

C. HEMJE.
SHIP OF WAR.

No. 458,340.

Patented Aug. 25, 1891.

Fig. 1.

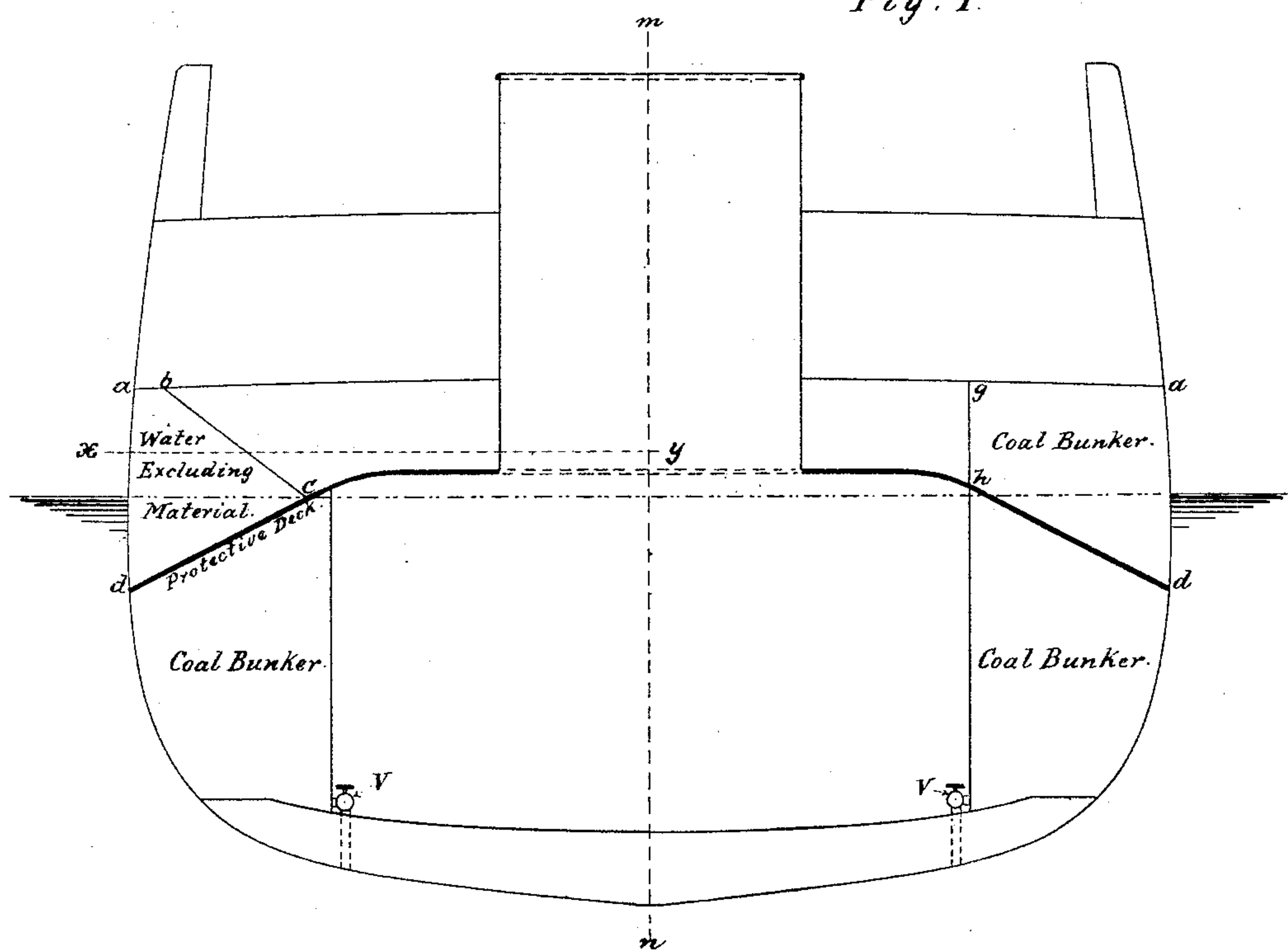
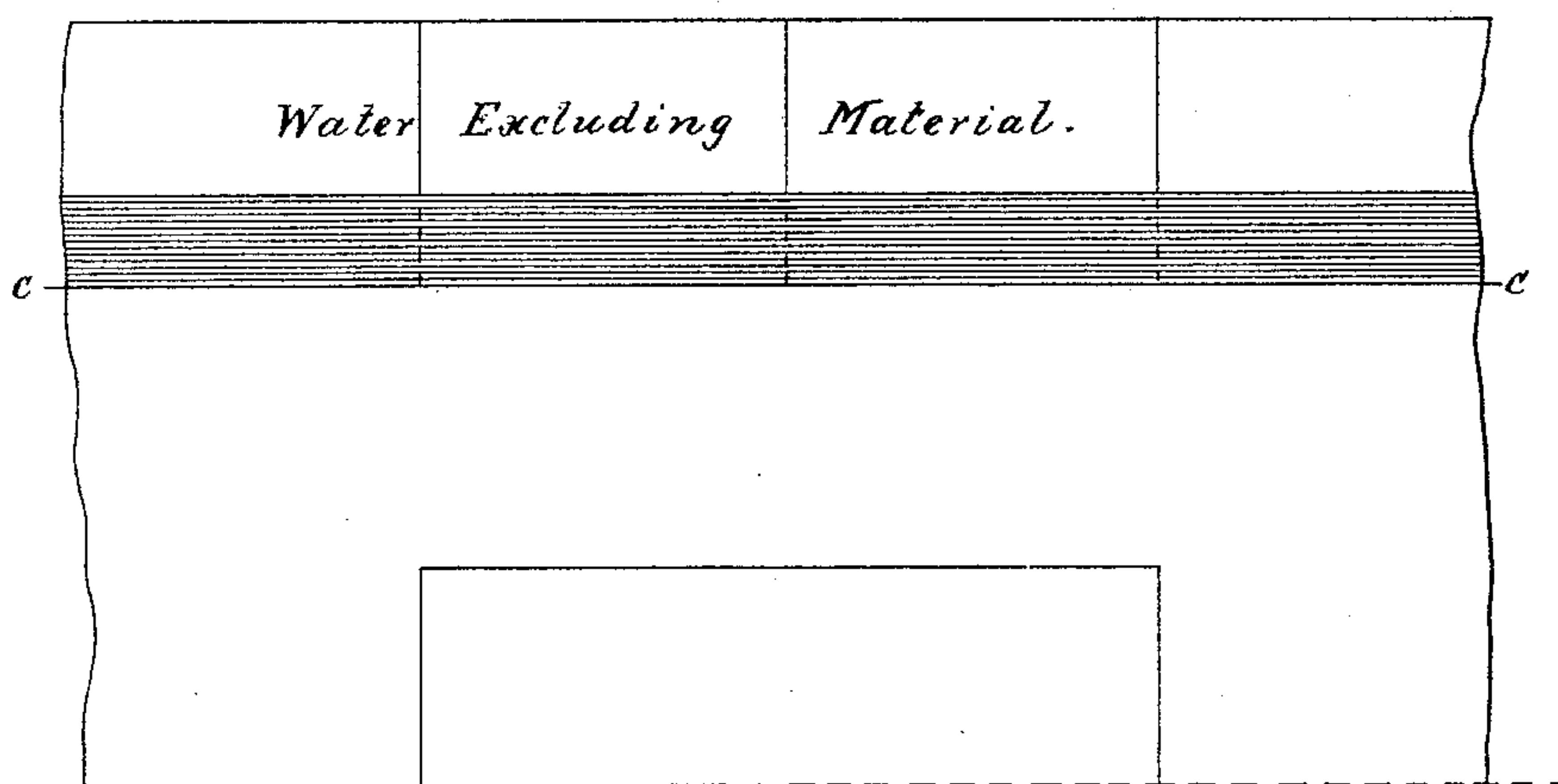


