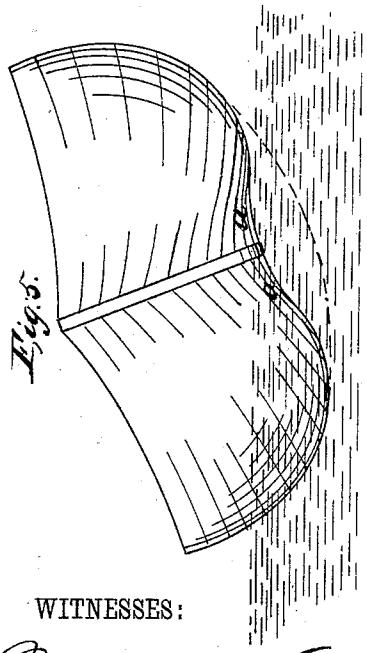
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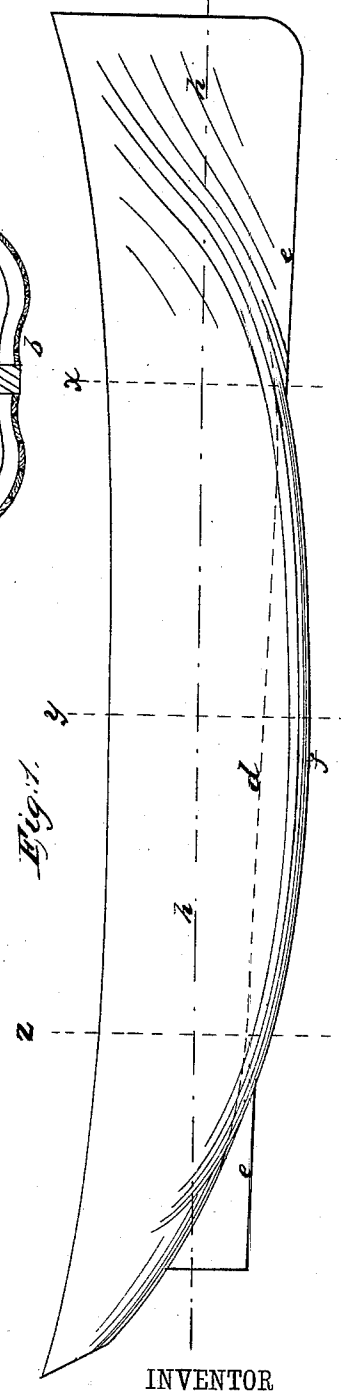
J. S. BIRCH.

CONSTRUCTION OF VESSELS.

No. 277,443. Patented May 15, 1883.







WITNESSES:

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CONSTRUCTION OF VESSELS.

SPECIFICATION forming part of Letters Patent No. 277,443, dated May 15, 1883.

Application filed May 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. BIRCH, of the city, county, and State of New York, have invented a new and useful Improvement in Sailing-Vessels, of which the following is a specification.

My improvement in sailing-vessels consists of a concave form of the bottom of the hull, the concavity beginning at a point near where the bow merges in the bottom, the bow being proportionately less in the perpendicular measurement to the bottom than in the common construction, and forming nearly a flat transverse section at the said point where the concavity begins. From the bow the concavity extends to a point where it vanishes in the stern a little beyond where the rise of the stern begins, the bow and stern being practically the same as in ordinary vessels, except as to the height of the perpendiculars, and the concavity is to increase in breadth from stem to stern, also in depth. At the same time it is preferred to increase the beam of the vessel about in the proportion that the bottom is lessened, or thereabout, making the cross-section the same; or it may be greater with good results. The objects are to effect better and easier passage of the vessel through the water by the removal of that angular portion of the bottom below the main part, and substituting a channel of the form described, along which the water will find freer escape from the fore-quarter of the vessel when leaning abeam, and also to enable that part of the bottom on which the vessel rides when so leaning to be more like the natural bottom, instead of the side on which the vessels of the common form mainly rest in such cases, which enables the vessel to part the waves striking the quarter, and to ride over them easier and much faster than the vessels of ordinary form can do. The said construction also makes the vessel stiffer against the side pressure of the wind, and therefore more comfortable to the passengers as well as safer, and it affords the advantages of a flat-bottom vessel when sailing erect, all as hereinafter described, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of a vessel of my improved construction. Fig. 2 is a transverse section on the line *x x*. Fig. 3 is a transverse section on line *y y*. Fig. 4 is a transverse section on line *z z*; and Fig. 5 is an elevation of the bow of the vessel, showing the manner in which it rides on the water when tilted abeam. The dotted lines in this figure, representing the ordinary form of bottom, show that by the removal of the portion of the bottom within said lines the buoyancy of the windward sides is diminished, and at the same time the two sides of the immersed section are made nearly uniform, whereby the vessel will carry more sail and ride better.

a, Figs. 3 and 5, represents the form of the bottom of the vessel at the middle cross-section, *y*. *b*, Fig. 2, and *c*, Fig. 4, represent the form of the bottom at the fore and aft extremities of the groove of the bottom, respectively.

The dotted line *d*, Fig. 1, indicates the line of the bottom of the groove from *x* to *z*, parallel with the keel *e*, the keel being made a little lower than said bottom; but I also intend to make the keel deeper, if desired, and may extend it even with the bottom at *f*; or I may use a center-board, the keel being as herein shown.

h represents the water-line.

Figs. 2, 3, and 4 show the widening of the groove from bow to stern, and said figures, and also Fig. 1, show the increasing depth.

The advantages of the improved form of bottom which I propose for sailing diagonally to the wind are apparent in Fig. 5, which shows that when the vessel is careened it rides the water substantially the same as when upright—that is to say, the center of gravity is substantially over the center of the bottom on which the vessel rides, and the immersed section is substantially the same form on both sides, whereby the water divides at the fore-quarter about as evenly and the vessel rides as naturally as when upright, and it will be apparent that by increasing the breadth proportionately as the bottom is diminished the vessel will be much less liable to capsize.

Besides the increasing breadth and depth of the groove in the bottom of the hull, my invention is distinguished from vessels of the catamaran form, and also from life-boats of double bottom, by the concave form of the groove, by which the change of form where the two sides of the groove unite is more gradual and easy than in the forms above mentioned, which is more favorable to speed. Besides, it avoids the

tendency of the water to hold the vessel down by suction, when rising on the waves, that deeper grooves produce.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The hull of a sailing-vessel having a concave form of the bottom, together with the keel extensions of the bow and stern, the said concavity beginning at a point near where the bow merges in the bottom and widening therefrom rearward, the bow and the stern being practically the same as in ordinary vessels, except in the height of the perpendiculars, substantially as described.

JOHN S. BIRCH.

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