S. P. WILLEBY.

Combination of Center and Bilge Keels for Vessels.

No. 139,222. Patented May 20, 1873.

Fig. 1

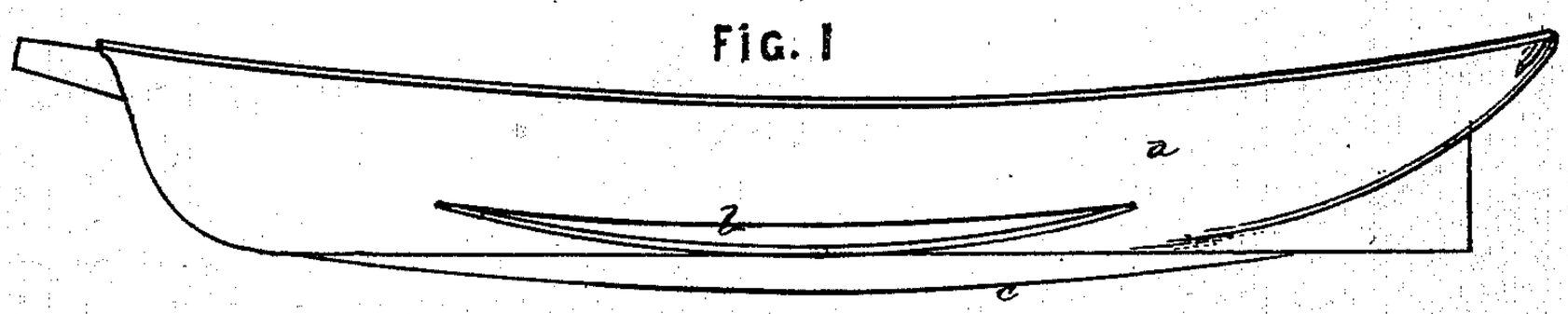


Fig. 2

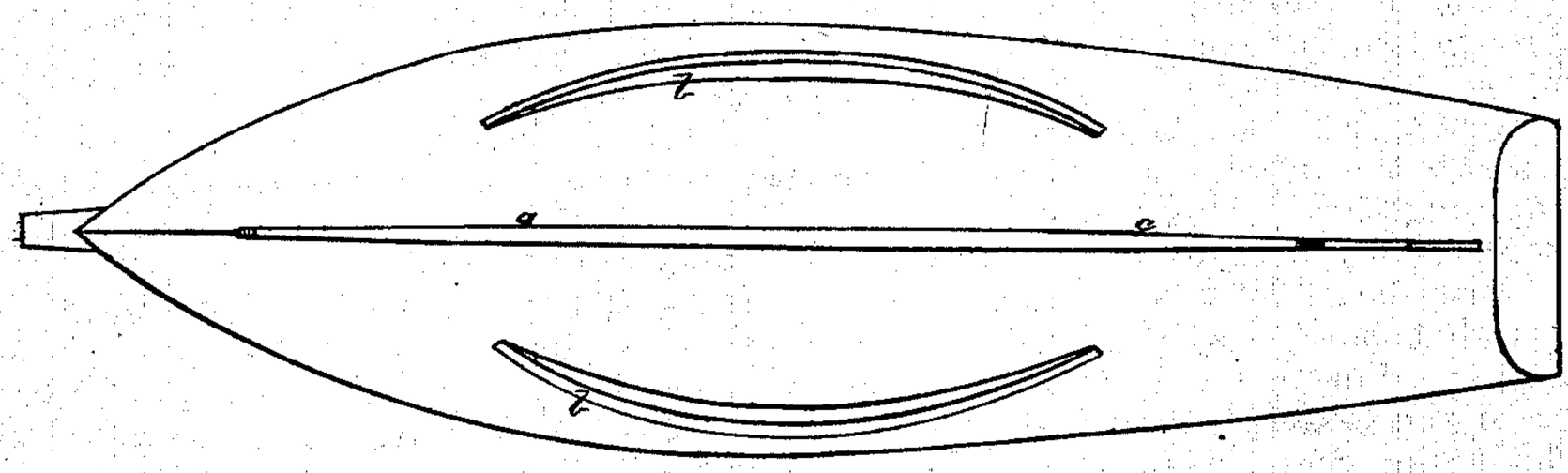
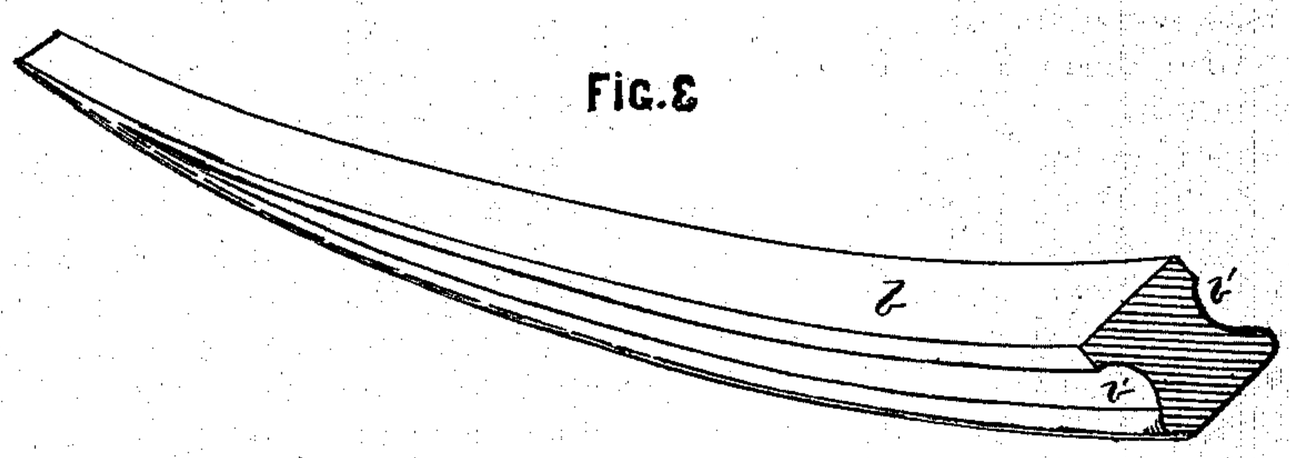


