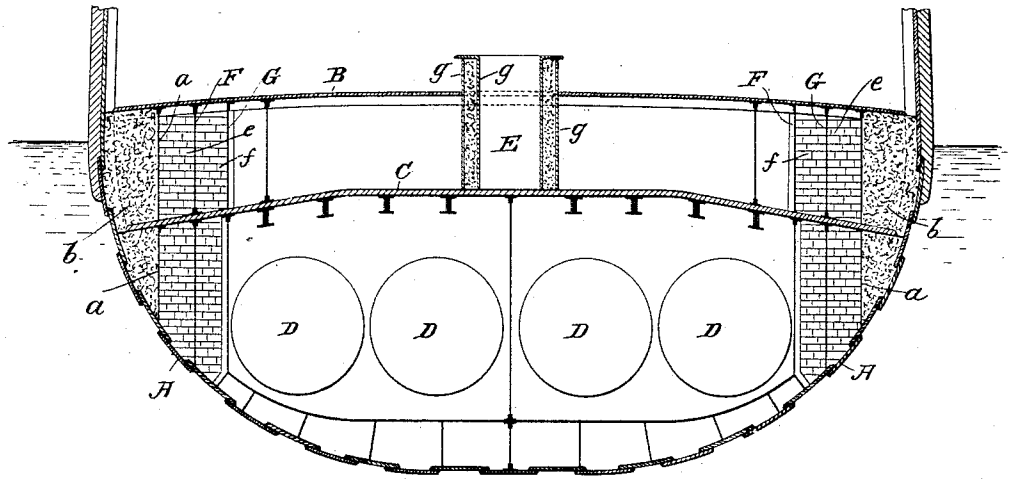
(No Model.)

L. P. DE LA BARRIÈRE.

LIGHT PROTECTION FOR MEN OF WAR OR MERCHANTMEN.

No. 425,363. Patented Apr. 8, 1890.



Attest:
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UNITED STATES PATENT OFFICE.

LÉOPOLD PALLU DE LA BARRIÈRE, OF PARIS, FRANCE.

LIGHT PROTECTION FOR MEN-OF-WAR OR MERCHANTMEN.

SPECIFICATION forming part of Letters Patent No. 425,363, dated April 8, 1890.

Application filed December 9, 1889. Serial No. 333,158. (No model.) Patented in France July 29, 1886, No. 177,682.

To all whom it may concern:

Be it known that I, LÉOPOLD PALLU DE LA BARRIÈRE, of the city of Paris, France, have invented Improvements in Light Protection for Men-of-War or Merchantmen, (for which I have received Letters Patent in France for fifteen years, dated July 29, 1886, No. 177,682, in the name of Dominique Entrope Marcel Pallu de la Barrière,) of which the following is a full, clear, and exact description.

The object of the present invention is to provide vessels with a system of protection which prevents ingress of water by an automatic stopping of all holes produced by projectiles, ramming, collisions, running foul of the wreckage, &c., and which imparts to the vessel the capacity of maintaining under unfavorable conditions an invariably upright position. These objects are attained by the use, as hereinafter set forth, of the amorphous cellulose obtained from cocoanut-husks. The cellulose extracted from the pericarp of the cocoanut (care being exercised in this operation to avoid crushing) contains in admixture a proportion, which may vary within wide limits, of the hair-like fiber constituting the pericarp or peel of the nut, and this material is compressed or packed into compartments in the sides or hull or other exposed portions of the vessel. Good results are obtained by using fourteen parts of the cellulose to one part of fiber. The properties of this material, which (among others) distinguish it from all known substances, are great buoyancy or lightness, incorruptibility, resistance to attacks of insects, and capacity to increase rapidly in bulk when brought into contact with water. By reason of these properties a vessel protected in accordance with this invention is rendered extremely buoyant and proof against sinking when pierced by projectiles or otherwise. In case of a breach being made in the hull by a projectile, torpedo, ram, or other means the obturating property of the cellulose causes by its increase in bulk an almost instantaneous closing of the breach as soon as the water enters the opening. This protection by obturation affords in itself a great safeguard, sufficient, probably, for merchantmen, where stowage capacity is of great importance, bulk or volume being the basis of freight; but for ships of war and for other vessels in which it may be deemed an advantage the invention contemplates a further protection by "obstruction." In case the obturating barrier or cushion should be destroyed the obstructing part of the system will still afford protection against the invasion of water. This part of the invention, moreover, is applicable to portions of a ship's hull where a shot-hole would produce no great damage, and where it is only necessary to guard against the accumulation of water in sufficient quantity to capsize the ship.