Fig. 2.



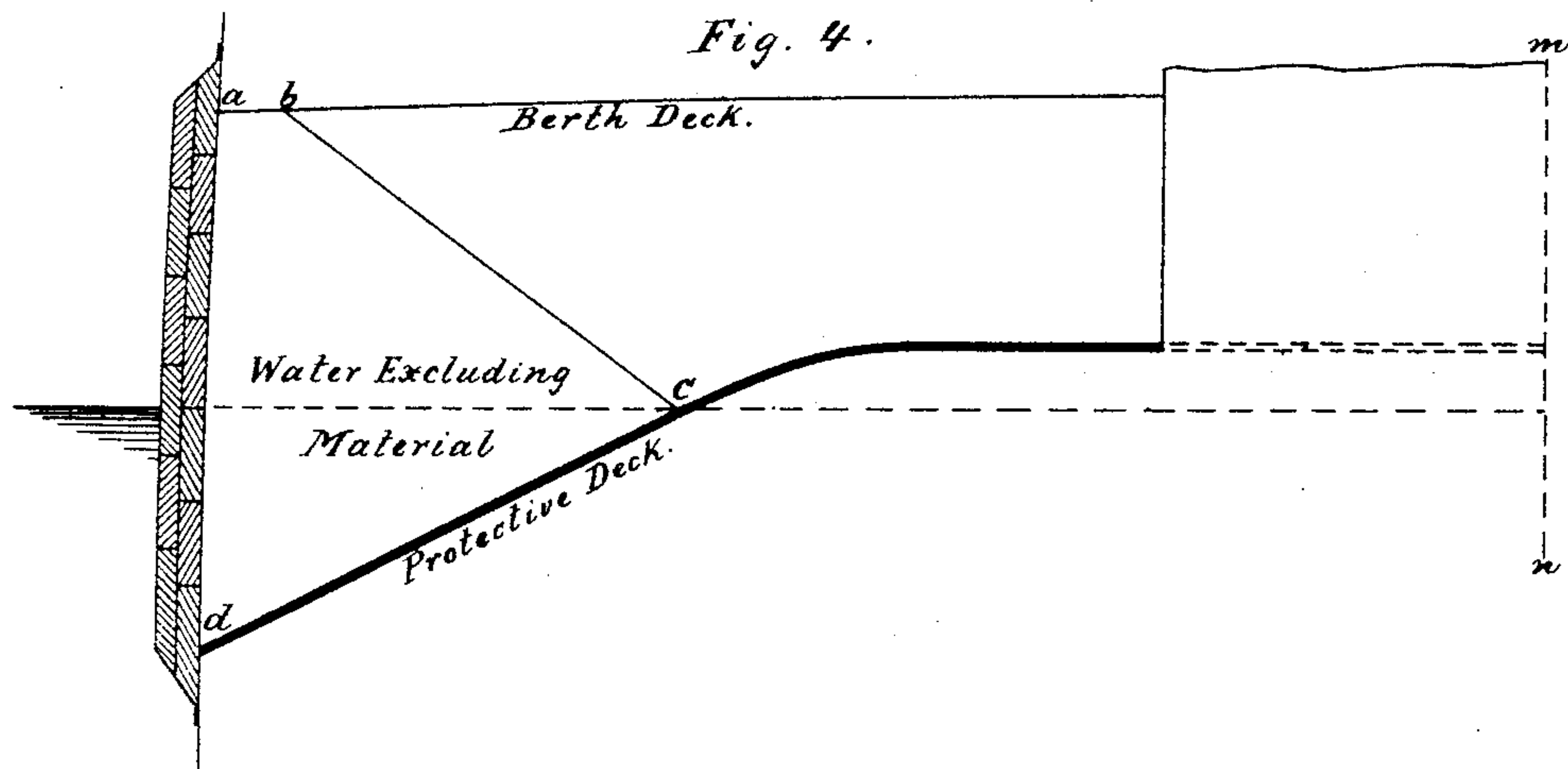
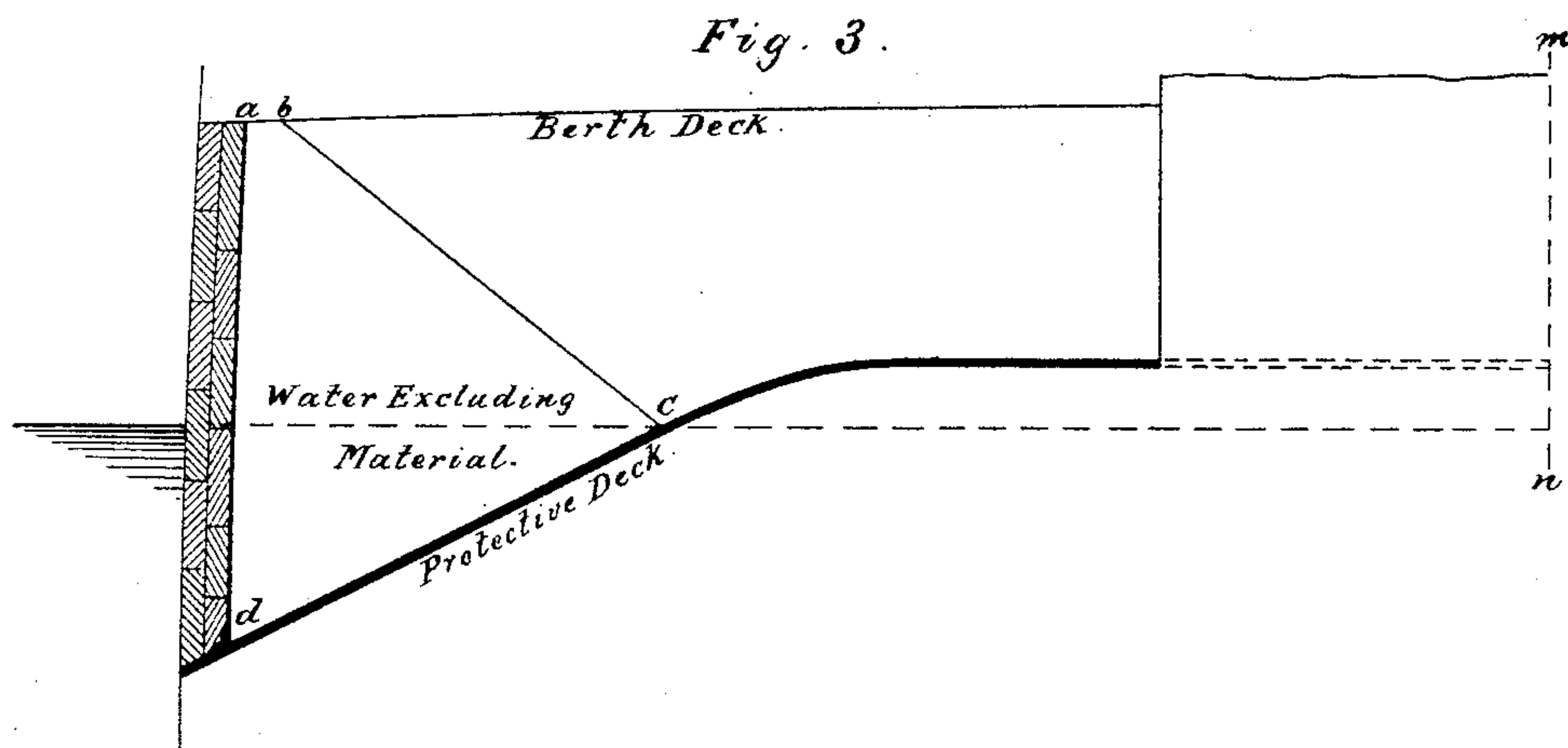
WITNESSES
W. P. Clason
C. B. T. Moore

