N. G. HERRESHOFF.

CONSTRUCTION OF SAILING VESSELS.

No. 189,459. Patented April 10, 1877.

Fig: 1.

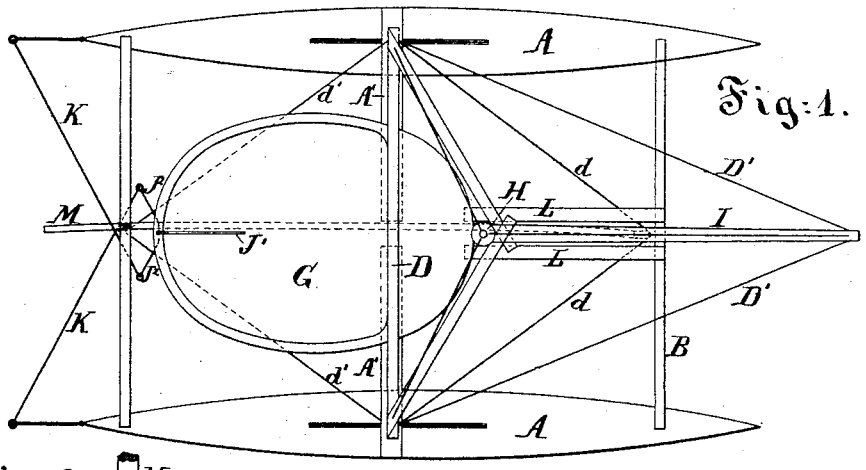

Fig: 2.

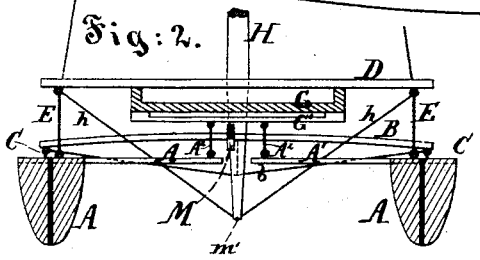

Fig: 3.

Witnesses:

A. Henry Gentner

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Inventor:

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by his attorney

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UNITED STATES PATENT OFFICE.

NATHANIEL G. HERRESHOFF, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN CONSTRUCTION OF SAILING-VESSELS.

Specification forming part of Letters Patent No. **189,459**, dated April 10, 1877; application filed March 20, 1877.

To all whom it may concern:

Be it known that I, NATHANIEL G. HERRESHOFF, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements relating to Sailing-Vessels, by which I can obtain great speed and stability, with safety and comfort; and I do hereby declare that the following is a full and exact description thereof.

I employ two hulls, each of a proper model, held at a considerable distance apart, parallel to each other. A peculiar frame-work connects the hulls and supports the deck and mast or masts.

I provide, by peculiarities in the frame-work and attachments, for a considerable amount of independent plunging or longitudinal pitching of each hull, and also for considerable lateral rolling, both of which are important provisions for navigation on the open sea. I restrain the lateral rolling by elastic connections.

The steering is efficiently provided for. A center-board may be mounted, if desired, in one or both the hulls, and ample provision is made for bracing the mast or masts.

The following is a description of what I consider the best means of carrying out the invention in a small vessel with one mast and a bowsprit.

The accompanying drawings form a part of this specification.

Figure 1 is a plan view. Fig. 2 is a central cross-section, and Fig. 3 an isometric view of the whole.

Similar letters of reference indicate like parts in all the figures.

A A are respectively the port and starboard hulls, each complete in itself, and constructed with a center-board case, center-board, rudder, &c. There should be a tight deck on each, with provisions for pumping. In large vessels the space below deck in each hull may be utilized. I will describe this as too small to allow such to be effected with economy.

Points near the bow of each hull are connected by slightly-curved beams B, trussed with rods *b*, and united to the hulls at each end by universal joints C C. A similar trussed beam is similarly jointed to each hull near the stern. The hulls may pitch independently of each other, and the universal joints C will impose no restraint on the movement. A straight or slightly-curved timber, M, extends longitudinally along the center, just below the transverse pieces B, and jointed to each.

A straight stick, D, extends across at a higher elevation, about midway between the stem and stern. An upright or nearly upright link, E, bears on each hull A a little one side of the center line, with a universal joint, free to work in all directions. The upper end of each link, E, is similarly jointed to the under side of the cross-piece or central beam D. G is a deck, of a light oval form, having a suitable raised rim or bulwark, adapted to accommodate persons, stores, &c. It is secured to both the transverse beam D and the longitudinal piece M. It is furthermore secured to the mast H, which it aids to support, and by which it is in turn supported. The weight of any load upon the deck G is transmitted to the hulls A through the medium mainly of the cross-beam D and upright links E, which bear amidships, but partly through the other cross-pieces B, which bear near the ends, respectively.

