2 Sheets. Sheet 1.

H. C. Johnson,

Sails & Rigging.

No. 42,665. Patented May 10, 1864

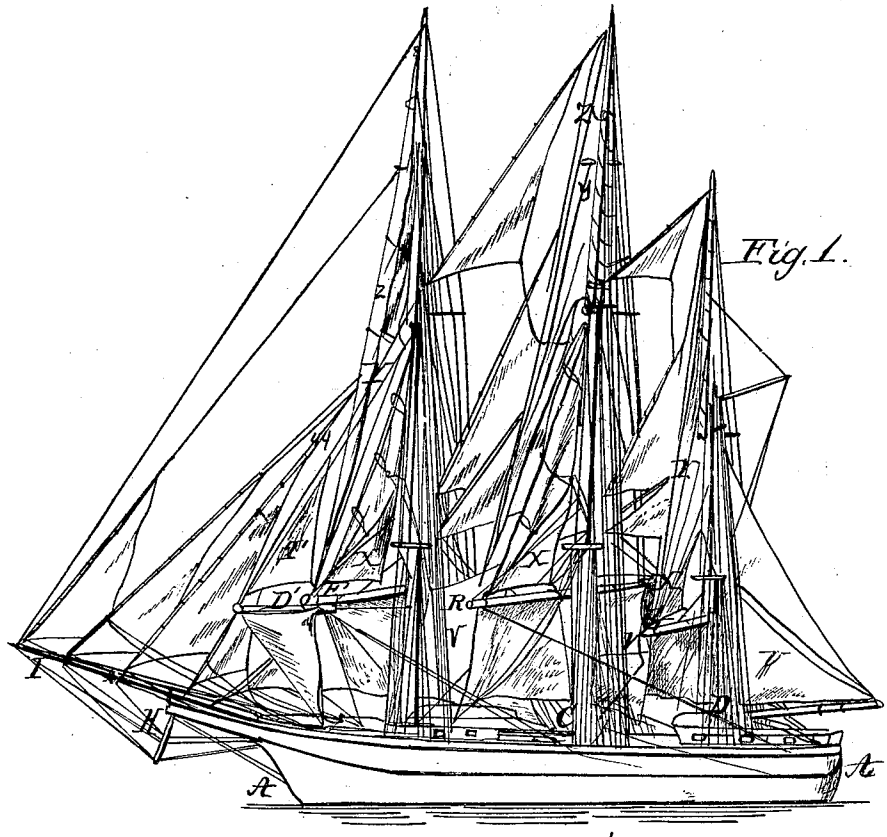

Fig. 1.

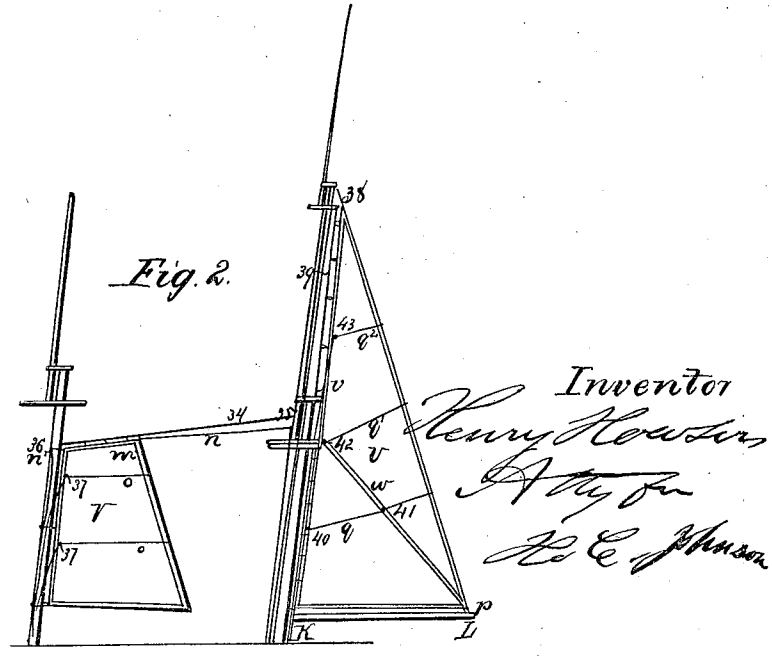

Fig. 2.

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2 Sheets. Sheet 2.

