Sheet 1. 2 Sheets.

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Armor Clad.

No. 54,083. Patented Apr. 17, 1866.

Fig. 5.

Fig. 4.

Fig. 3.

Fig. 2.

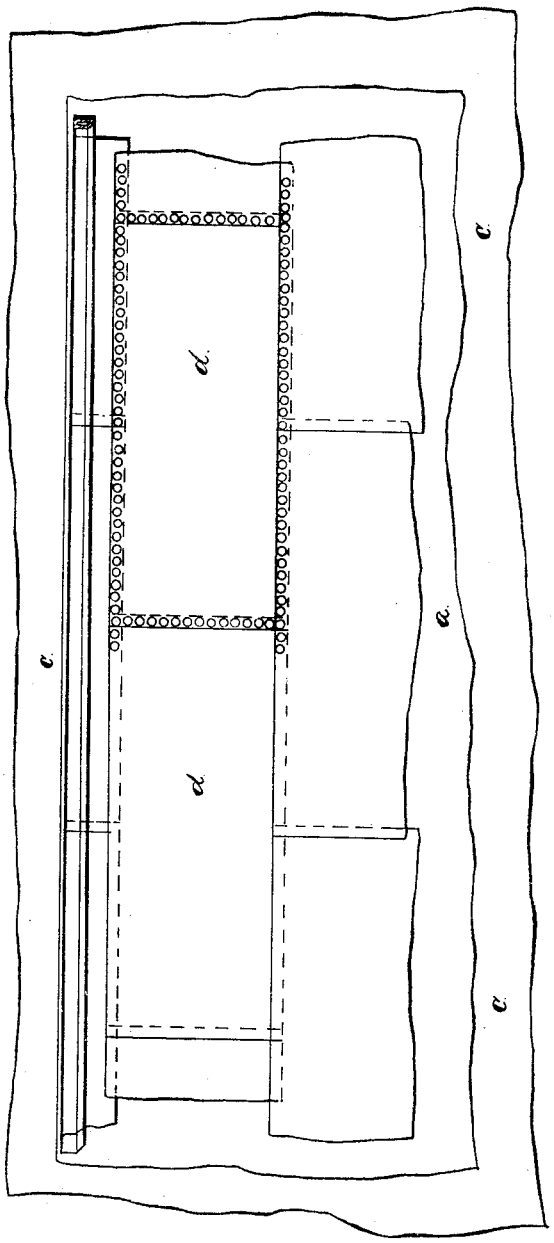
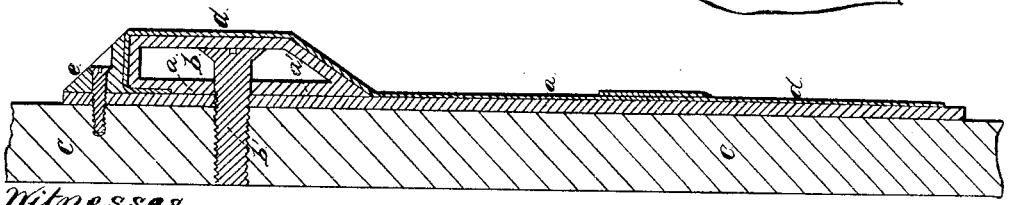


Fig. 1.



Witnesses.

W. Lloy d Wise. Assoc. I.E.
Chandos Chambers adelphi London. W.C

Chas. H. Fellers
Chandos Chambers Adelphi London. W.C

Inventor.

Frederic Pelham Warren

Sheet 2. 2 Sheets.

F. P. Warren.

Armor Clad.

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Fig. 7.

Fig. 6

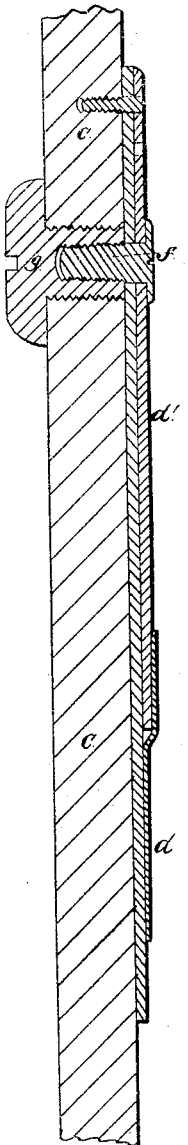


Fig. 8.

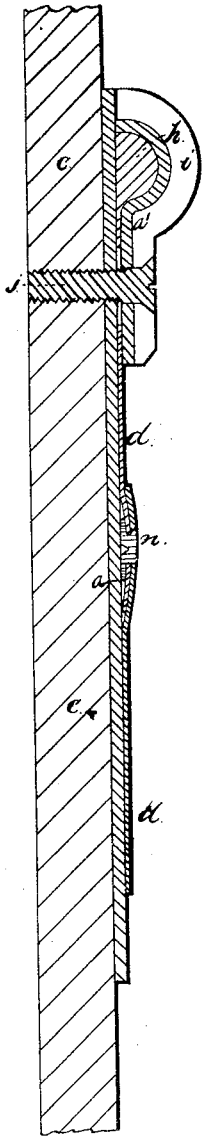


Fig. 9.

