

VI. *An Account of a Method for the safe Removal of Ships that have been driven on Shore, and damaged in their Bottoms, to places (however distant) for repairing them.*
By Mr. William Barnard, Shipbuilder, Grove Street, Deptford; communicated by Nevil Maskelyne, D. D. F. R. S. and Astronomer Royal.

Read Dec. 23, 1779.

Deptford, April 14, 1779.

ON the shores of this Island, distinguished for its formidable fleets and extensive commerce, and so particularly situated, there must necessarily be many shipwrecks: every hint by which the distress of our fellow creatures may be alleviated, or any saving of property made to individuals in such situations, should be communicated for their good. As the members of the Royal Society have it in their power to make such hints most universally known, I have been induced, from their readiness to receive every useful information, to lay before them a particular account of the success attending a method for the safe removal of ships that have been driven on shore,

shore, and damaged in their bottoms, to places (however distant) for repairing them; I hope, therefore, they will excuse the liberty I have taken in presenting this to them. Should the Society honour me by recording it, it will make me the most ample satisfaction for my attention to it, and afford me the greatest pleasure.

On January the 1st, 1779, in a most dreadful storm, the York East Indiaman, of eight hundred tons, homeward bound, with a pepper cargo, parted her cables in Margate Roads, and was driven on shore, within one hundred feet of the head, and thirty feet of the side, of Margate Pier, then drawing twenty-two feet six inches water, the flow of a good spring tide being only fourteen feet at that place.

On the 3d of the same month I went down, as a ship-builder, to assist as much as lay in my power my worthy friend Sir RICHARD HOTHAM, to whom the ship belonged. I found her perfectly upright, and her stern (or side appearance) the same as when first built, but sunk to the twelve feet water mark fore and aft in a bed of chalk mixed with a stiff blue clay, exactly the shape of her body below that draft of water; and from the rudder being torn from her as she struck coming on shore, and the violent agitation of the sea after her being there, her stern was so greatly injured as to admit free access thereto,
which

which filled her for four days equal to the flow of the tide. Having fully informed myself of her situation and the flow of spring tides, and being clearly of opinion she might be again got off, I recommended, as the first necessary step, the immediate discharge of the cargo; and, in the progress of that business, I found the tide always flowed to the same height on the ship; and when the cargo was half discharged, and I knew the remaining part should not make her draw more than eighteen feet water, and while I was observing the water at twenty-two feet six inches by the ship's marks, she instantly lifted to seventeen feet eight inches, the water and air being before excluded by her pressure on the clay, and the atmosphere acting upon her upper part equal to six hundred tons, which is the weight of water displaced at the difference of those two draughts of water.

The moment the ship lifted, I discovered she had received more damage than was at first apprehended, her leaks being such as filled her from four to eighteen feet water in one hour and a half. As nothing effectual was to be expected from pumping, several scuttles or holes in the ship's side were made, and valves fixed thereto, to draw off the water to the lowest ebb of the tide, to facilitate the discharge of the remaining part of the cargo; and, after many attempts, I succeeded in an external application

tion of sheep skins sewed on a fail, and thrust under the bottom, to stop the body of water from rushing so furiously into the ship. This business effected, moderate pumping enabled us to keep the ship to about six feet water at low water, and by a vigorous effort we could bring the ship so light as (when the cargo should be all discharged) to be easily removed into deeper water. But as the external application might be disturbed by so doing, or totally removed by the agitation of the ship, it was absolutely necessary to provide some permanent security for the lives of those who were to navigate her to the river Thames. I then recommended, as the cheapest, quickest, and most effectual plan, to lay a deck in the hold, as low as the water could be pumped to, framed so solidly and securely, and caulked so tight as to swim the ship independant of her own leaky bottom. I herewith send you a drawing of the same, which will give the Society a clearer idea of the business than a long description, which, however, it may be useful to add for the better enabling others to put this method in practice.

Beams of fir timber, twelve inches square, were placed in the hold under every lower deck beam in the ship, as low as the water would permit; these were in two pieces, for the convenience of getting them down, and also for the better fixing them of an exact length, and well
bolted

bolted together when in their places. Over these were laid long Dantzic deals of two inches and an half thick, well nailed and caulked. Against the ship's side, all fore and aft, was well nailed a piece of fir, twelve inches broad and six inches thick on the lower, and three inches on the upper edge, to prevent the deck from rising at the side. Over the deck, at every beam, was laid a cross piece of fir timber, six inches deep and twelve inches broad, reaching from the pillar of the hold to the ship's side, on which the shores were to be placed to resist the pressure of the water beneath. On each of these, and against the lower deck beam, at equal distance from the side and middle of the ship, was placed an upright shore, six inches by twelve inches, the lower end let two inches into the cross piece. From the foot of this shore to the ship's side, under the end of every lower deck beam, was placed a diagonal shore, six inches by twelve, to ease the ship's deck of part of the strain by throwing it on the side. An upright shore, of three inches by twelve, was placed from the end of every cross piece to the lower deck beams at the side; and one of three inches by twelve on the midship end of every cross piece to the lower deck beam, and nailed to the pillars in the hold. Two firm tight bulkheads or partitions were made as near the extremes of the ship as possible. The ceiling
or

or inside plank of the ship was very securely caulked up to the lower deck, and the whole formed a compleat ship with a flat bottom within side to swim the outside leaky one; and that bottom being depressed six feet below the external water, resisted the ship's weight above it, equal to five hundred and eighty-one tons, and safely conveyed her to the dry dock at Deptford.