INVENTOR
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UNITED STATES PATENT OFFICE.

CHARLES HEMJE, OF ANNAPOLIS, MARYLAND.

SHIP-OF-WAR.

SPECIFICATION forming part of Letters Patent No. 458,340, dated August 25, 1891.

Application filed February 14, 1891. Serial No. 381,478. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HEMJE, a citizen of the United States, residing at Annapolis, in the county of Anne Arundel and State of Maryland, have invented certain new and useful Improvements in Ships-of-War; and I do hereby 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.

My invention relates, principally, to those classes of war-ships known as "protected cruisers," and "partially-protected cruisers" or gun-boats, and has for its object to protect such vessels to as great an extent as possible against loss of stability caused by penetration of their sides in the region of the water-line, as well as to counteract any transverse inclination of the ship caused by loss of buoyancy and stability through damage done to one side of the ship.

My improvement may be said to consist of three distinct features: first, the application of a belt of suitable water-excluding material along the sides of the ship between the protective deck and the deck above, arranged in such a manner as to give the greatest possible protection to stability for the amount of material used; second, to protect the sides of ships so that projectiles passing through them will make the smallest possible hole and allow of temporary repairs even while in action, and, third, to provide such means that in case one or more compartments on one side of the ship have been laid open to the sea and partially or wholly filled with water, so that the ship has a considerable inclination toward the damaged side, and so that the guns on the intact side become useless on account of their limited depression, the ship can be returned to a position of upright equilibrium. I attain these results by certain parts shown in the accompanying drawings, in which—

Figure 1 is a vertical cross-section of the type of ships known as "protected cruisers." Fig. 2 is a portion of a horizontal section on the line xy of Fig. 1. Fig. 3 is a detail or part of a cross-section showing the wood belt recessed into the side of the ship and a belt of water-excluding material. Fig. 4 is a detail show-

ing the wood belt applied to the outside of the ship, as also the belt of water-excluding material.