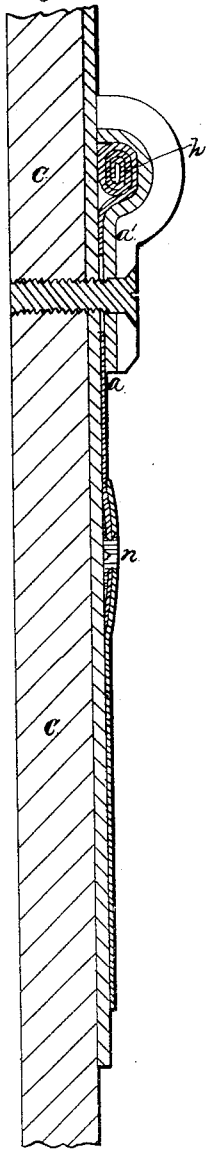
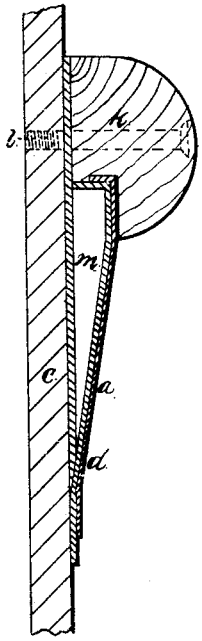


Fig. 10.



Witnesses.
W. Lloyd Wise Assoc. Inst.
Chandos Chambers Adelphi
Chas. Hoffberg London W.C.
Chandos Chambers Adelphi
London W.C.

Inventor.
Frederic Pelham Warren

UNITED STATES PATENT OFFICE.

FREDERIC PELHAM WARREN, OF EAST COURT, COSHAM, GREAT BRITAIN.

IMPROVED SHEATHING FOR IRON VESSELS.

Specification forming part of Letters Patent No. **54,083**, dated April 17, 1866.

To all whom it may concern:

Be it known that I, FREDERIC PELHAM WARREN, of East Court, Cosham, in the county of Hants, Kingdom of Great Britain and Ireland, commander in the navy of Her Britannic Majesty, have invented certain new and useful Improvements in Attaching Copper or other Sheathing to Iron Vessels; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the combination, with the iron plates of a vessel having serrated outer surfaces, of a metal sheathing having a serrated inner surface and an intermediate layer of insulating material, the serrated surfaces of the plates causing the insulating material to adhere so firmly to the same as to cement the sheathing firmly to the vessel; and my invention further consists of certain devices, fully described hereinafter, whereby the upper edge of the sheathing is secured firmly to the vessel without destroying the perfect insulation of the said sheathing.

In order to enable others skilled in the art to apply my invention, I will now proceed to describe the mode of carrying the same into effect.

On reference to the accompanying drawings, which form a part of this specification, Figure 1, Drawing No. 1, and Figs. 6, 8, 9, and 10, Drawing No. 2, are sectional views, representing parts of the side of an iron vessel with sheathing attached according to my improvement; Fig. 3, Drawing No. 1, a side view of a portion of a vessel with the sheathing-plates attached; Figs. 2, 4, and 5, Drawing No. 1, views illustrating the kinds of rivets used for securing together the sheathing-plates; and Fig. 7, a sectional view, showing two of the sheathing-plates secured together.

The side C of the vessel, to which the sheathing is to be applied, is first roughened or indented and is then coated with a fibrous or other non-conducting material, *a*, the material which I prefer to use, under ordinary circumstance, being what is known as "Hay's patent water-proof glue." The inner surfaces of the sheathing-plates *d* are then roughened, and a coating of fibrous or other non-conducting material, similar to that placed on the side C of the vessel, is laid on the roughened sides of these plates. In the edges of the plates *d* intended to be attached together I drill corresponding rows of openings. The upper edge of the uppermost plate *d* is then introduced between the side of the vessel and a band, *b*, Fig. 1, of galvanized iron or other suitable material, which is coated with insulating-cement, and is secured, by bolts *b'*, to the side of the vessel, so as to confine the edge of the sheathing-plate firmly between the two. The plate *d* is then bent over the band *b* and is brought against the outer coated surface of the vessel, and against the lower edge of the plate is laid the upper edge of another plate *d*, and through the openings in the edges of both plates are passed the split shanks of rivets *n*, which are then driven home, so as to spread the shank and clinch the same against the non-conducting material *a*, as shown in Figs. 8 and 9, the clinching of the rivet being effected without perforating or otherwise injuring the insulating material *a*. The remaining plates *d* are then secured in a similar manner to those already attached to the vessel, and that portion of the sheathing which is bent over the band *b* is protected by a cleat or band, *e*, of wood or other suitable material, as shown in Fig. 1. In some instances, however, in place of securing the upper edge of the sheathing by the band *b*, as described, a rib, *h*, is formed at the upper edge of the upper plate *d* by folding the same, as shown in Fig. 9, or in any other suitable manner, and a belt or band, *k*, of galvanized iron or other suitable material, of such a form as will cover the said rib, is laid over the same, and the whole are secured firmly to the side of the vessel by bolts J.

In order to insure a more perfect insulation and prevent the slightest galvanic action, the bolts which secure the upper portion of the sheathing to the vessel may be tapped into screws *g*, of wood or other suitable non-conducting material, secured, as shown in Fig. 6, into the armor-plates or side of the vessel. The sheathing is also cut away at the point where the bolts pass through the same, so that there shall not be the slightest contact between the sheathing and the bolts, as shown in Figs. 8 and 9.

It will be seen that by roughening the surfaces of both the vessel and the sheathing they

are both caused to adhere firmly to the non-conducting material placed between the same, and are consequently strongly cemented to each other; and it will also be seen that by the means herein described of securing the plates to each other and to the vessel a most perfect insulation of the plates is obtained, so that no galvanic action can result from the contact of different metals.

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

1. The combination, with the iron plates of a vessel having serrated outer sufaces, of a metal sheathing, *d*, having a serrated inner surface and an intermediate layer of insulating material, substantially as and for the purpose set forth.

2. A band or rib, *k*, constructed and applied to the upper edge of the sheathing, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERIC PELHAM WARREN.

Witnesses:
F. PIKE,
WILLIAM HOLMES.