Since I wrote the above account, I have been desired to use the same method on a Swedish ship, stranded near Margate on the same day as the York East India-man, and swim her to London. As this ship is about two hundred and fifty tons, and the execution of the business something different from what was practised with regard to the large ship, I hope it will not be thought improper to describe it.

As this ship's bottom was so much injured, having lost eight feet of her stern-post and all her keel, several floor-timbers being broke, and some of the planks off her bottom, (so as to leave a hole big enough for a man to come through) several lower deck beams being likewise broke, and all the pillars in the hold broken and washed away; I thought it necessary to connect, in some degree, the shattered bottom with the ship's decks, not only to support the temporary deck by which she was to swim up, but to

prevent the bottom being crushed by the weight of the ship when she was put upon blocks in the dry dock: to effect which, after I had put across twelve beams of fir, six inches by twelve, edgeways, one under every lower deck beam of the ship, and well fastened them to the ship's side, I placed two upright pieces to each beam of six inches by twelve, securely bolted to the sides of the keelson, and scored six inches under the ship's lower deck beams, and three inches about the beams of the temporary deck, and well fastened to each: then the deck was laid with long two-inch Dantzic deals, and well nailed and caulked; the ship's inside plank was well caulked up to the lower deck. A piece of fir, of twelve inches broad and two inches thick on the upper, and four inches on the lower edge, was well nailed to the ship's side all fore and aft, and well caulked on both edges to prevent the side of the deck from leaking, or being forced up by the pressure of the water against the deck, a two-inch deal or cross piece was laid over every beam from the ship's side to the uprights at the middle line; then, at equal distance from the side and middle line, pieces of six inches square, as long as could be got down, were put all fore and aft on both sides, scored two inches over every cross piece, and well bolted through the cross piece and deck, and into the fir beams. From this fore and aft piece or ribband to the
ship's

ship's side, and from it to the uprights in the middle, were placed two rows of diagonal shores, six inches square, the heels of which were securely wedged against the fore and aft piece or ribband, which afforded sufficient support to the temporary deck without any other shores. Two bulkheads or partitions were built, as far as the fore-mast forward, and mizen mast aft, well planked, shored, and caulked, to resist the water. As decks laid in this manner, and in so much hurry as the time of low water requires, will of consequence leak in some degree, and as that leakage, washing from side to side, will cause the ship to lay along, I fixed a two-inch deal, twelve inches broad, edgeways, all fore and aft at the middle line, and well caulked it, to stop half the water on the weather or upper side, when the ship would incline either way, which not only made her stiffer under sail, but facilitated the pumping out the water made by leaks in the deck.

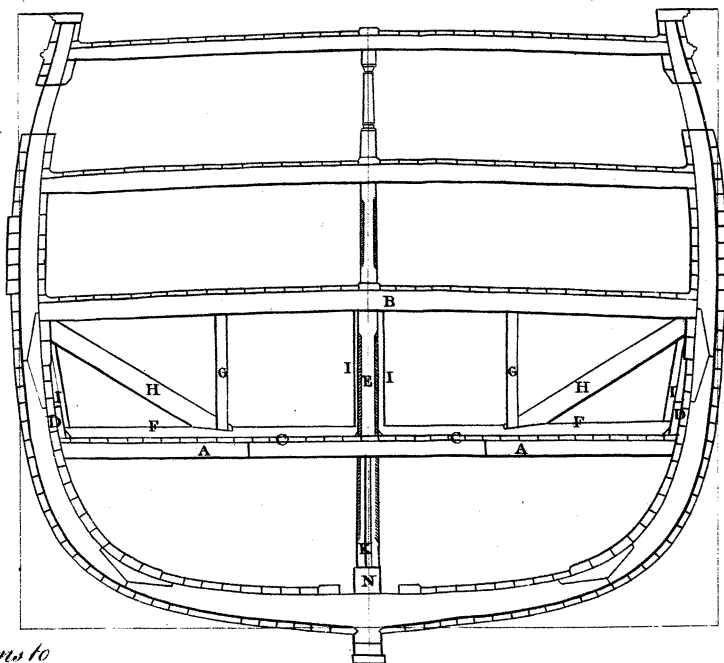
This deck was sixty-three feet long and twenty-three feet broad, and was laid at five feet five inches above the bottom of the keel, or four feet above the top of the floor timbers, and swam the ship at twelve feet five inches water, resisting two hundred and sixteen tons, and containing under it one hundred and twenty-four tons of water, which pressing against the under side of the temporary