On the right-hand side of Fig. 1 the arrangement of coal-bunkers shown is that of a so-called "protected cruiser," the generally adopted or, at least, advocated policy being to first use the coal out of the bunkers below the protective deck and keep the coal in the bunkers above it as long as possible, as a partial protection against damage from penetration of the sides. Coal, as generally stowed on board ship, takes up about five-eighths of the space, so that when the sides are penetrated the space where water can enter would be partially filled with coal, and the loss of buoyancy and of moment of inertia would only be three-eighths of the loss as compared with the bunkers empty. Ships of this class, with their thin sides of about one-half inch in thickness, are liable to penetration by even the smallest projectiles from stem to stern, and the only parts protected are those below the protective deck, provided the slopes of the latter are thick enough to withstand the oblique impact of the projectiles.

The greatest danger to a ship in action is probably the loss of stability due to the penetration of the sides near the water-line. If the coal is to be kept in the upper bunkers for protection, it certainly cannot be used as fuel, and as it weighs about eighty pounds per cubic foot and only fills five-eighths of the bunker-space, thus allowing three-eighths to be filled with water, it would be better to protect the sides by a belt of water-excluding material—such as cellulose or woodite, &c.—which weighs only about twelve pounds per cubic foot, and absorbs, when penetrated, but very little water.

One of my improvements consists in the application of a belt of suitable water-excluding material, as shown in Fig. 1, and indicated by the letters $a b c d$, running along the side of the ship, either for the ship's whole length or for such a length amidships as is considered sufficient to protect the stability. Belts of cellulose—a material produced from the fiber of the cocoanut—have been used in a number of ships of the French navy, not, however, for what might be called "stability

belts," but on account of the peculiar properties of the cellulose, which, when penetrated and wetted by the water following the projectile, swells to such an extent as to completely close the hole, thus preventing more water from entering the ship. These belts have been of nearly uniform thickness with their inner side vertical or parallel to the side of the ships. Fig. 5 shows such a belt indicated by the letters *a e f d*, whereas my improved belt is indicated by the letters *a b c d*, having its inner side inclined, as shown by the dotted line *b c*. Penetration of a ship's side at the water-line, and consequent admission of water on the slopes of the protective deck, creates a loss of buoyancy and of moment of inertia, of which the latter is the most dangerous, as it seriously affects the stability of a ship. With my inclined belt *a b c d*, Fig. 5, of nearly the same volume as the vertical belt no water-line area would have been lost and the stability would remain nearly the same as in the intact condition, thus showing the advantage of my inclined belt. The inclined side *b c* of the belt need not necessarily be straight, but can be made slightly curved.

Another important feature of my invention consists in providing the sides of the ship for some distance below and above the water-line with a wood belt, either recessed into the side of the ship, so as to give a continuous and fair, or nearly continuous and fair, outer surface, as shown in Fig. 3, or attached to the outside of the ship, as shown in Fig. 4. It is a well-known fact that projectiles, when passing through the thin sides of an iron or steel ship, do not make a round hole, but tear and split the iron or steel plate in all directions, making it impossible to stop up the breach or to make temporary repairs, and even if the penetration is above the water-line, water may enter through the downward-extending rents, which would not be the case if the projectile had made a round hole. The water which has entered the ship and lodges on the slope of the protective deck therefore remains in free communication with the sea, thus creating a loss of moment of inertia and stability, which may endanger the safety of the ship. If the breach made by the projectile could be temporarily repaired and the water on the eaves of the protective deck could be cut off from communication with the sea the water which has entered the ship would simply act as so much weight or ballast, and although the ship would have a slight heel toward the damaged side the moment of inertia, and therefore the stability, would be restored. To accomplish this I propose to provide the ship with a wood belt, either recessed, as shown in Fig. 3, or on the outside surface of the ship, as shown in Fig. 4. A projectile in passing through such a wood belt will make a round hole, which, as in the days of the old wooden ships, can be plugged up, so as to cut off the communication between the sea and the water

inside the ship, thus restoring the lost stability.

