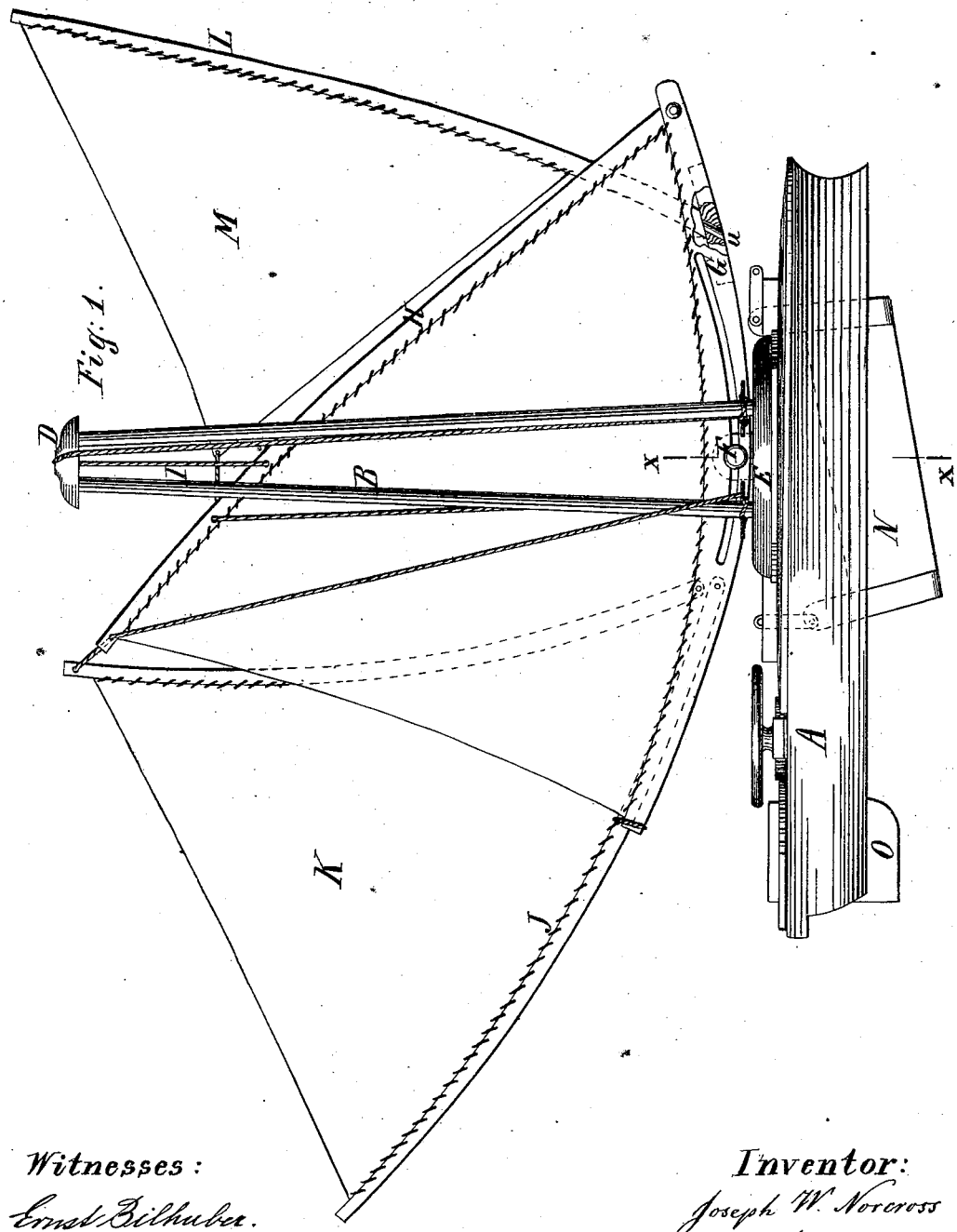
2 Sheets--Sheet 1.

J. W. NORCROSS.

Masts and Sails of Vessels.

No. 163,940. Patented June 1, 1875.



Witnesses:

Ernst Bilhuber.

Henry Gentner

Inventor:

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2 Sheets--Sheet 2.

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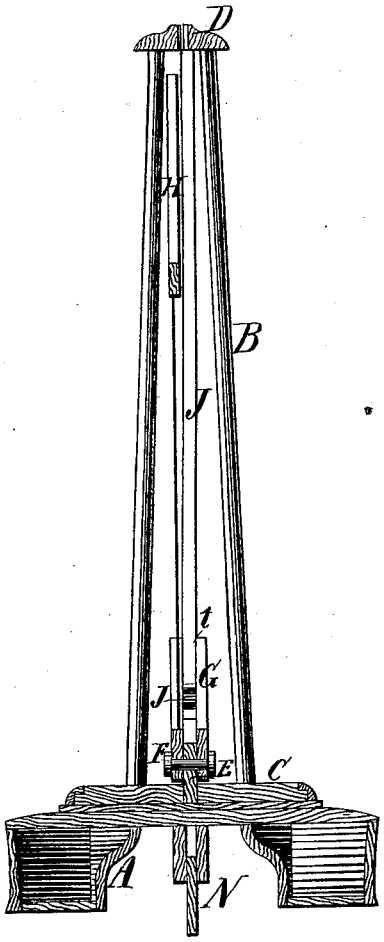
Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH W. NORCROSS, OF EAST BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MASTS AND SAILS OF VESSELS.

Specification forming part of Letters Patent No. **163,940**, dated June 1, 1875; application filed November 13, 1874.