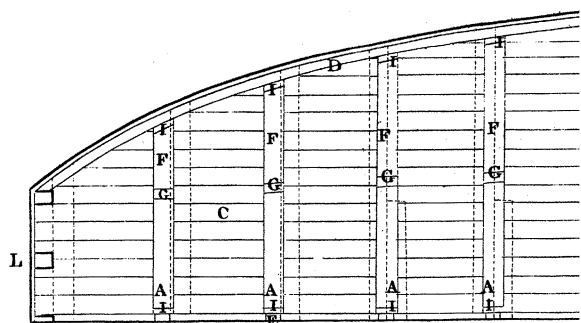
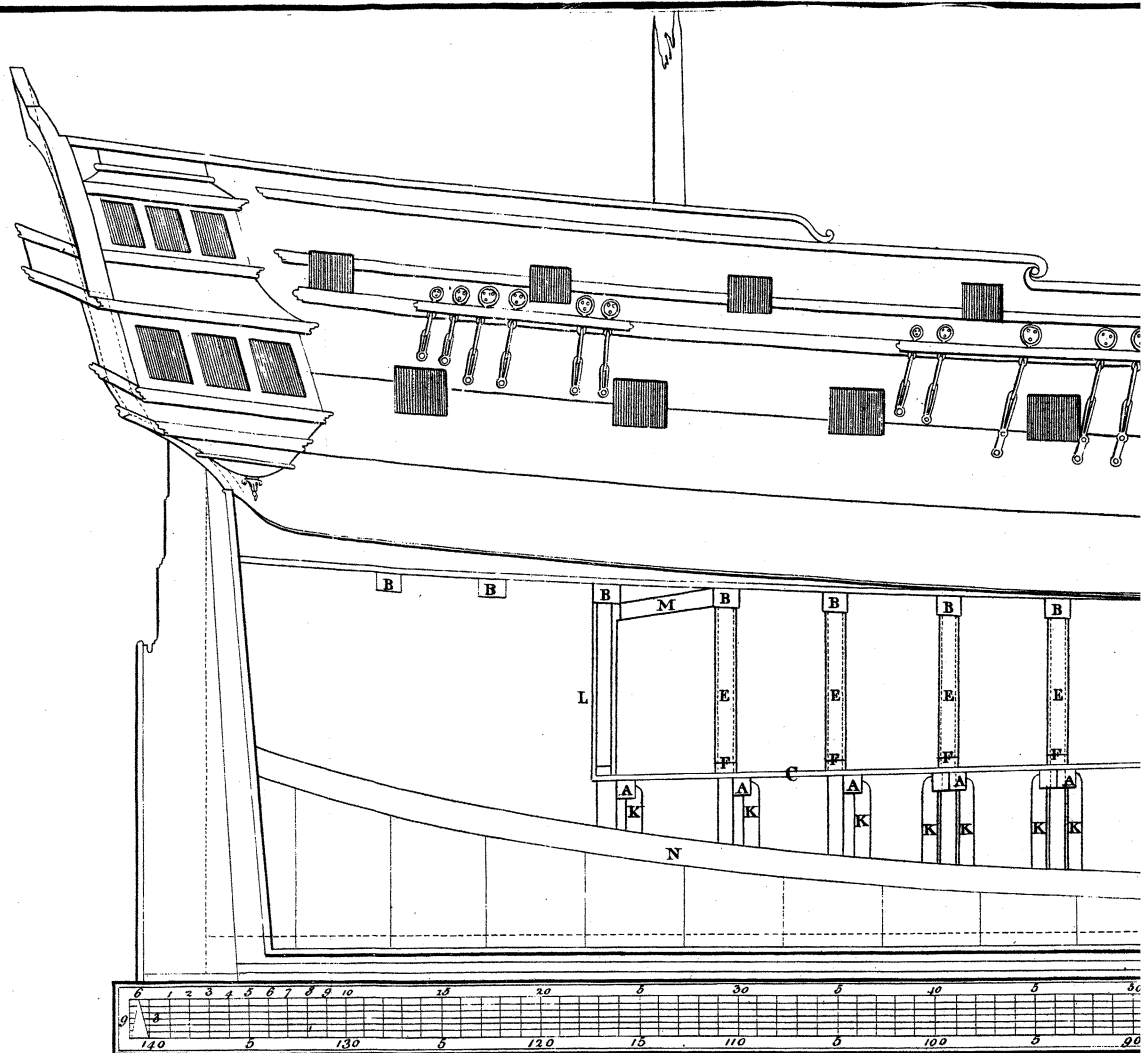
deck acted as ballast, and brought her safely into the dry dock at Deptford, from the most dangerous situation possible, being partly within and partly without Margate Pier, where she had been left by some Ramsgate men, who had undertaken to remove her from the place where she was stranded to a safer one within Margate Harbour.