H. C. Johnson,

Sails & Rigging

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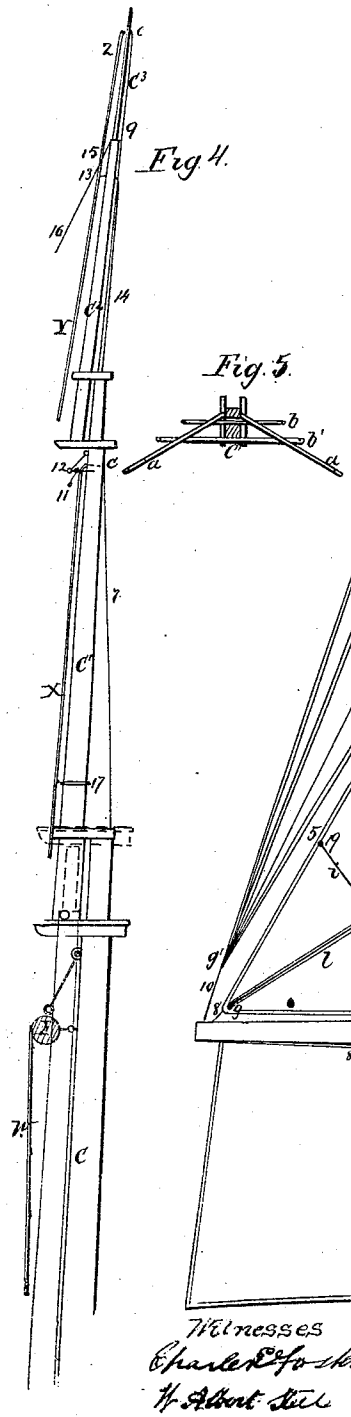

Fig. 4.

Fig. 5.

Fig. 3.

Fig. 8.



Fig. 6.

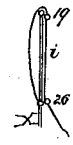

Fig. 7.

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UNITED STATES PATENT OFFICE.

H. C. JOHNSON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVED SHIP'S SAILS AND RIGGING.

Specification forming part of Letters Patent No. **42,665**, dated May 10, 1864.

To all whom it may concern:

Be it known that I, H. C. JOHNSON, of Philadelphia, Pennsylvania, have invented certain Improvements in Ship's Sails and Rigging; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and, to the letters of reference marked thereon.

My invention consists of certain improvements in ship's sails and rigging fully described hereinafter, whereby the spreading and reefing of the sails may be accomplished by fewer hands than are usually employed. My improvements also do away with much of the top weight of ordinary masts, and enable the vessel to sail with lighter ballast than usual.

In order to enable others to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side view of a ship with my improved sails and rigging; Fig. 2, a detached view showing the main and mizzen masts with part of the sails and rigging; Fig. 3, Sheet 2, a rear view of one of the masts with the sails; Fig. 4, a side view of Fig. 3; Fig. 5, a section on the line 1 2, Fig. 3; Fig. 6, a section on the line 3 4, Fig. 3; Fig. 7, a section on the line 5 6, Fig. 3; Fig. 8, a detached view of the sails.

Similar letters refer to similar parts throughout all the views.

A, Fig. 1, represents the hull of the vessel; B, C, and D, the masts; E, F, and G, the yards; H, the bowsprit, and I the jib boom, all of which parts correspond in general form and arrangement with those of ordinary vessels, excepting that the masts are taller, and the yards somewhat stouter, than usual.

The jib-sails and stay-sails as well as the square sails attached to the yards E, F, and G, are formed, secured, and arranged for furling in the usual manner.

The view, Fig. 3, of the mainmast will serve to illustrate the main features of my invention. This mast consists, as usual, of the mainmast C, maintop-mast C′, main-top-gallant mast C^2, and main-royal mast C^3. The shrouds and stays which support the masts are arranged and secured to the latter in the usual manner. When desirable, however, the top-gallant and royal stays may pass through outriggers *a*, secured to the cross-trees *b* and *b′*, Fig. 5, the former of which is shorter than the latter in order that its ends may not come in contact with the sail. The top-sail X is triangular in shape, the upper corner being attached to the halyards 7, Fig. 4, which pass through an opening at *c* in the top mast, and thence to the deck.

To each of the lower corners, *g*, of the sail X is secured a cord, technically termed "sheet", 8, which passes through an opening in the end of the yard F, along the under side, to the center of the latter, and through a block to the deck. A portion of the sail at X′ is cut away to avoid the stays connected to the mast at this point, each of the corners *d* being secured to an eye on a "quarter-band," *e*, surrounding the yard F. The top-gallant sail Y and royal-sail Z are in one sheet of the shape represented in the drawings, all that portion inside the lines *y′ y′* being the top-gallant sail, and that outside the said lines the royal-sail. The upper corner of the royal-sail is connected to the royal-halyards 9, Fig. 4, which pass through the royal-mast at *c′* and to the deck, each of the lower corners, *g′*, of the sail being connected to a sheet, 10, which passes through the end of the yard F, and beneath the same to the deck in the same manner as the sheet 8. A portion of the top-gallant sail at Y′ is cut away to avoid the stays attached at this point to the mast, and to each of the corners *h* is secured a rod, 11, Figs. 3 and 6, the upper end of which has an eye which passes round and slides on a truss, 12, secured to the upper part of the top-mast. To the top-gallant sail, at the point 13, Fig. 4, are secured the top-gallant halyards 14, which pass directly through the top-mast and thence to the deck. In the royal-sail is an eyelet-hole, 15, Fig. 4, through which passes the top-gallant stay 16. To the center of the top-sail is secured the vertical midship rope *x*, Fig. 8, and from each of the lower corners of the sail to the midship rope at *h′* extends a leech-rope, *y*, the said midship and leech ropes being secured to the sails throughout their entire length. At the points *h′* an eye is secured to the midship rope, which is connected to a staple projecting from the band 17. A similar midship rope, *x′*, and leech ropes *y′* are secured to the top-gallant and royal sails, and to the midship ropes of

