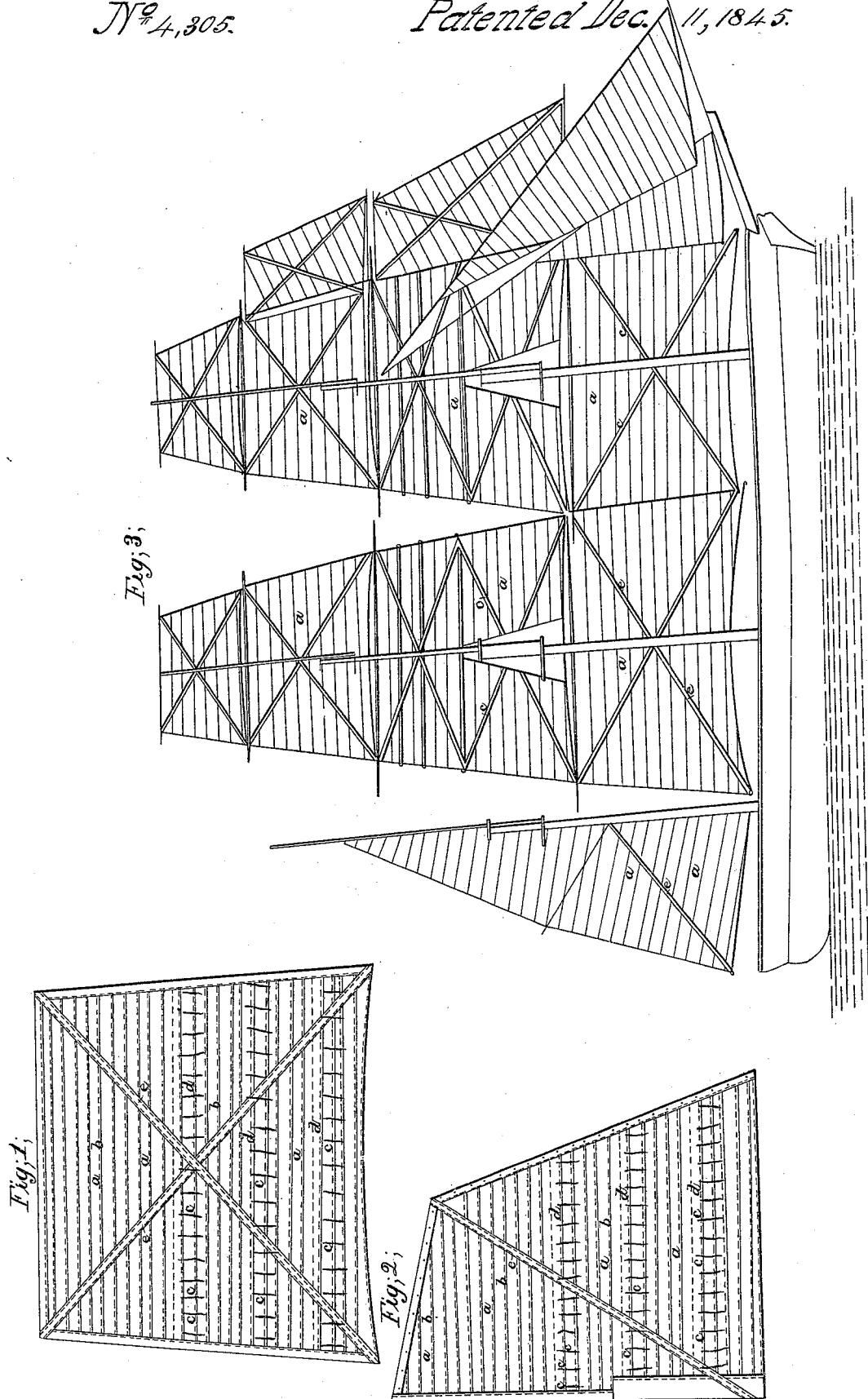


J. Maull.
Sails & Rigging.
Patented Dec. 11, 1845.
N^o 4,305.



UNITED STATES PATENT OFFICE.

