G. E. ELIA.

SHIP OR VESSEL.

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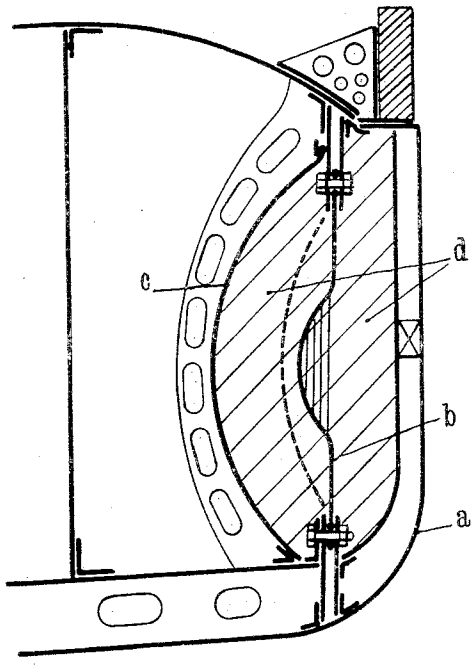
1,008,802. Patented Nov. 14, 1911.



WITNESSES

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SHIP OR VESSEL.

1,008,802. Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed June 22, 1910. Serial No. 568,304.

To all whom it may concern:

Be it known that I, GIOVANNI EMANUELE ELIA, a subject of the King of Italy, and a resident of Hotel de Crillon, Place de la Concorde, Paris, in the Republic of France, engineer, have invented certain new and useful Improvements in and Relating to Ships or Vessels, of which the following is a specification.

This invention relates to ships or vessels and is particularly applicable for use in connection with vessels employed in naval warfare, the object being to preserve the stability of the same in the event of their being subjected to the effects of a submarine explosion.

It has heretofore been proposed to provide a ship with thin outer plating and strong inner plating divided by partitions into a certain number of water tight compartments in each of which there is arranged a system of wire cables for the purpose of absorbing or neutralizing the effects of a submarine explosion. This arrangement while very effective against the explosion of torpedoes or submarine mines, which affect a comparatively small portion of the ship, does not present sufficient protection against the explosion of cables or explosives arranged in the form of a belt and extending the whole length of the ship. In this case the explosion of such a cable on one side of the ship would rupture the whole of that side with the result that water would enter the aforesaid compartments thereby destroying the balance of the ship and causing the same to heel over to such an extent that it would become filled with water and sink.

According to this invention each of the water tight compartments is provided with a balance or displacement preserving device which presents prior to the explosion, a volume which is substantially equal to that of the corresponding watertight compartment.

The object of the invention is to preserve for each compartment substantially its original volume after the outer plating has been broken away with the result that the balance and displacement of the ship will remain the same.

In order that the said invention may be clearly understood and readily carried into effect I will describe the same more fully with reference to the accompanying drawing which is a cross section of part of a ship provided with a balance and displacement preserving device in accordance with this invention.

The sides of the ship are divided in the known manner into watertight compartments, the longitudinal walls of which are constituted by thin outer plating *a* and by strong inner plating *c* protected by a framework or system of steel cables *b* arranged behind the plating *a*. Each compartment contains an elastic filling *d* such as cork, indiarubber or other substance or a composition provided with a base of cork, indiarubber or other substance, in which the cables *b* are embedded, the said filling preferably presenting a density that is substantially equal to that of the water of flotation. This filling may have the following composition for example:—Two volumes of Portland cement having a density of 1.35 and 1 volume of cork of a density of 0.30 that is to say three volumes with a density equal to 1 thus

$$\frac{(1.35+1.35+0.30)}{3}.$$

When an explosion takes place the outer plating is ruptured and the explosion gases act upon the elastic filling and upon the system of metal cables *b* thereby forcing the latter backward and causing them to assume a position approximating to that represented by the broken lines, this movement of the cables being practically unimpeded owing to the elasticity of the filling *d*. When the pressure produced by the explosion gases has subsided, the elastic filling *d*, resumes its initial volume with the result that the volume of its compartment remains substantially the same and the balance of the ship is preserved.

In the event of a portion of the filling being detached from the ship by the effects of the explosion the portion so detached is replaced by the water of flotation, and as such water is of the same density as the filling, the balance and displacement of the ship remain the same.

If the explosion has been produced by a torpedo or submarine mine, its effects may rupture a single compartment or several adjacent compartments the filling devices of which will act to preserve the stability of the ship. If the explosion is due to an explosive cable or belt, all the filling devices

on one side of the ship will be brought into operation and prevent any dangerous disturbance of the ship's balance.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a ship's hull of the kind set forth, the combination of watertight compartments, a system of steel cables inside the said compartments, and an elastic filling embedding the said cables in the compartments, said elastic filling having a specific weight substantially equal to that of the surrounding water.

2. In a ship's hull of the kind set forth, the combination of watertight compartments having a thin outer plating, a relatively stronger inner plating, together with an elastic filling mass in the compartments and a system of protecting steel cables embedded in the filling mass.

3. In a ship's hull of the kind set forth, the combination of watertight compartments having a thin outer plating and a stronger inner plating, with an elastic filling mass in the compartments, the said mass formed of a composition with a base of cork, india-rubber, or the like, and a system of deformable protecting steel cables embedded in the said mass.

4. In a ship's hull of the kind set forth, the combination of watertight compartments having a thin outer plating and a stronger inner plating, with a balance or displacement preserving device situated in each of the said compartments, the said device consisting of an elastic filling mass having a specific weight substantially equal to that of the surrounding water.

In testimony whereof I have hereunto placed my hand at Paris this 9th day of June 1910.

GIOVANNI EMANUELE ELIA.

In the presence of two witnesses:
H. C. Coxe,
Henry Schwab.