(No Model.)

C. HARRIS.

STEAMSHIP.

No. 491,170. Patented Feb. 7, 1893.

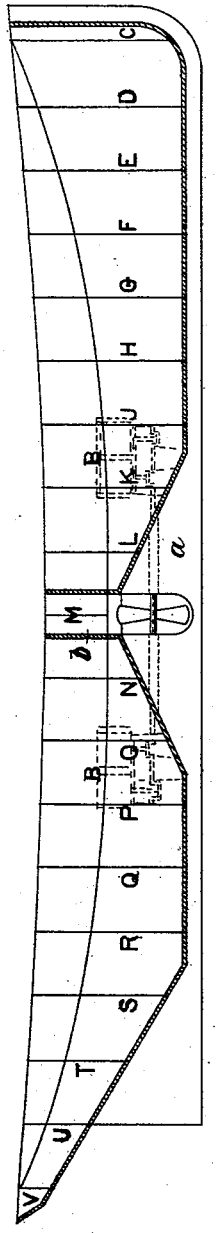

Fig. 1.

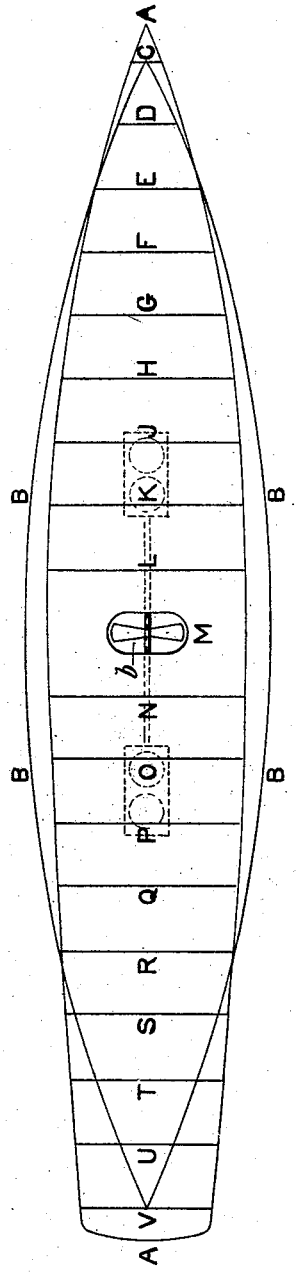

Fig. 2.

WITNESSES

L. A. Connor Jr.

Geo. Snyder.

INVENTOR

Charles Harris,

By Geo. P. Whittemore,

Atty.

UNITED STATES PATENT OFFICE.

CHARLES HARRIS, OF BRIGHTON, ENGLAND.

STEAMSHIP.

SPECIFICATION forming part of Letters Patent No. 491,170, dated February 7, 1893.

Application filed July 13, 1891. Serial No. 399,323. (No model.) Patented in England March 3, 1891, No. 3,787.

To all whom it may concern:

Be it known that I, CHARLES HARRIS, a citizen of the United Kingdom of Great Britain and Ireland, residing at Brighton, in the county of Sussex, England, have invented certain new and useful Improvements in Steamships; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention has been patented to me in Great Britain, March 3, 1891, No. 3,787.

My invention relates to steamships, and its object is to improve the lines of the hull so as to diminish rolling, and obtain other advantages, as will hereinafter appear.

The invention consists in the construction and arrangement of the hull as hereinafter set forth and particularly pointed out in the claims.

Figure 1 is a longitudinal section. Fig. 2 is a deck plan.

The drawings represent by Figs. 1 and 2 respectively the longitudinal section and deck plan of a small vessel seventy six feet in length over all and twelve feet, six inches beam, with a molded depth of nine feet, having for the first improvement a central bulge, just above the water line designed to insure greater immunity from excessive rolling than is usually experienced in this class of steamship.

The principle upon which this line is arrived at may be thus described:—Having laid down the outline of an ordinary deck plan, as indicated by the line A A, a start is made, in the bows, from the center of the section C and also from the center of V astern: from these points are drawn two lines B B, segments of the arc of a circle whose radius is about equal to the extreme length of the ship, which widen apart until they reach the maximum spread of the bulge previously determined upon by the designer, in this case, one foot, six inches beyond the outside of the deck line amid. In the plan, the bulge is shown of an ovoidal, or egg-shaped form:—but if the sides of the vessel whereto this principle is being adapted run parallel with each other for any distance amid, it will be advisable to let the bulge line follow the same contour. The starting points of the bulge line may commence withinboard at any site the designer pleases, and may also extend from stem to stern if preferred. In the longitudinal section, the graduating level of the bulge line B B is shown, as it rises fore and aft with the lines of the ship: this line therefore, where it intersects the vertical lines C D &c. to V, indicates the exact level of the maximum bulge at each and every one of such vertical sections. It will be noted that the curve of the bulge on the longitudinal section follows a similar shape to the curve on the plan, and this rule should obtain in all cases of ship building on this principle. The designer, when planning this line will need to have carefully before him the length, breadth and depth of his vessel taken in conjunction with her estimated draft, because the lowest parts of the bulge amid, between K and O, should always be just above, or at least about on a line with the water line.

This bulge line principle is, in its application, obviously capable of manifold variations, affording wide scope for the taste and judgment of naval architects and engineers. This style of build will adapt itself in an especial degree to double ended boats, having stem and stern alike.

The advantages claimed for this invention are:—First. Diminished rolling by reason of (*a*) the central bulge acting as a counterbalancing weight on either side, and (*b*) the increased stability caused by the cubical feet of displacement and the superficial area covered thereby being both greater than the cubical feet of the stowage or area contained in the superimposed space above.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A steamship hull whose walls extend continuously from keel to bulwarks, and have in each side an outwardly curving bulge, projecting beyond the outline of the deck, said bulge being widest amidships and sheering from the waterline amidships to the level of the deck at stem and stern substantially as described.

2. A steam ship hull whose walls extend con-

tinuously from keel to bulwarks and have in each side a bulge projecting beyond the outline of the deck on lines curved outward from stem and stern to a point amidships, and sheering upwardly from said amidships point to the level of the deck at stem and stern, substantially as described.

3. A steam ship hull whose walls extend continuously from keel to bulwarks its greatest beam being amidships on the water line, the greatest breadth of the sections fore and aft of this point coinciding with a curved line sheering from the water line amidships to the level of the deck at stem and stern, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES HARRIS.

Witnesses:

CHRISTOPHER JOSEPH BEETON,
40 *Devonshire Place, Brighton.*

S. HARRISON,
24 *Cheltenham Place, Brighton.*