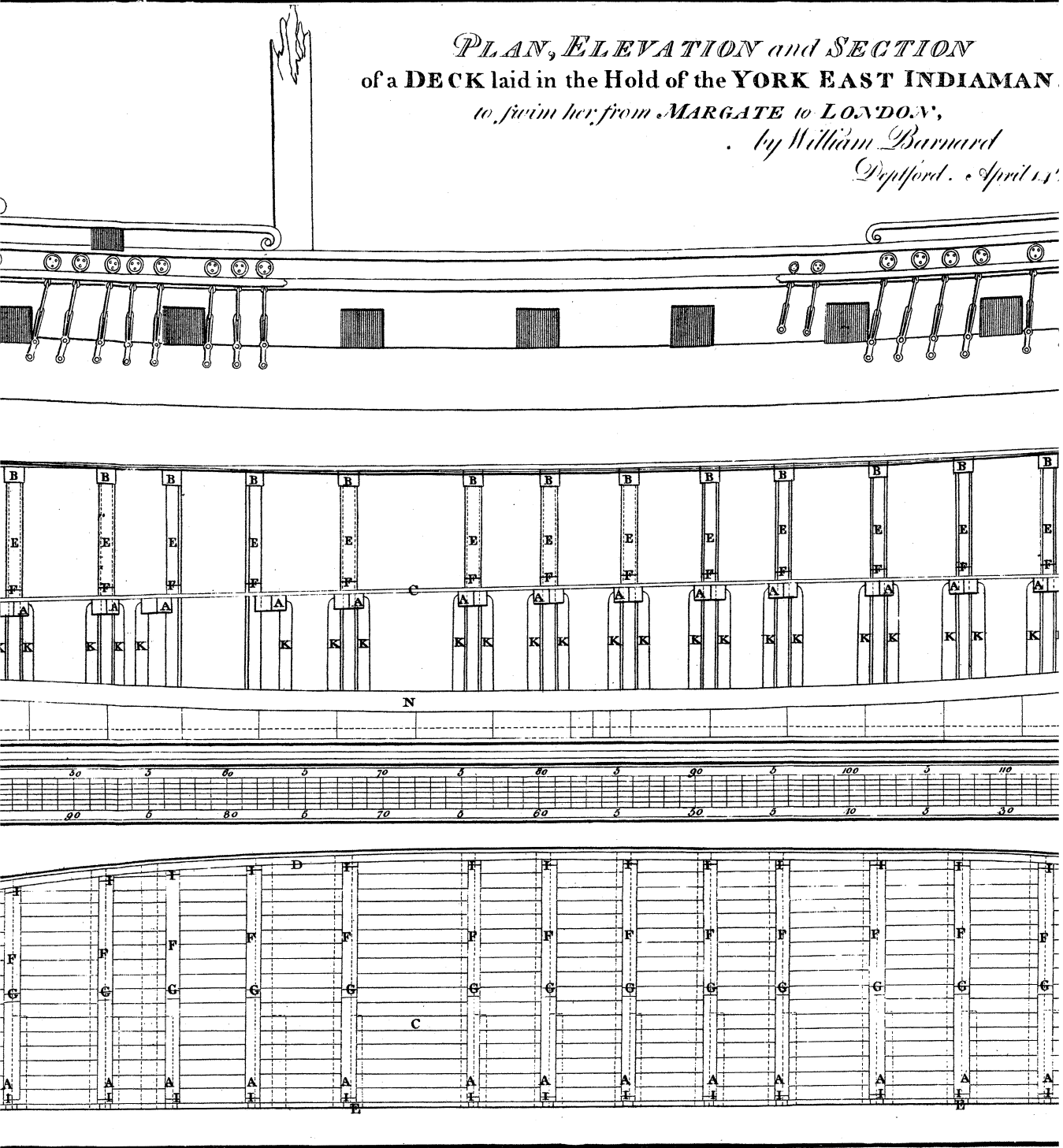
R E F E R E N C E S ,

- A. Beams of Fir 12 inches square put across in halves with 12 feet scarp and bolted to each other and to the Ships side one under every Lower deck Beam.
- B. Ships Lower deck Beams.
- C. Hat of the Deck laid with 2 1/2 in. deals 36 ft long.
- D. A piece of Fir 12 in. broad 8 1/2 in. thick well nailed against the Ships side all fore & aft over the Deals to prevent the side of the Deck from rising.
- E. Pillars in hold about which every half Beam was scored and through which the middle bolt of the Beams was driven.
- F. Cross pieces of Fir 12 in. broad and 6 in. thick placed over every lower Beam from the pillar in the middle to the side to prevent the nails drawing through the deals & to place the Shores upon to support the Deck.
- G. Shores 12 in. by 6 in. on every cross piece and let into them 2 in.
- H. Diagonal shores from the foot of every upright shore G. to the Ships side under every end of Lower deck Beams.
- I. Shores of 12 in. by 3 in. from each end of the cross piece to the Lower deck Beams to keep the Cross piece from rising.
- K. Shores of 10 in. by 3 in. from the top of the Keelson under every half Beam to prevent the Deck from settling and thereby loosening the shores above.
- L. Bulkheads to keep out the Water in the extreme ends of the Ship.
- M. Shores to support D^o.
- N. Ships Keelson.



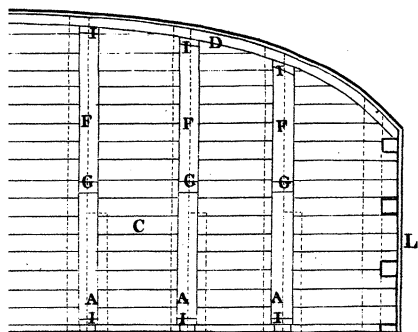
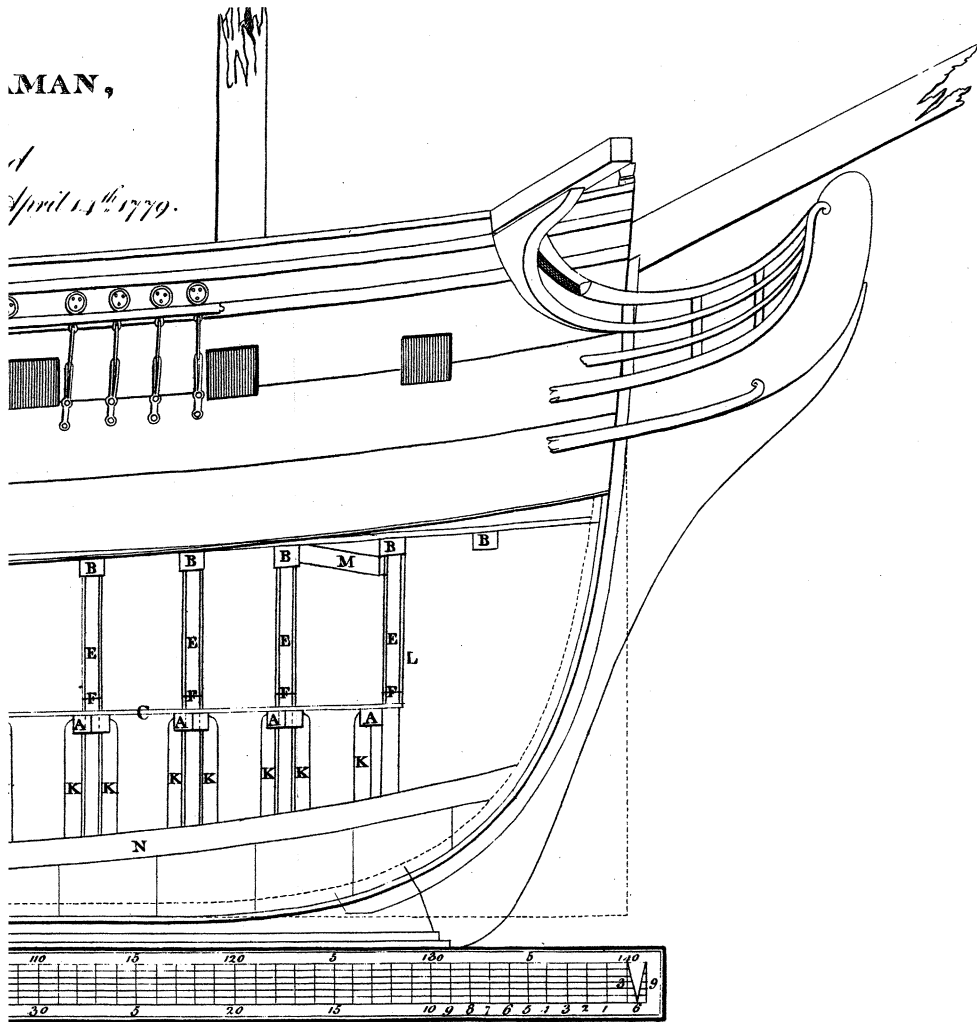