JAMES MAULL, OF PHILADELPHIA, PENNSYLVANIA.

SAIL FOR SHIPS, &c.

Specification of Letters Patent No. 4,305, dated December 11, 1845.

To all whom it may concern:

Be it known that I, JAMES MAULL, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in the Method of Making Square, Gaft, and other Sails for Vessels, and that the following is a full, clear, and exact description of the principle or character thereof which distinguishes it from all other things before known and of the manner of making and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a representation of a square sail made on my improved plan; Fig. 2, a fore and aft sail, and Fig. 3, a view of the sails applied to the masts of a vessel.

The same letters indicate like parts in all the figures.

The usual mode of making sails with the seams vertical is accompanied with many difficulties, such as the liability to tear in consequence of the weft of the cloth, which is of less strength than the warp, being in the direction of the width of the sail, which from the mast to the edge, is of less length than from top to bottom, and therefore each portion required to sustain more strain than in the longest direction. In furling all the seams have to be folded and each one is therefore subjected to breaking and wear. Every width of cloth, when the sail is furled, is equally exposed to wear, and additional bands have to be put on the sail to receive the reef-points; but what is still more important, it is known that cloth of all kinds is more elastic in the width than in the length and therefore, the direction of greatest elasticity and weakness is thrown in the direction of the least width, consequently the sail will belly, as it is termed, and prevent a vessel from sailing as near the wind as it would if the sails were more stiff. Various attempts have been made to avoid these admitted difficulties. The most, and I may say, only effective mode heretofore devised for this purpose, is the storm sail patented in England, which consists in adding to the sails, made with the vertical seams, diagonal bands on the fore and after part crossing each other at right angles and the seams diagonally; but this, however, in-

creases the weight of the sails and adds greatly to the expense of making and repairing them, and removes only two of the difficulties, viz: the tendency to belly to excess and the liability to tear; but by my improvement I remove all the above difficulties in a great measure at less expense than the common mode.

My invention consists simply in making the sails with the seams running horizontally instead of vertically, as represented in the accompanying drawings, in which (a) represents the width of cloth running horizontally, and (b) the seams. To make the bands for the reception of the reef points (c, c), the cloth at the seams is lapped over and made with a double seam, as at (d); and when desired, diagonal bands (e) may be added.

From this mode of cutting and making sails it will be apparent that there is no waste of material in cutting the diagonal edges, for the diagonal of one strip is cut from the diagonal of the other. The warp of the cloth (which is the least elastic and strongest) and the seams are all put in the direction of the width of the sail, which being less in width than in height from the mast to the outer edge, receives a greater amount of strain than in the vertical direction, and therefore bends not only to prevent them from splitting, but what is of still greater importance, from bellying to the same extent, and therefore will enable a vessel to sail nearer the wind, the importance of which will be fully appreciated by all acquainted with navigation. This direction of the seams avoids much of the labor of folding the seams in reefing the sails, and as the cloth is rendered more stiff by the seams and the stiffness renders it more liable to break, changing their direction from the vertical to the horizontal avoids the necessity of folding them, as they lie in the direction of the folds. The additional reef bands are dispensed with and the seams substituted therefor. When the sails are reefed all the wear comes on the lower width which when worn may be removed and replaced with facility, while on the old plan, a piece must be cut from each width of cloth. And finally the great additional strength given to the sails widthwise en-

ables me to employ cotton cloth, which from its cheapness and other acknowledged qualities, has made it highly important to adopt it if the desired strength could be attained.

5 What I claim as my invention and desire to secure by Letters Patent, is—

Cutting and making the sails of all kinds

of vessels with the warp of the cloth and the seams in a horizontal direction, for the purpose and in the manner described.

JAS. MAULL.

Witnesses:

EDWARD HURST,

MICHAEL WISE.