H. H. Warden,
Armor Clad.

No. 34,539. Patented Feb. 25, 1862

Fig. 1.

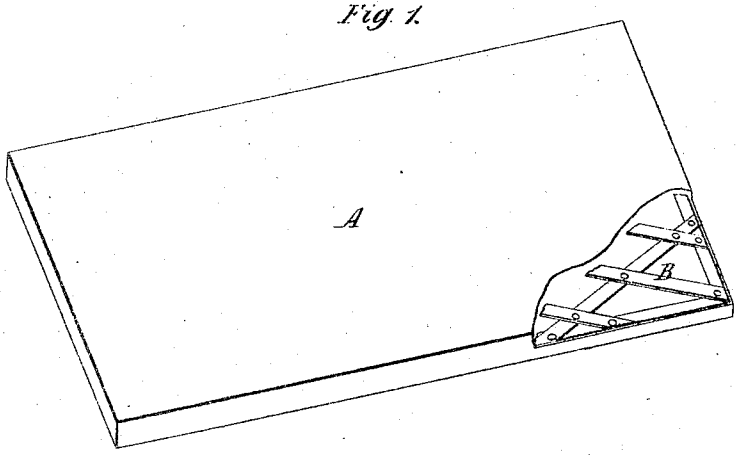
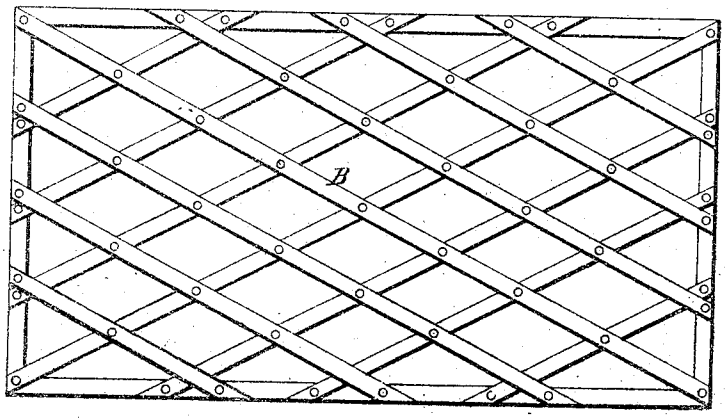


Fig. 2.



Fig. 3.



Inventor.

H. H. Warden.

UNITED STATES PATENT OFFICE.

H. H. WARDEN, OF NEW YORK, N. Y.

IMPROVED SHIPS' ARMOR-PLATES.

Specification forming part of Letters Patent No. **34,539**, dated February 25, 1862.

To all whom it may concern:

Be it known that I, H. H. WARDEN, of No. 50 Wall street, in the city, county, and State of New York, have invented a new and Improved Armor for Vessels or Ships of War; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of one of the plates which constitute the armor, one corner of the plate being broken away to show more clearly the invention. Fig. 2 is a transverse section of the same. Fig. 3 represents a web or lattice-work of wrought iron which is embedded in the plate when it is cast.

Similar letters of reference indicate corresponding parts in the several figures.

It is a well-ascertained fact that ships of war clad with plates made of either wrought or cast iron alone are incapable of withstanding the force of cannon-balls or projectiles thrown against them from rifled ordnance. When these plates are made of wrought-iron, balls or projectiles thrown against them with any considerable force have the effect to part the fibers of the iron and pass through them into the ship, and when made of cast-iron the balls or projectiles, instead of passing through the plates, simply fracture them, when they will fall in fragments from the sides of the ship into the water and leave a naked or bare spot on the ship.

The object of this invention is to obtain plates of cast iron or cast steel for covering vessels or ships of war, which, while they are as liable to fracture as ordinary cast-metal plates, when fractured will not leave their places on the sides of the ships, thereby affording protection to the ship for a longer period,

The invention consists in embedding a web or lattice-work of wrought iron in a cast-iron or cast-steel plate. The superiority of the plate thus made over either a wrought, cast-iron, or steel plate as a covering for vessels or ships of war consists herein, that while it possesses the same hardness as either alone it combines the advantages of both wrought and cast metal, inasmuch as the plates, though fractured, adhere together and do not become separated and leave a bare spot on the side of the ship, even after repeated shots against them.

To enable others skilled in the art to fully understand and construct my invention, I will proceed to describe it.

In the accompanying drawings, A represents one of the plates embodying my improvement, and which constitute the armor for the ship. This plate is made in rectangular form of cast-iron or steel, with a web or lattice-work of wrought iron embedded in it when it is cast, and it may be made of any desired length, width, or thickness.

B is the web or lattice-work of wrought-iron, which is embedded in the plate. This web or lattice work for plates of half an inch in thickness may be made of common hoop iron, and for plates of three and four inches in thickness may be made of common bar iron. The bars of iron to form the web are first placed across each other in the manner shown in Fig. 3, and riveted together at the points of intersection, after which the ends of the bars are cut off even with the side and end pieces; or they may be cut to the proper length before they are riveted together. When the plates are to be made, this web or lattice-work of wrought iron is placed in the mold so as to have the cast metal about equally divided on both sides of it, forming through the middle of the plate horizontally alternate layers of wrought and cast metal. The plates are put upon the sides of the ship so as to abut each other, and may be secured to the ship by bolts passing through them from the outside and fastened by screw-nuts on the inside of the hull of the ship, or they may be secured in any other suitable manner.

I do not confine myself to any particular size or shape of plate, as it is evident that my invention is equally applicable to plates of any and every size and shape.

I do not claim, broadly, the casting of iron upon wrought-iron; nor do I claim, broadly, the employment of wrought iron lattice-work in ship-building.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

As an improved article of manufacture, an armor-plate for ships, composed of a wrought-iron frame embedded within a cast-iron body, substantially as herein shown and described.

H. H. WARDEN.

Witnesses:

J. W. COOMBS,

JAMES LAIRD.