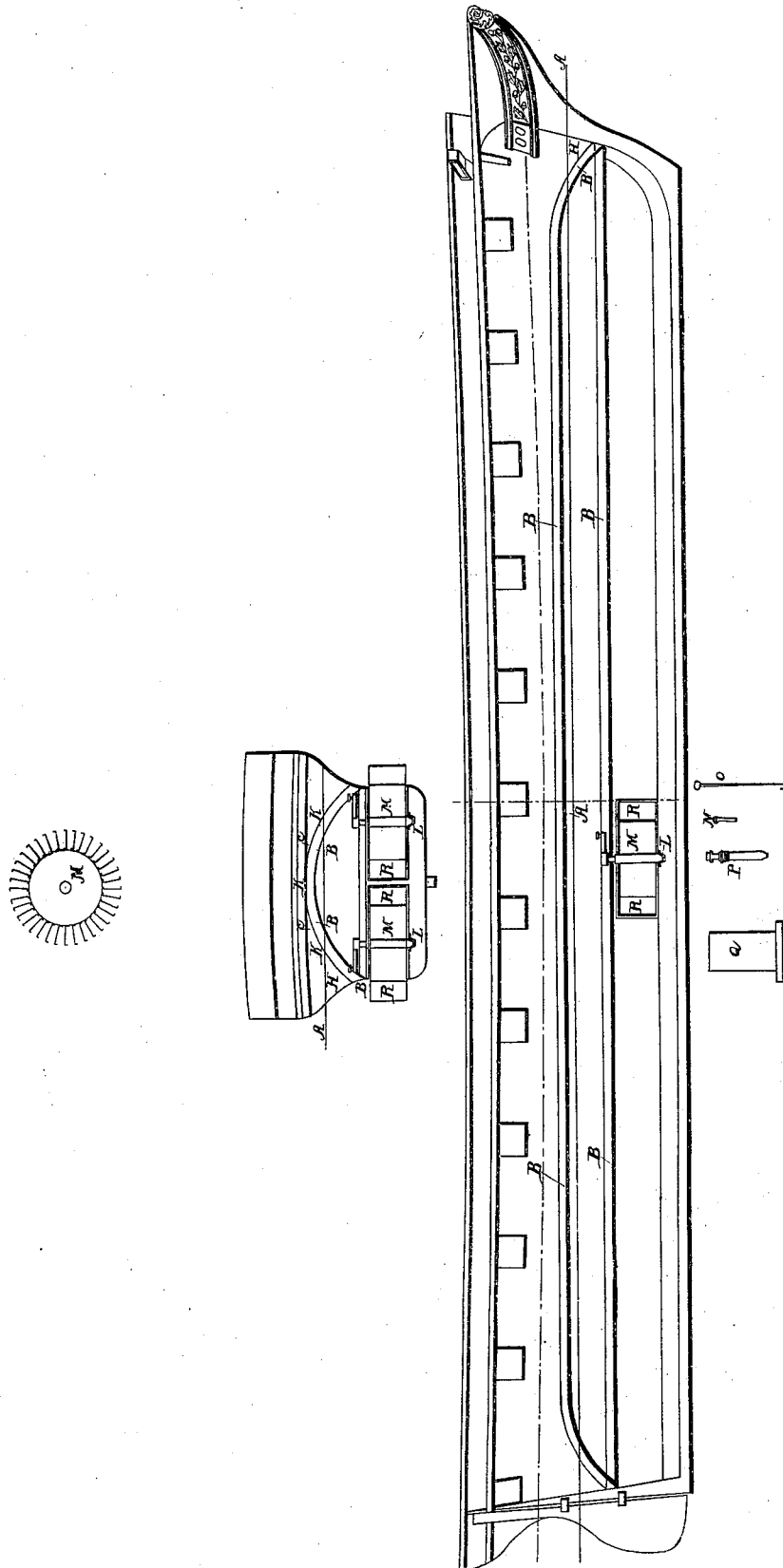


# Harris & Hunter. Paddle Wheel.

N<sup>o</sup> 2,004.

Patented Mar 12, 1841.



# UNITED STATES PATENT OFFICE.

WILLIAM W. HUNTER, OF THE UNITED STATES NAVY, AND BENJAMIN HARRIS, OF NORFOLK, VIRGINIA.

## IMPROVEMENT IN THE MANNER OF CONSTRUCTING AND PROPELLING STEAM-VESSELS.

Specification forming part of Letters Patent No. 2,004, dated March 12, 1841; antedated November 2, 1840.

### *To all whom it may concern:*

Be it known that we, WILLIAM W. HUNTER, of the United States Navy, and BENJAMIN HARRIS, of Norfolk, Virginia, have jointly invented a new Mode of Constructing and Propelling Steam-Vessels, by which the steam-engine, water-wheel, and machinery are protected from the effect of the sea and shell-shot and any other shot discharged from cannon afloat, so that said vessel cannot be made to sink by said means; and we do hereby declare that the following is a full and exact description.