PLAN, ELEVATION and SECTION
of a **DECK** laid in the Hold of the **YORK EAST INDIAMAN**
to give her from MARGATE to LONDON,
by William Barnard
Deptford. April 14.



MAN,

April 14th 1779.



REFERENCES.

A. Beams of Fir 6 in.² by 12 in.² under every Lower deck Beam in the Ship.

B. Upright pieces 6 in.² by 12 in.² two to every Beam, well bolted on each side the Keelson and to the Beams.

C. Plank of the Deck laid with long two inch Deals.

D. Pieces of Fir fore and aft on each side over the Deck, well nailed to the Ship's side to prevent the Deck from rising.

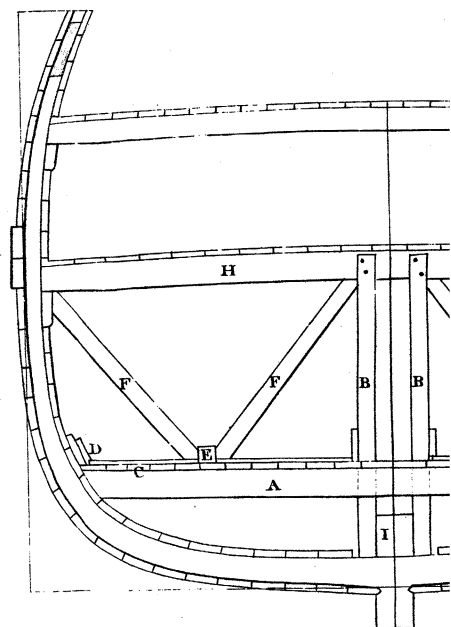
E. Pieces of Fir of 6 in.² square bolted down to the Beams all Fore & aft to support the heels of diagonal shores.

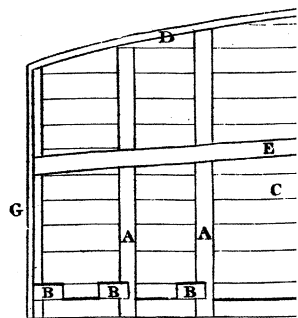
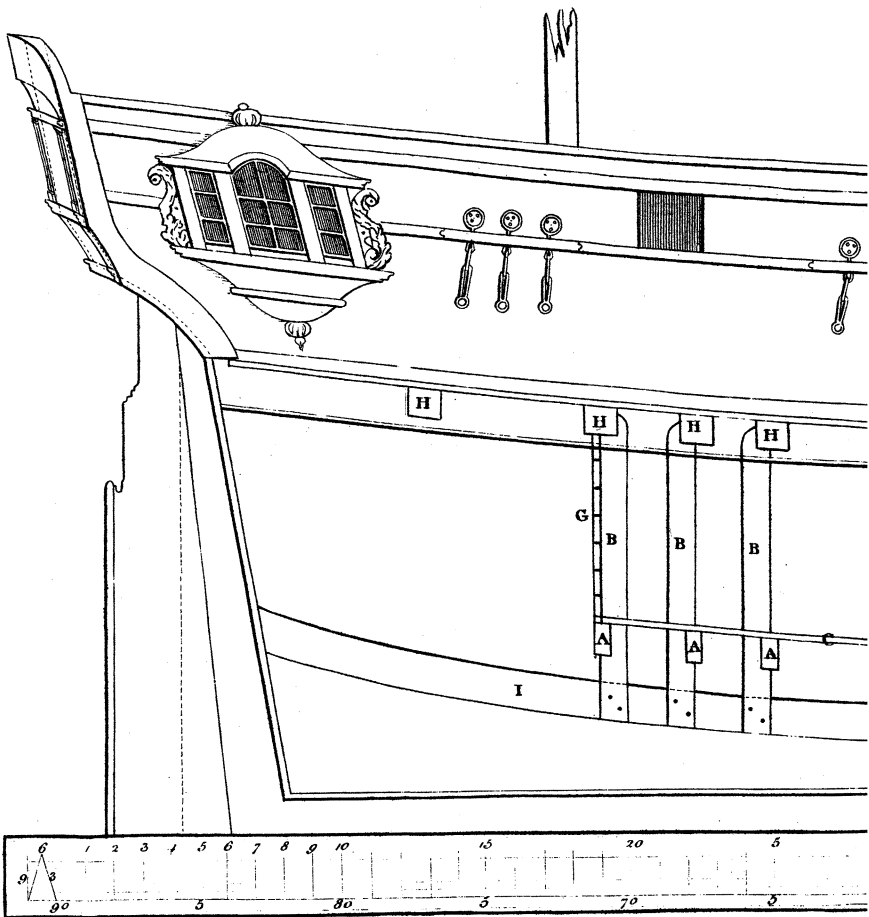
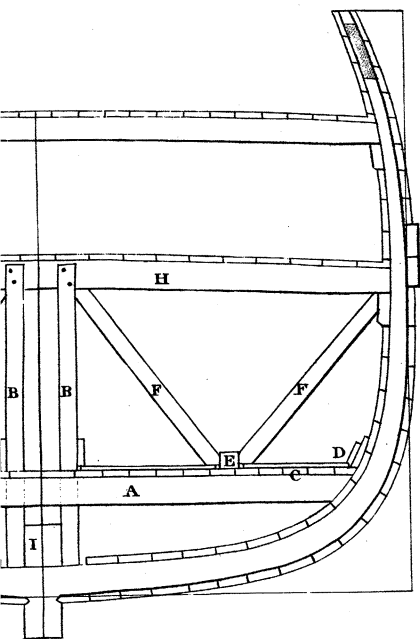
F. Diagonal shores of 6 in.² square to support the Deck against the pressure of the Water beneath.