Fig. 3



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SAMUEL P. WILLEBY, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN THE COMBINATION OF CENTER AND BILGE KEELS FOR VESSELS.

Specification forming part of Letters Patent No. **139,222**, dated May 20, 1873; application filed July 31, 1872.

To all whom it may concern:

Be it known that I, SAML. P. WILLEBY, of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in the Hulls of Vessels, of which the following is a full and accurate description, sufficient to enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, and to the figures and letters marked thereon forming part of this specification.

The object of my invention is to dispense with the center-board of vessels, and principally of flat-bottomed vessels, to be used in shallow water. For this purpose I construct the hull *a* of the vessel in the usual manner, but without the center-board. The object sought to be obtained by a center-board is achieved by means of a pair of concave supplementary keels, *b*, constructed and designed for use as hereinafter described. I also use, instead of the common straight center-keel, a keel constructed as shown in the drawing, which is made curved at its lower portion, or rounded, deep in the center, and tapering to a line forward and aft, shown at *c*. The supplementary keels are made with concave sides *b'*, and are also rounded or curved at their outer surface, and tapering to a point at each end. These concave keels are located midway of the vessel, upon the bilge, and owing to their curvature, as shown plainly in the drawing, both their fore and stem ends approach the central keel more closely than their centers.

As will be noticed by reference to the drawing, the concavity on the outer or upper side of the supplementary keels is greater than on their inner or lower sides, the design of this construction being to afford a stronger hold of the vessel upon the water.

The object of making the center keel deep at its middle point is to afford the vessel a turning point. If constructed without this she would not readily obey the helm; with this keel, so constructed, she answers readily.

In the drawing, Figure 1 represents the hull of a vessel with my improvement. Fig. 2 is a view of the hull, showing curvature of the bottom supplementary keels and their position. Fig. 3 is a sectional view of a supplementary keel.

The keels are applied to the vessel before she is planked, and are securely attached by means of strong bolts passing through the timbers and ceiling.

The disadvantages of a center-board in a vessel are obvious and well known. First, it weakens and makes difficult the construction, for an opening has to be made in the bottom, and the timbers, instead of being run the entire length, are cut short. Again, the center-board is liable to get out of order, and may not work in the time of greatest difficulty and danger. Also, a center-board, if used, will at times greatly strain the vessel.

If driven by a strong wind upon the lee shore and the center-board be used, the vessel is likely to be strained beyond endurance. With my improvements, under the same circumstance, a heavy press of canvass may be employed, the vessel carried out of danger, and lives and property saved.

I am aware that supplementary keels for a similar purpose, namely, to dispense with a center-board in vessels, have been already employed. I do not, therefore, broadly claim their use; but

What I do claim is—

In a vessel-hull, the combination of the rounded center-keel and curved concave supplementary keels, as set forth.

In testimony whereof I have set my name, in the presence of two witnesses.

SAML. P. WILLEBY.

Witnesses:

THOS. J. M. TIGHE,

M. DANL. CONNOLLY.