In carrying out this part of the invention the amorphous cellulose is compressed into the form of blocks of cubical or other convenient shape, the surfaces of which are provided with a water-proof covering or coating, as of lacquer, or rendered impermeable to moisture in any way suitable for the purpose. These blocks or cubes are packed in the parts of the vessel which require such protection, and a reserve supply may be carried for emergency. These blocks weigh only about eight pounds to the cubic foot, whereas sea-water weighs over sixty-four pounds to the cubic foot; hence it would be impossible for sea-water to collect in any portion or compartment of the vessel which is occupied by these blocks to an extent likely to prove disastrous. In case of the shell of any individual brick or block being penetrated its obturating properties would come into play.

In order that my said invention may be fully understood by those skilled in the art to which it relates, I will now describe one mode of its application in connection with the accompanying drawing, which shows in vertical cross-section part of a ship's hull sufficient for the purpose of explanation.

A represents the outside wall of the vessel, and B the main deck. Beneath the deck B is another deck C, known as the "protective" deck, constructed of metal plate and arched or curved upward from the sides of the vessel. The object of this deck, which is mainly or entirely below the water-line, is to protect the engine, boilers, and other vital parts of the ship. The boilers are indicated at D. A curved upper surface is given to the protective deck C, in order to deflect any projectile that may penetrate the side of the vessel above the edges of the deck, which are always

beneath the water-line. The hatches pass through the middle line of the protective deck, as indicated at E.

As thus far described the vessel is of a type known prior to my invention.

At *a* are shown vertical partitions running along the sides of the vessel and forming compartments (marked *b*) between them and the wall A of the ship. These compartments *b* are at the most exposed portions of the vessel, extending from the deck B a few feet above the water-line down to a point some distance beneath the protective deck C. These compartments are filled with the amorphous cocoanut-cellulose, which is packed tightly therein, as already described, forming the outer protective barrier or cushion.

Inside the compartments *d* are shown two other compartments *e f*, formed by the vertical partitions F and G, and also extending from the wall A to the deck B. Compartments *e f* are filled with the obstructing-blocks closely packed, so as to leave no room for the collection of water in quantity sufficient to effect the stability of the ship.

A vessel protected in this manner is proof against actual destruction or sinking from breaches in the hull, at least until the protective barriers are so far broken down that their efficiency is destroyed, which could not be quickly or easily accomplished even under conditions the most favorable to the attacking force. The outer barrier *b* acts by obturation, closing upon every aperture made therein and preventing ingress of water to the interior compartments *e f*. When the efficiency of the obturative protection becomes impaired, should this occur, the vessel is still prevented from capsizing or sinking by the obstructing action of the light and buoyant blocks in the compartments *e f*.

Where a protective deck C is used in the construction of the vessel, it is obvious that the penetration of water above the deck would not endanger the engines and boilers unless the guards to the hatches E were injured. To prevent ingress of water to the hold at this point the hatches are protected by double walls *g*, having the space between the walls packed or filled with the cellulose in the same free condition as in compartment *b*, thus protecting the hatches by obturation.

The foregoing description is given by way of example to show how my system of protection may be applied in practice; but it is not intended to limit the invention to the precise mode described, since it will be obvious that the practical application of the system admits of considerable variation or modification, and that the construction of particular vessels, the purpose for which they are to be used, and other variable conditions will necessitate departures from the plan above described.

I claim as my invention—

1. As a protection for vessels, a barrier or cushion composed essentially of the amorphous cellulose of the cocoanut, substantially as described.

2. As a protection for vessels, the described blocks composed of the amorphous cellulose of the cocoanut compressed into the desired shape and provided with a shell or coating impermeable to water, substantially as and for the purpose set forth.

3. A vessel provided at the exposed portions of the hull with compartments containing the amorphous cellulose of the cocoanut, so that ingress of water may be prevented by the obturative property of said cellulose, and having other spaces or cavities filled with blocks of the same substance compressed into shape and provided with a sheath or coating impermeable to water, said blocks acting to obstruct the ingress of water, and so prevent the capsizing and sinking of the vessel, as set forth.

The foregoing specification of my improvements in light protection for men-of-war and merchantmen signed by me this 23d day of November, 1889.

LÉOPOLD PALLU DE LA BARRIÈRE.

Witnesses:
EDWARD P. MACLEAN,
ALBERT MOREAUX.