G. Bulkheads or Partitions to keep out the Water at the extremes of the Ship.

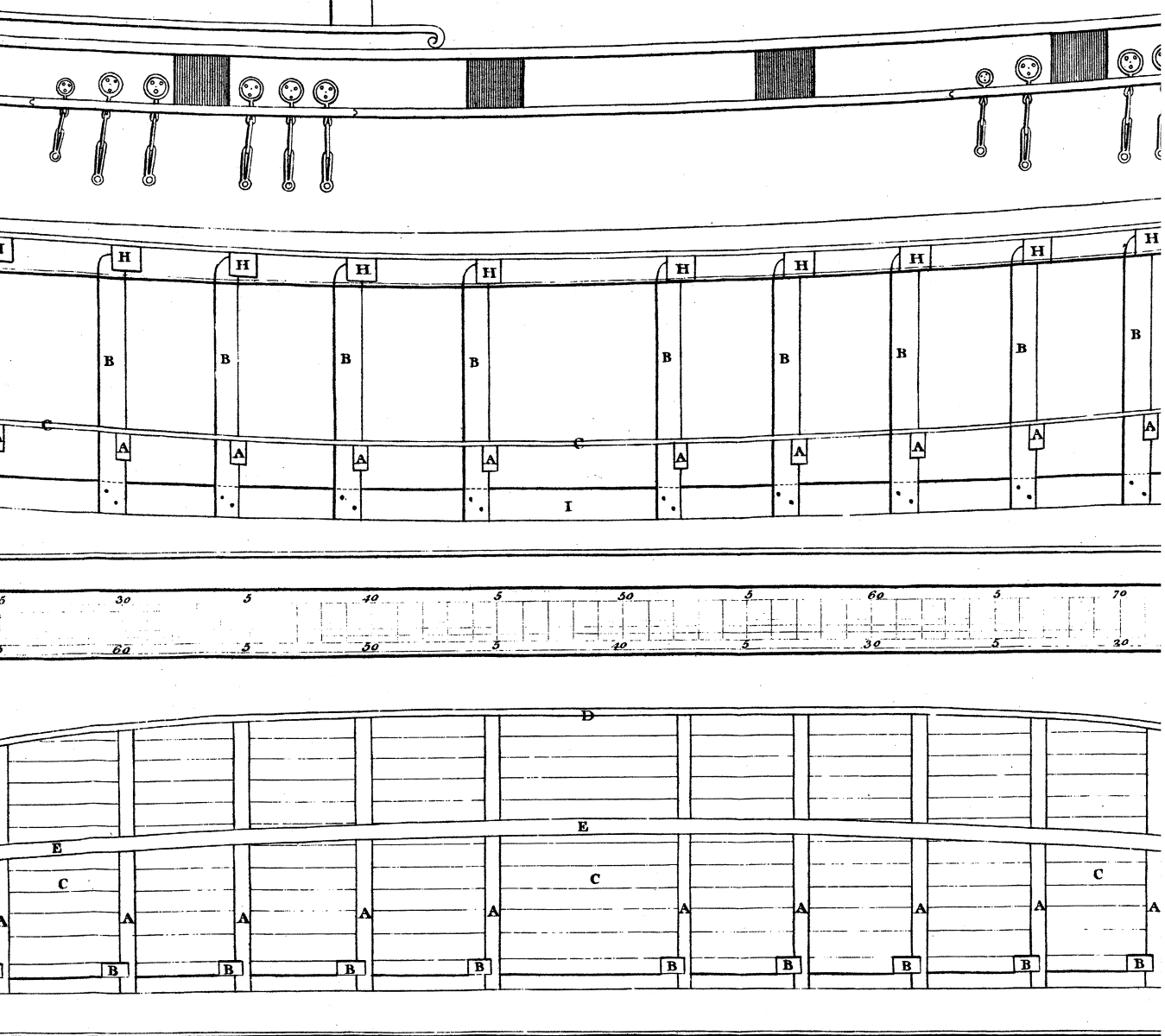
H. Ship's lower deck Beams.