Another great danger to which these ships are exposed is the under-water damage caused by ramming or torpedo explosions, &c. If from any cause one or more of the side coal-bunkers or other side compartments on one side of the ship are partially or wholly filled, the ship would have a considerable heel toward the damaged side, thereby greatly impairing her maneuvering qualities and more than likely make the guns on the intact side (which are only capable of a depression of about five degrees) absolutely useless, thus placing the ship completely at the mercy of the enemy if attacked on the intact side. To counteract this evil I propose to provide in convenient places on both sides of the ship, such communication with the sea through suitable valves *V*, as shown in Fig. 1, that water can be admitted into any convenient side compartments opposite to the damaged and flooded compartments in sufficient quantity to counteract the heel and again to place the ship in upright position.

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

1. In a war-ship, a protective or water-tight deck fitted on its slopes with a belt of buoyant or water-excluding material, the inner side or boundary of said belt to extend upwardly and outwardly toward the side of the ship, substantially as shown and described.

2. In a war-ship, a protective or water-tight deck arranged so that the penetration of the ship's side at or near the water-line will admit water on the slopes of said deck and thereby heel the ship, in combination with certain interior side compartments in or near the double bottom, having connection with the sea by suitable valves or their equivalent to enable such compartments to be partially or wholly filled with water to counteract any heel of the ship caused by damage to the ship's side, substantially as described.

3. In a war-ship, a protective or water-tight deck fitted on its slopes with a belt of buoyant or water-excluding material, the inner side or boundary of said belt to extend upwardly and outwardly toward the side of the ship, in combination with certain interior side compartments in or near the double bottom, having connection with the sea by suitable valves or their equivalent to enable such compartments to be partially or wholly filled with water to counteract any heel of the ship caused by damage to the ship's side, substantially as described.

4. In a war-ship, a protective or water-tight deck arranged so that the penetration of the ship's side at or near the water-line will admit water on the slopes of said deck and thereby heel the ship, in combination with an outwardly-applied or recessed water-line belt, of wood or its equivalent, substantially as described.

5. In a war-ship, a protective or water-tight deck arranged so that the penetration of the ship's side at or near the water-line will admit water on the slopes of said deck and thereby heel the ship, in combination with an outwardly-applied or recessed belt, of wood or its equivalent, and the interior side compartments in or near the double bottom, having connection with the sea by suitable valves or their equivalent to enable such compartments to be partially or wholly filled with water to counteract any heel of the ship caused by damage to the ship's side, substantially as described.

6. In a war-ship, a protective or water-tight deck fitted on its slopes with a belt of buoyant or water-excluding material, the inner side or boundary of said belt to extend upwardly and outwardly toward the side of the ship, in combination with an outwardly-applied or recessed belt, of wood or its equivalent, and the interior side compartments in or near the double bottom, having connection with the sea by suitable valves or their equivalent to enable such compartments to be partially or wholly filled with water to counteract any heel of the ship caused by damage to the ship's side, substantially as described.

7. In a war-ship, the combination of the thin unarmored sides of the ship in the wa-

ter-line region with a water-line belt of wood or its equivalent and the inner belt of buoyant or water-excluding material, the inner side or boundary of said belt to extend upwardly and outwardly toward the side of the ship, substantially as described.

8. In a war-ship with unarmored sides, a longitudinal belt, of wood or its equivalent, extending in depth from near the protective deck to a height near the deck above, in combination with the inner belt, of buoyant or water-excluding material, the inner side or boundary of said belt to extend upwardly and outwardly toward the side of the ship, substantially as described.

9. In a war-ship, the ship's hull unprotected by side-armor around the water-line region, in combination with a water-line belt, of wood or its equivalent, a protective or water-tight deck, and an inner belt, of buoyant or water-excluding material, the inner side or boundary of said belt to extend upwardly and outwardly toward the side of the ship, substantially as described.

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

CHARLES HEMJE.

Witnesses:

WM. P. CLASON,
C. B. T. MOORE.

It is hereby certified that in Letters Patent No. 458,340, granted August 25, 1891, upon the application of Charles Hemje, of Annapolis, Maryland, for an improvement in "Ships-of-War," errors appear in the printed specification requiring the following corrections: In line 9, page 2, the word "ships" should read *ship*; same line and line 10 the words, numeral, and letters, "Fig. 5, shows such a belt indicated by the letters *a, e, f, d,*" should be stricken out; in line 13, same page, the word "dotted" should be stricken out; in lines 19-20, same page, the word and numeral "Fig. 5," should be stricken out; and in line 21, same page, the word "no" should read *less*; and that the Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 12th day of January, A. D. 1892.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

W. E. SIMONDS,
Commissioner of Patents.