Stiff diagonal braces D′ connect the ends of the beam D with the bowsprit, which latter is also firmly connected to the mast.

A short upright, M′, is fixed to the forward end of the piece M, and aids to support the bowsprit I. It also receives a bob-stay, *m*, which extends from the forward end of the bowsprit under the piece M′ to the foot of the mast H. Another fore-and-aft stay, *m′*, extends from the foot of the mast H to the after end of the timber M. Two other stays, *h h*, connect the foot of the mast H with each end, respectively, of the cross-beam D, and still another, *h′*, with the top of the upright M′. A pair of stays, *d d*, connect the ends of the cross-beam D with the front end of the timber M, and another pair, *d′ d′*, connect the same ends with a point near the after end of the same beam M. All these may be steel wire, galvanized, tinned, or otherwise protected from oxidation. The whole produces a light frame-work, supporting the deck and its load, and also the mast and bowsprit, upon the

hulls, with freedom for the latter to both pitch and roll.

An elastic restraint upon the rolling is imposed through the medium of arms A^1 A^1, of ash or other strong and elastic material, extending from each hull toward the other, and terminating near, but not touching, the central timber M. These arms A^1 may be connected to the boat through the medium of bolts with india-rubber washers, or the like, to increase the elasticity.

Their inner extremities are connected by links A^2 with an inner piece, G′, of ash or other elastic material, held a little below the deck G. When, in either a ground-swell or a chopping sea, one or both of the hulls A seeks to roll, the motion is resisted simply by this elastic train of connections. The result is a limited freedom of the rolling, the pieces A^1 and G′ yielding upward and downward to accommodate the motion, and promptly bringing each hull to an even keel so soon as the disturbing strain is diminished. The helm J^1 is applied not on either of the rudder-heads, but on a separate shaft, J, in the central line of the structure, and farther forward than the rudders. On the lower end of this shaft are arms J^2, extending obliquely backward. To the end of each a rod, K, is jointed, which connects to an arm on the rudder, on the opposite side—that is to say, the rod K from the port arm J^2 extends to the starboard rudder, and the rod K from the starboard arm J^2 extends to the port rudder.

In turning a double boat, one hull necessarily makes a shorter turn or describes a curve of less radius than the other. This requires that the rudders of the two boats should be turned to unequal extents, the boat which is the inside one, or nearest the center of the curvature, having its rudder turned to the greatest angle. Such motion is obtained through my arrangement.

If the compound vessel is to be turned to port the helm is put starboard, in the usual manner, turning the arms J^2 J^2 to the same extent, but by reason of their oblique position and their being centered considerably in advance of the rudder-posts, the port rudder is turned through a greater arc than the other. When, on the other hand, the vessel is to be turned to starboard, the helm J^1 is put to port, as usual, and the rudder on the starboard boat, which is then on a smaller circle, turns through the greatest arc.

Each side of and below the bowsprit are longitudinal pieces L, of hard wood, which, in addition to their obvious service as supports for men in handling the jib, contribute somewhat to the strengthening of the frame-work.

I believe that any ordinary or suitable style of rigging may be adopted on my mast and bowsprit. The long transverse beam D affords admirable points for attaching back-stays for the mast and bowsprit shrouds from the bowsprit.

The wide base afforded by my two hulls allows the carrying of an unusual quantity of sail.

In my experiments, including the Centennial yacht race in New York harbor in 1876, where my invention was ruled out after beating all the boats of the fleet, I used one large jib and mainsail. In that case the construction differed, in being steered by only one rudder, of which the shaft J formed a part; but I prefer the two rudders, connected as herein shown.

I claim as my invention—

1. The two hulls A A, connected near the ends by the cross-pieces B, with universal joints C, as herein specified.

2. The longitudinal timber M and deck G, in combination with the end cross-pieces B, universal joints C, and hulls A A, as specified.

3. The amidship-beam D and links E, in combination with the deck G, end connections B C, and hulls A A, as herein specified.

4. The elastic arms A^1 A^1, in combination with the hulls A A and their connections to the deck G, or its equivalent, as herein specified.

5. In a double-hulled boat, the mast H, aiding to support, and being itself supported by, a deck, G, and having its foot braced in all directions, as herein specified.

6. A double-hulled vessel having a deck or frame-work supported upon jointed connections, as and for the purposes herein specified.

7. In combination with the two connected hulls A A and two rudders, R R, the arms J^2 J^2 and rods K, adapted to compel the turning of the one rudder more than the other, as herein specified.

8. The two hulls A A, connections B C, and deck G, in combination with a rudder or rudders, as herein specified.

In testimony whereof I have hereunto set my hand this 16th day of March, 1877, in the presence of two subscribing witnesses.

NATHL. G. HERRESHOFF.

Witnesses:

SOPHIE DI V. CHAPPOLIN,

JAMES M. DRAKE.