I. Ship's Keelson.



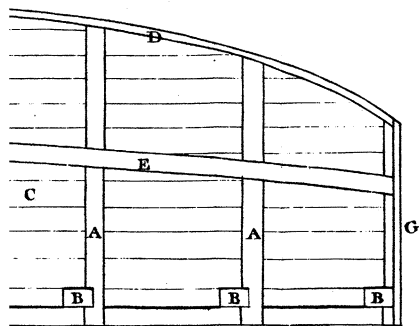
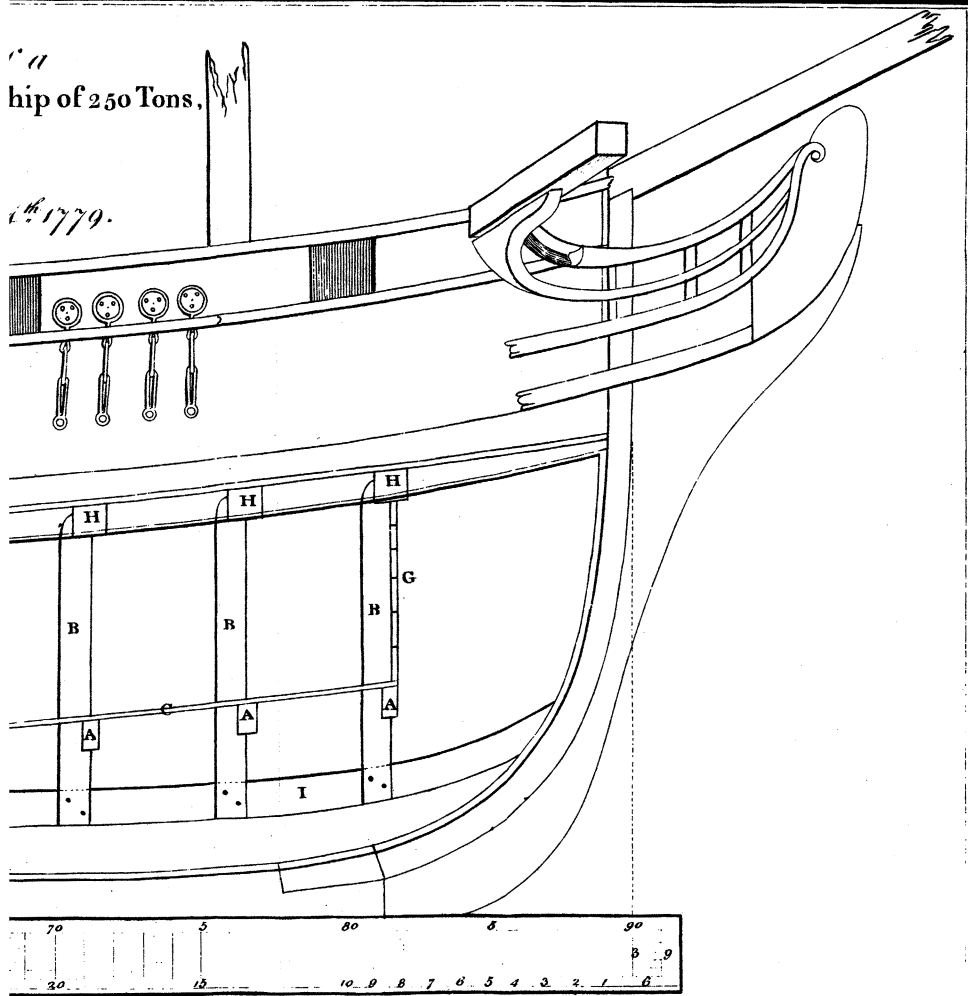


PLAN ELEVATION and SECTION of a
DECK laid in the Hold of the **HARDIESSE** a Swedish Ship of 2
to bring her from MARGATE to LONDON,
by William Burnard
Deptford April 14th 1779



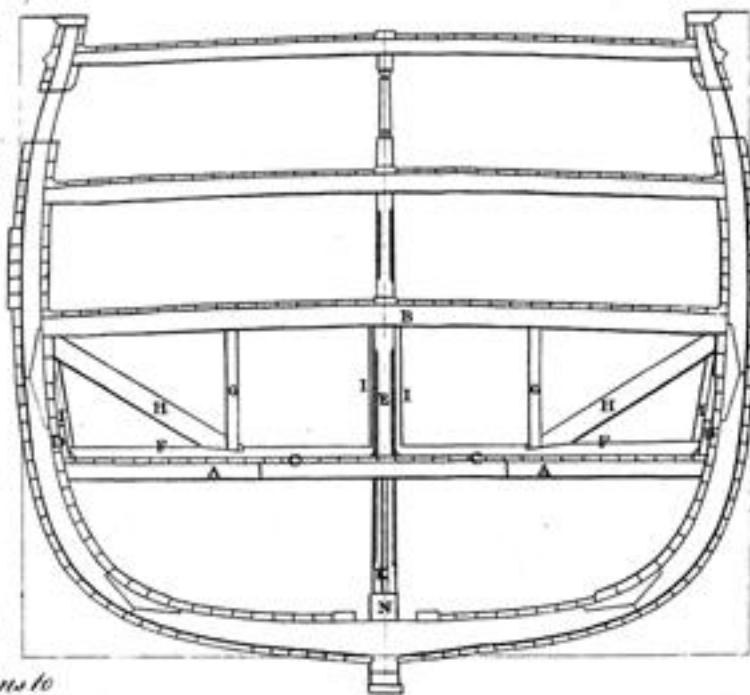
C. A.
Ship of 250 Tons.

1779.