The nature of our invention consists in providing the vessel with an arched deck, called a "shield-deck," faced with iron, which facing forms, with the direction of any missile discharged from cannon afloat, an angle over one hundred and thirty-five degrees, and will therefore glance or throw off said missile. Said shield-deck, in connection with the parts of the vessel below it, gives (by its displacement of water) a buoyancy by which said vessel will float, though the vulnerable parts of said vessel be pierced or torn by shot so as to admit all the water capable of entering. The steam-engine, machinery, and water-wheels are placed below said shield-deck and every part of them below the water-line, therefore out of the reach of shot, and the water-wheels, being from their position always submerged, are relieved from the effect of the sea.

To enable others skilled in the arts to make use of our invention, we will proceed to describe its construction and operation.

See the accompanying model on the scale of ten feet to the inch, and the drawing representing a section of a steamer for harbor defense.

A A A is the water-line; B B B B, the shield-deck faced with iron and supported by wooden beams. The abutments of said shield-deck are joined and secured entirely round the vessel at a given distance below the water-line, out of the reach of shot. The summit of said shield-deck is exactly amidships and elevated the same distance above the water-line as its abutments are below it. The hatches are amidships in the summit of the shield-deck and fitted with iron or other metal water-tight slides to traverse fore and aft within the shield-deck at C C. The abutments

of the shield-deck at B B are, by reason of their distance below the water-line, out of the reach of shot, and the surface of the shield-deck, being faced with iron, forming, with the direction of any missile discharged from cannon afloat, an angle over one hundred and thirty-five degrees, and as said angle will cause said missile to be glanced or thrown off from said deck it follows that part of the vessel contained under the surface of said shield-deck is secure from the effect of shot.

Compare the displacement or space contained between that part of the water-line, that part of the inner surface of the vessel's side, and that part of the surface of the shield-deck at H H to that contained between the part of the water-line and part of the surface of the shield-deck at K K K, and it is evident, should the side be so pierced or torn by shot as to fill the first-named displacement or space at H H with water being all the water that can possibly be admitted, the vessel will settle just so much as that weight of water will occasion and no more, leaving to the vessel the buoyancy occasioned by the greater displacement or space contained between K K K less the weight of water at H H. Said vessel therefore cannot be made to sink by the means named in the premises, and the steam-engine and machinery will be protected by said means.

The water-wheels of said vessel revolve horizontally under water, the hub M and inner paddles of each wheel in the vessel, in wheel-openings made therefor, fitting the wheel as near as may be to avoid contact and consequently friction. The water-wheels should be made of metal and consist of a hollow water-tight hub M and paddles R. Said wheels are either fixed permanently or made to be detached at pleasure from a vertical shaft passing through the floor of the vessel, and in said floor, which is made of stout timber, there is a pedestal and stuffing-box, the first to support the shaft firmly in its position, and in which it also revolves, and the latter to exclude the water. The lower ends of said shafts L are in the shape of an inverted cone and made of metal properly tempered to diminish friction. Said shaft ends revolve in metal saucers fixed in the bottom of the wheel-openings. The upper ends of

said water-wheel shafts connect to the steam-engine by a crank or wheel gearing. The middle parts or hubs M of the paddle-wheels are made hollow and water-tight, so that they may be both lighter and so buoyant as to relieve their shafts from weight and friction. When it is desirable to construct said paddle-wheels to ship and unship, a circular flange of metal larger in diameter than the crank is secured to the floor over the wheel-openings, embracing each water-wheel shaft. On said flange is attached by screw-bolts and packing a cylinder Q, reaching in height above the water-line, said cylinder Q to be removed and placed out of the way when the operation of shipping and unshipping the water-wheels is completed. Water-wheels fitted to ship and unship are thus attached to their shafts, viz: In the hub M is a female screw with perpendicular grooves for the reception of keys N, each of which is fitted with an eyebolt on its upper end, so as to admit of their being drawn by an iron hook and rod O to the top of the cylinder Q above the water-line and replaced in the same manner. The water-wheel shafts have a male screw P to correspond and fit the screw in the water-wheel hub M, and the operation of shipping and unshipping said wheel is thus performed: the engine is detached from the wheels by removing the connecting-rod or by throwing out the wheel-gearing, the cylinder Q is secured to its flange, the stuffing-box is taken off, the pedestals are taken out, the shaft-keys N

are drawn, and the shafts are unscrewed and hoisted into the vessel through the cylinder Q. The water-wheels being now detached, any seaman can readily draw them from the wheel-openings and hoist them inboard and place another in the wheel-opening. The paddle-wheel will then rest on the bottom of the wheel-opening. Lower the shaft and turn it till the end takes in its saucer, then till the wheel is clear of the bottom of the wheel-opening, and key it. Put in the pedestals, which will nearly exclude the entrance of water. Pump the water out of the cylinder Q, and while placing the stuffing-box turn a cock in the lowest part of the cylinder Q, through which any water passing the pedestals will run into the hold of the vessel. Detach the cylinder Q and remove it and connect the engine.

What we claim as our invention, and desire to secure by Letters Patent, is—

The application of shield-decks to vessels constructed of metal or wood, whether propelled by steam-power or any other, and also the application of submerged water-wheels on the plan described in the accompanying specification, whether placed horizontally or obliquely, for the purpose of propelling vessels.

WM. W. HUNTER.  
B. HARRIS.

Witnesses:

THO. NEWTON,  
WM. INSELL.