To all whom it may concern:

Be it known that I, JOSEPH W. NORCROSS, of East Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in the Masts and Sails of Vessels, of which the following is a specification:

This invention is illustrated in the accompanying drawing, in which Figure 1 represents a side view. Fig. 2 is a transverse section.

Similar letters indicate corresponding parts.

This invention consists in a mast composed of two or more timbers, in combination with a platform which revolves in or on the deck of a vessel, and with a cap, which unites the tops of the timbers. On said revolving platform is secured a lug, which forms the support and guide for the boom of a sail, either the boom or the platform being made movable fore and aft for the purpose of regulating the sail-balance without changing the sail. The motion of the boom takes place in the arc of a circle described from the center of the cap of the mast which supports the block for the halyard of the sail, so that said halyard does not interfere with the fore-and-aft motion of the boom. Said boom is provided with a groove in its upper edge, which forms the guide for the boom of an outrigged aftsail, and allows of drawing the aftsail-boom in or out as the effective surface of the sails is to be decreased or increased. With the main-boom is connected a sheer-boom of an outrigged foresail.

In the drawing, the letter A designates the hull of my vessel, and B is the mast, which, in the example shown in the drawing, is constructed of four timbers that rise from a platform, C, and are connected at their tops by a common cap, D. Both the platform and the cap might be made in the form of a cross without changing the result. The platform C revolves in a socket formed for its reception in the deck, and from said platform rises a lug, E, through which extends a pivot, F, that forms the guide for the boom G, said boom being provided with slots, which straddle the pivot, so that the boom can be moved fore and aft, or across the platform C. If desired, however, the boom can be firmly connected to the platform, and the platform can be so arranged that it, together with the mast and the boom, can be moved fore and aft. The guide-slots in the boom G form portions of a circle described from the center of the cap D, and to the forward end of said boom is pivoted the gaff H, which is raised or lowered by the halyard I, the sail being secured to the boom and the gaff, so that by raising said gaff the sail is stretched. The halyard I extends through the center of the cap D, and its end is fastened to a cleat or other device secured to the platform C. By this arrangement the halyard does not interfere with the motion of the boom, and by moving the boom and the sail fore and aft I am enabled to adjust the sail-balance without changing any sails.

The advantage of this arrangement will be readily appreciated by sailors, and requires no further explanation. The mast of my vessel, being composed of four timbers, is not liable to vibrate or to snap. There are always two timbers on the lee side, and two to windward, the former acting as braces, and the latter as shrouds.

The boom G is provided at its upper edge with a groove, *t*, Fig. 2, for the reception of the boom J, Fig. 1, of an outrigged aftsail, K. At or near the forward end of the boom G is a stop, *u*, for the reception of the boom L of an outrigged foresail, M, the connection being of such a nature that the boom L acts as a sheer-boom, allowing the same to be adjusted at any desired inclination.

In the vessel represented by the drawing I have shown two center-boards, N O, the forward one of which is so arranged that it in reality takes the place of two distinct center-boards. By lifting the back end and dropping the forward end a forward keel is obtained, and by reversing it a center keel is produced. The center-board O forms a movable aft-keel, and it takes the place of the keel and the rudder; but, if desired, an ordinary rudder may be used, together with this center-board.

The operation of laying-to a vessel is usually effected by opposite pressure of the wind—*i. e.*, the head-sail is set so as to cause the bow to fall off from the wind; the aftsail is set at an angle to take the wind on the other side. This method answers the purpose as long as the

force of the wind does not exceed the strength of the sail; but as soon as it is more than the sail can bear it tears or bursts the sail, and then the vessel is left to the mercy of the wind.

Laying-to with my new vessel is on entirely different principles, and obviates in a great measure excessive pressure. It is done in the following manner: The center keel is put down. Then the sail is hauled back, so that the sail-balance is back of the center, and it is then secured, the boom being in the line of the vessel. The after-keel is raised, and the effect is that the vessel falls off a small degree, but it is immediately checked by the aft part of the sail, and she falls off on the other side, and in this manner she describes small arcs of a circle. It is obvious that the strain which does this work comes upon the sail in such acute angles that it cannot pack in the sail. In fact, if the sail were, as it should be, absolutely taut, probably no possible strain could be brought to bear on it which would break it down.

Another way of laying the new vessel to is to leave fore-and-aft keels down, center up, then haul the sail to its extreme aft-balance, and swing to a right angle to her lines. This holds her effectually, but is not so comfortable in a single vessel.

The main object of securing the boom to a revolving platform is to be able to set the sail so as to meet the necessary angle of the wind. It is obvious that this can be done by having but two stationary timbers in the mast, the boom being suspended from a common center on the cap to a center on deck; but in this case the boom can only revolve part way round, and the mast would require stays fore and aft. I have also tried a center mast so made as to admit the sail to belly, and supported with stays; but I did not find this to answer as well as the way I have previously described.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a mast composed of four timbers with a platform which revolves in or on the deck of the vessel, and with a cap which unites the tops of the four timbers, substantially as set forth.

2. The combination of the boom of a sail with a guide secured on a platform revolving in or on the deck of the vessel, either the boom or the platform being movable fore and aft, substantially as described.

3. The combination of a curved boom and a suitable guide with a halyard suspended from the cap of the mast B, substantially as set forth.

4. The arrangement of a groove in the main-boom, for the reception of the boom of an outrigged aftsail, substantially as described.

5. The combination of a sheer-boom with the main-boom, constructed and operating substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of November, 1874.

JOSEPH W. NORCROSS.

Witnesses:
SAML. JENNISON,
ALFRED T. PERRY.