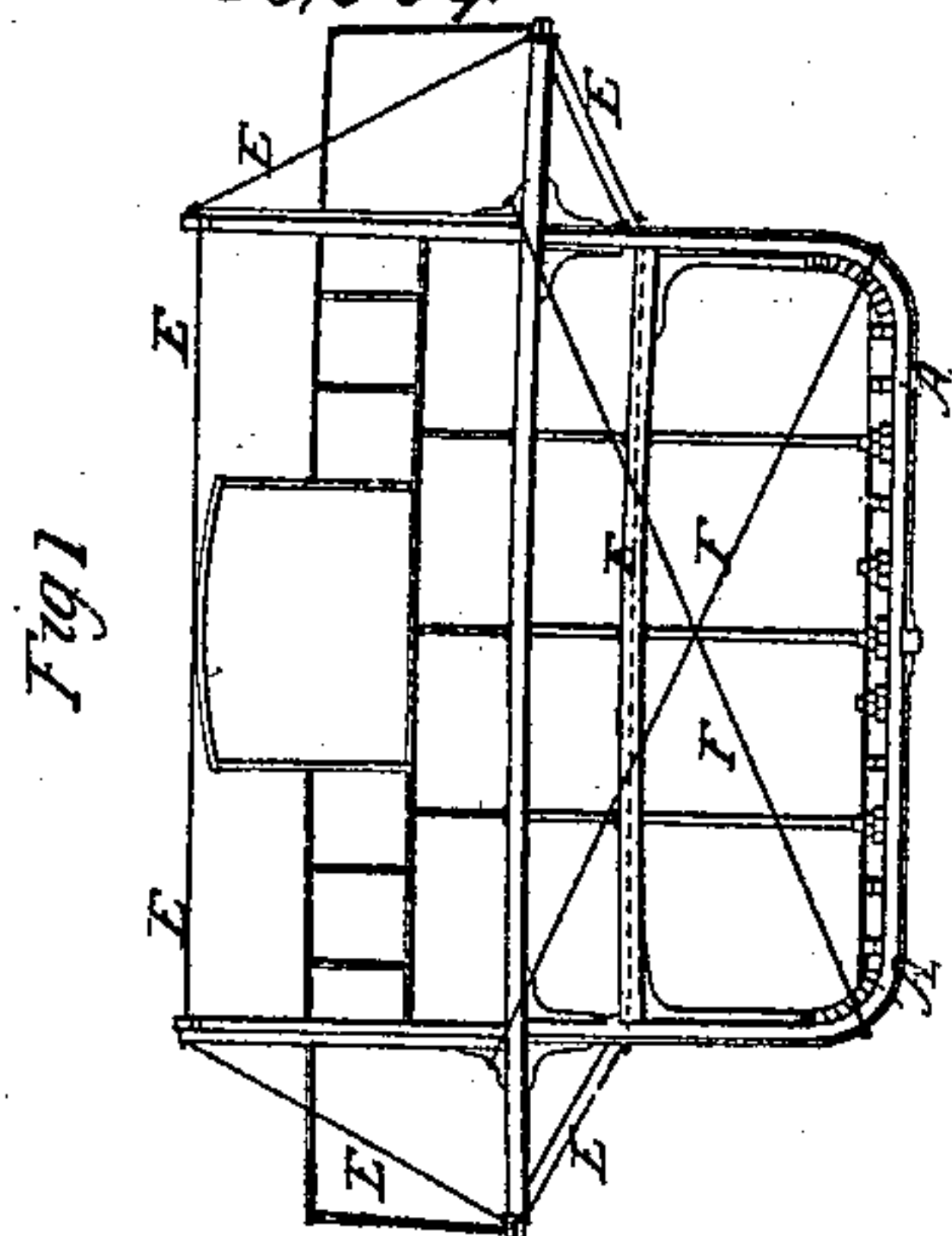


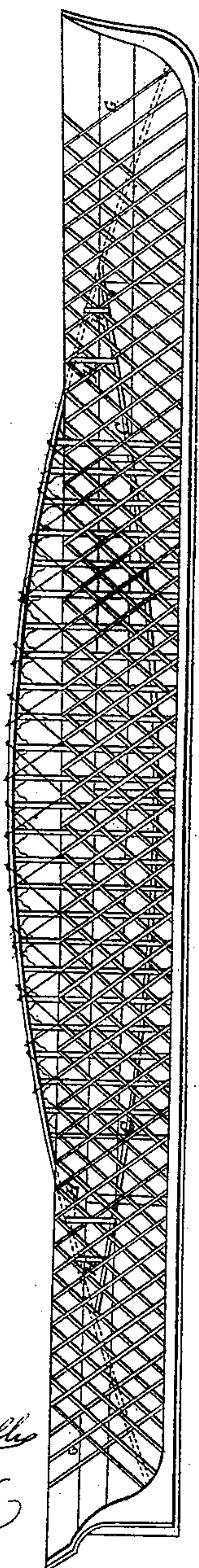
*H. Randall*  
*Ship Building*

*Patented Oct 22, 1861.*

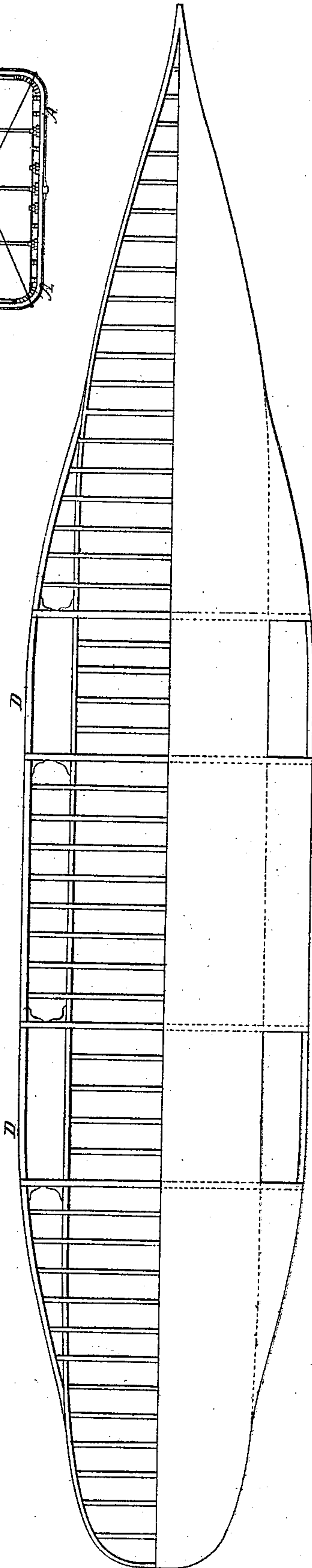
*No. 2,555.*  
*33,559.*



*Fig 2*



*Fig 3*



*Witnesses*

*Charles P. Waller*  
*R. J. Palmer*

*Inventor*

*H. Randall*



# UNITED STATES PATENT OFFICE.

HENRY RANDALL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF, AND ISAAC P. BALDWIN, OF NEW YORK, N. Y.

## IMPROVEMENT IN SHIP-BUILDING.

Specification forming part of Letters Patent No. 33,559, dated October 22, 1861.

*To all whom it may concern:*

Be it known that I, HENRY RANDALL, at present of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and Improved Method of Framing Steamships of Light Draft; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in so framing steamships as to insure with a flat bottom and light draft great strength in a vertical direction, so as not only to prevent a sinking of the extremities and rising of the middle, but also to prevent a rising of the extremities and sinking of the middle of the ship; also, to insure greater strength laterally and to effectually prevent any twisting or wreathing motion or tendency to roll, thus rendering a ship not only steady, but firm and rigid in every part throughout its entire length, enabling it to stand up squarely in any sea and to be always in trim, allowing the swell of the sea to pass under it, (instead of dashing against its sides or quarter,) and to ride the waves with more ease and greater safety.

A high rate of speed on the ocean can only be attained by steamships with a light draft, and to make them safe strength is indispensable, and although deep-draft vessels may be made sufficiently strong from the vertical strength of their form, as will be evident, it is difficult of accomplishment in the case of light-draft and flat-bottomed vessels, as will be correspondingly evident, and no plan hitherto known to the public accomplishes this to a sufficient extent, even theoretically, in any form for practical application.

To enable others skilled in ship-building to use my invention, I will proceed to describe it as follows:

To insure a light draft and steady motion, a broad flat bottom is given to the ship, with very little dead-rise from the keel to the bilge-keelsons, turning a short round bilge. (See cross-section view A A, Fig. 1.) This form extends about one-fourth the entire length of the ship, when the curve of the bilge gradually enlarges and approaches the keel as the