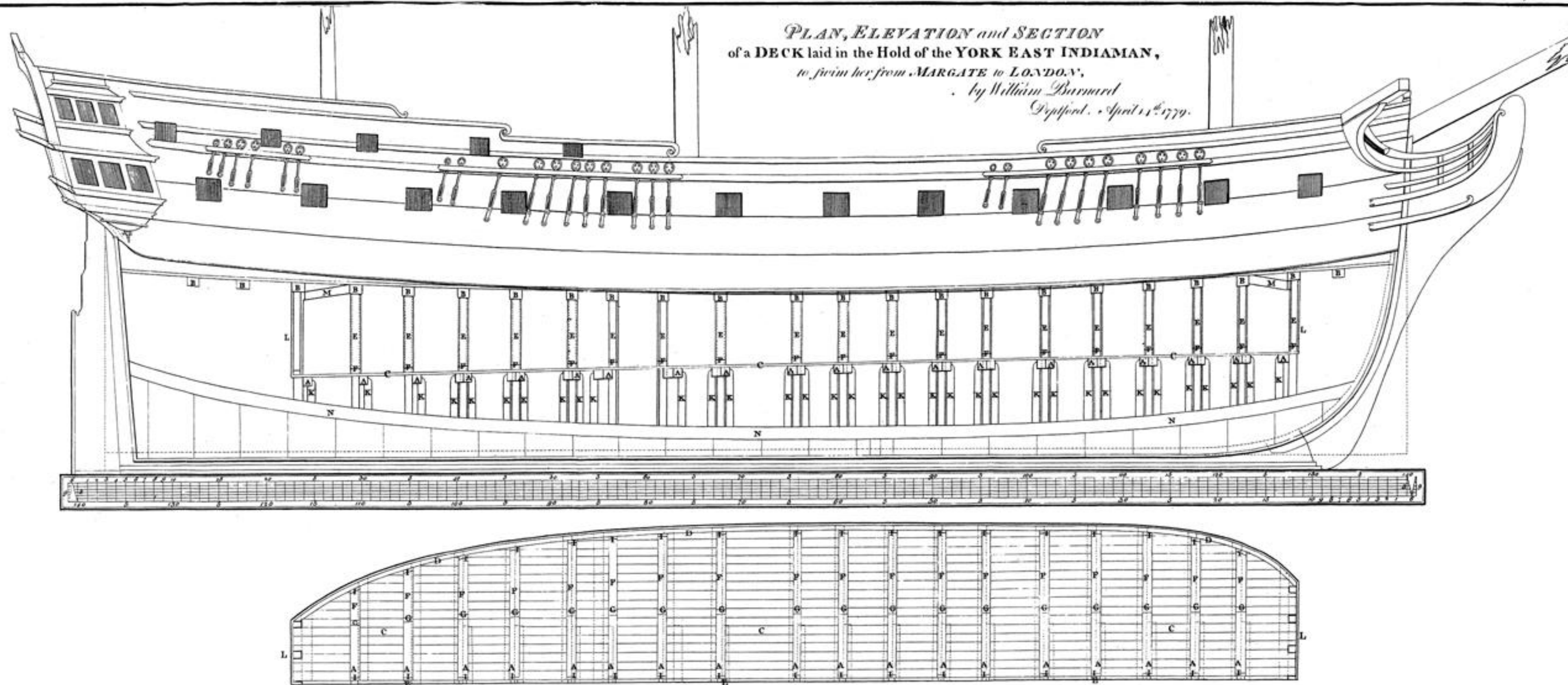


REFERENCES.

- A. Beams of Fir 12 inches square put across in halves with 12 feet scarf and bolted to each other and to the Ships side, one under every Lower deck Beam.
- B. Ships Lower deck Beams.
- C. Hat of the Deck laid with 2 in. deals 3 ft. long.
- D. A piece of Fir 12 in. broad 8 in. thick well nailed against the Ships side all fore & aft over the Deals to prevent the side of the Deck from rising.
- E. Pillars in hold about which every half Beam was scored and through which the middle bolt of the beams was driven.
- F. Cross pieces of Fir 12 in. broad and 6 in. thick placed over every lower Beam from the pillar in the middle to the side, to prevent the masts drawing through the deals, & to place the shores upon to support the Deck.
- G. Shores 12 in. by 6 in. on every cross piece and let into them 2 in.
- H. Diagonal shores from the foot of every upright shore G. to the Ships side, under every end of Lower deck Beams.
- I. Shores of 12 in. by 3 in. from each end of the cross piece to the lower deck Beams to keep the Cross piece from rising.
- K. Shores of 10 in. by 3 in. from the top of the Keelson under every half Beam, to prevent the Deck from settling, and thereby loosening the shores above.
- L. Bulkheads to keep out the Water in the same ends of the Ship.
- M. Shores to support D.
- N. Ships Keelson.



PLAN, ELEVATION and SECTION
of a DECK laid in the Hold of the YORK EAST INDIAMAN,
to swim her from MARGATE to LONDON,
by William Barnard
Depsford. April 11th 1779.



REFERENCES.

- A. Beams of Fir 6 in. by 12 in. under every lower deck Beam in the Ship.
- B. Upright pieces 6 in. by 8 in. two to every Beam, well bolted on each side the *Kilken* and to the Beams.
- C. Flat of the Deck laid with long two inch Planks.
- D. Pieces of Fir four and six ft on each side over the Deck, well nailed to the Ship's side to prevent the Deck from rising.
- E. Pieces of Fir of 6 in. square bolted down to the Beams all four & six ft. to support the heels of diagonal shores.
- F. Diagonal shores of 6 in. square to support the Deck against the pressure of the Water beneath.
- G. Bulkheads or Partitions to keep out the Water at the extremities of the Ship.
- H. Ship's lower deck Beams.
- I. Ship's *Kilken*.