all the sails are fastened hoops 18, which slide on the masts. At each side of the top, top-gallant, and royal sails, near the edges of the same, are secured the bull's-eyes 19, 20, 21, 22, 23, 24, and 25, similar bull's-eyes, 26, 27, 28, and 29, being fastened to the sails at the points shown in the drawings. On the front of the top-sail opposite the bull's eye 26 is secured one end of the spilling-line *i*, which passes over the edge of the sail, Figs. 1 and 7, through the bull's-eyes 19 and 26, through the block 30 to the deck. A similar spilling-line, *i'*, passes over the edge of the sail, through the bull's-eyes 20 and 27, to a block at the point 31 and to the deck. The spilling-line i^2 passes over the edge of the sail through the bull's-eye 21 directly to a block at 32 and thence to the deck. Spilling-lines *j*, *j'*, j^2, and j^3 pass over the edges of the top gallant and royal sails through the bull's-eyes and through blocks secured to the mast, and thence to the deck, as shown in the drawings. To each of the corners *g'* of the royal-sail is secured one end of the clew-line *k*, which passes through a block, 33, to the deck, the usual clew-line *l* being secured at one end to each corner of the top-sail X. To the upper edge of the spencer (sail) V, Fig. 2, Sheet 1, are secured a number of hoops, which are arranged to slide on the stay 34. To the corner *m* of this sail are secured the halyards *n* and *n'*, the former of which passes back to the block 35 and the latter forward to the block 36, and both to the deck. Two brails, *o o*, pass round the sail V through the bull's-eyes 37 to the deck. The spanker U is secured at its upper corner to the halyards 38, which pass through a block at the head of the top-mast to the deck. To the edge of the spanker are secured a number of hoops, those above the point of junction of the leech-rope *w* with the rope *v*, sliding on a span-rope, 39, and those below this point on a try-sail mast, K. To the lower corner, *p*, of the spanker is secured an outhaul, which passes through an opening in the end of the boom L and beneath the same to the foot of the mast. Through the bull's-eyes 40, 41, 42, and 43 pass the brails *q*, *q'*, and q^2. When the sails are arranged as shown in the drawing, 2, the royal sail is taken in by hauling successively on the spilling-lines j^3, j^2, *j'*, and *j*, at the same time slacking the halyards *q*, the edges of the sail by this means being each brought close to the leech-rope *y'*. The top-sail is reefed by loosening the halyards 7 and hauling on the spilling-lines *i* until the edge of the sail is brought down close to the bull's-eyes 26 and 27. The top and top-gallant sails can be taken in by slacking the sheets, drawing up the clew-lines, and hauling on the spilling-lines until the sail is folded close to the mast. One man should then go aloft and furl the sails close to the mast. The spencer and spanker sails are reefed or taken in by hauling on the brails in the same manner as with the top-sails. To spread the sails the clew-lines and spilling-lines or brails should first be slackened and the halyards and sheets or outhauls then drawn tight.

It will be seen that by this arrangement all, or nearly all, of the operations on the sails can be performed from the deck of the vessel. A much less number of hands will therefore be required and the danger of accident from going aloft avoided.

It will also be seen that by dispensing with the upper yards much of the top weight is removed, and the vessel can sail with considerably less ballast than is required by vessels having the usual rigging.

The operation of wearing ship may also be much more quickly performed, it being only necessary to brace one yard in order to set all the sails on a mast at any desired angle to the wind.

In all these respects this method of rigging is peculiarly applicable to steamers, where but few men can be employed, and where it is especially desirable to avoid top weight. The masts can be removed by bringing down first the top gallant and royal masts. The top-mast is then brought to the position shown in blue lines, Fig. 4, and the cap J raised, as shown in dotted lines in the same figure. The mast may then be readily lowered to the deck. When desirable also, the top-gallant and top masts can be lowered without unbending the sails, which remain secured to the masts by the hoops 18.

I claim as my invention and desire to secure by Letters Patent—

1. Spilling-lines and brails arranged in respect to the sails substantially in the manner described, so that the latter can be reefed or taken in from the deck of the vessel, substantially as and for the purpose set forth.

2. The top, top-gallant, and royal sails, when so formed that they can all be attached at their lower outer corners to one yard, substantially as set forth.

3. The rods 11, when arranged in respect to the truss 12, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

H. C. JOHNSON.

Witnesses:

CHARLES E. FOSTER,

JAMES MCCAHON.