ends are approached, terminating perfectly sharp at the ends and partially so on the bottom. A sufficient number of ribs are made to extend above the main deck sufficiently far to be trimmed off and be capped by or kneed to a vertical arch sprung from stem to stern and terminating in the dead-wood at each end of the ship, where it is firmly fixed. (See B B, Fig. 2.) Interwoven with this and the ribs is a counter-arch *c c*, extending nearly from stem to stern, its greatest curve resting on the bilge-keelsons, firmly connected at and near each end with broad iron straps *H*, and securely bolted throughout its entire length to the side of the ship. The main-deck timbers at their juxtaposition with the ribs are firmly connected and are projected beyond the ribs sufficiently far outboard to be trimmed off to match into and be capped by a horizontal arch sprung nearly from stem to stern of a sufficient curvature to embrace the paddle-boxes, as shown in Fig. 3, D D. Connected with all at proper intervals are adjustable iron tension-braces *E* and *F*, Fig. 1, that encircle and tie together the different sections of the ship in the most perfect manner, so as to effectually prevent any twisting or wreathing motion, the tension-braces *E* running from the main-deck timbers inboard and below (or from center posts or struts fixed between the main-deck timbers and the keelsons) to the ribs at a point above the waterline, thence to the horizontal arch, thence to the vertical arch, thence athwart ships, and in a corresponding manner from point to point to the counterpart place of beginning. The iron diagonal braces *a*, Fig. 2, which are usually placed on the inside of the ribs, I place on the outside of the ribs, and thus hoop the ship's frame firmly together, giving it still additional strength.

The manifold advantages gained by my method of building steamships are involved in the attainment of two points—viz., light draft with strength—by which, with a small power, high speed, safety, comfort, and economy are secured.

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

1. Making the main-deck timbers of a steamship project outboard sufficiently far to be

trimmed off and be capped by a horizontal arch of sufficient curvature to embrace the paddle-boxes and extending nearly from stem to stern, substantially as described.

2. In combination with the above, making a sufficient number of the ribs extend above the main-deck timbers, to which they are firmly connected, far enough to be trimmed off and be capped by a vertical arch sprung from stem to stern, or nearly so, substantially as described.

3. In combination with the foregoing, the inverted counter-arch, substantially as described.

4. In combination with all the above, the adjustable iron tension-braces E E, Fig. 1, substantially as described.

HENRY RANDALL.

Witnesses:

J. B. PALMER,  
CHAS. P. WILLIS.