(No Model.)

M. J. CUADROS.

APPARATUS FOR AUTOMATICALLY REGULATING THE FIRING OF ORDNANCE ON SHIPS.

No. 455,176. Patented June 30, 1891.

Fig. 1.

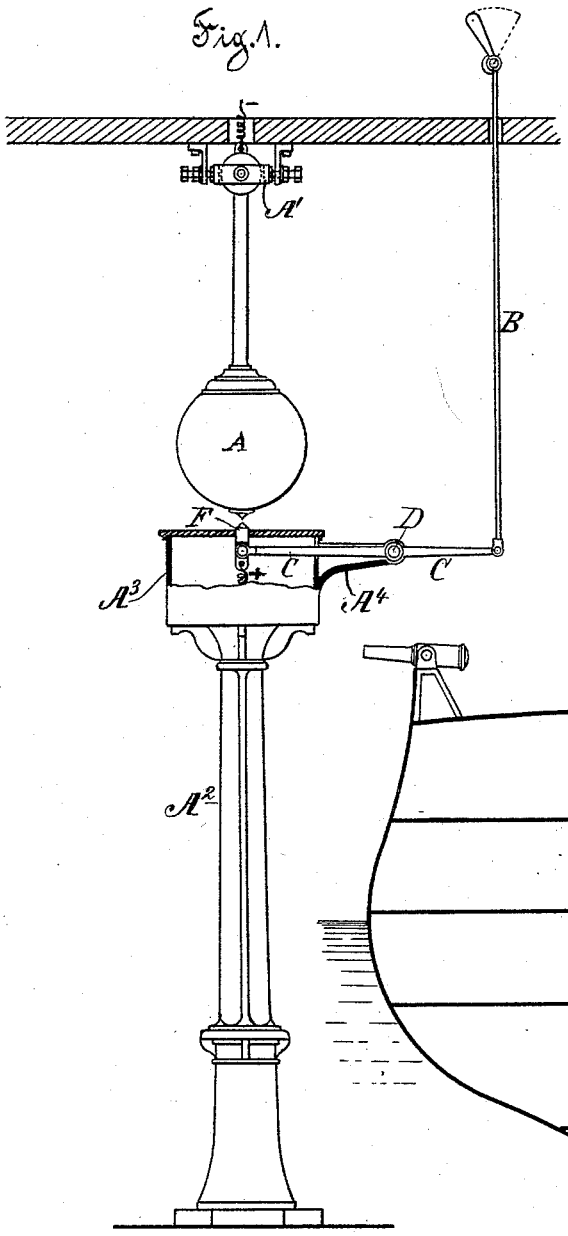


Fig. 2.

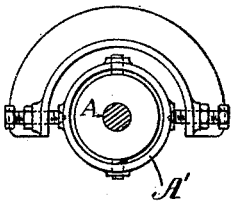
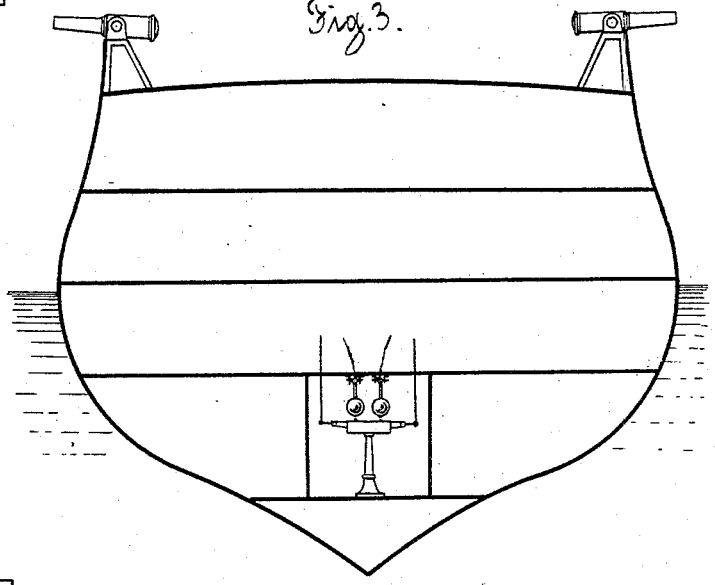


Fig. 3.



Witnesses:-
J. A. Rutherford.
J. B. Hopper.

Inventor:
Manuel José Cuadros.
By Janes L. Norris
Attorney.

UNITED STATES PATENT OFFICE.

MANUEL JOSÉ CUADROS, OF LIEGE, BELGIUM.

APPARATUS FOR AUTOMATICALLY REGULATING THE FIRING OF ORDNANCE ON SHIPS.

SPECIFICATION forming part of Letters Patent No. 455,176, dated June 30, 1891.

Application filed August 27, 1890. Serial No. 363,190. (No model.) Patented in Belgium July 7, 1890, No. 91,179.

To all whom it may concern:

Be it known that I, MANUEL JOSÉ CUADROS, military attaché, a citizen of the Republic of Peru, residing at present in Liege, Belgium, have invented certain new and useful Apparatus for Automatically Regulating the Firing of Ordnance on Ships, (for which I have obtained a patent in Belgium dated July 7, 1890, No. 91,179;) and I do hereby declare that the following is a full, clear, and exact description of the same.

In firing ordnance on board ship precision is very difficult to accomplish on account of the slight stability of the vessel. The slightest shifting of the center of gravity results in a modification of the angle of firing, and this objection has not heretofore been practically remedied, in consequence of which few projectiles reach the desired aim.

The object of my invention is to avoid the objection stated and provide novel means whereby the gun is fired when it is in the determined angle for firing. To accomplish this object my invention involves the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a detail sectional elevation of sufficient of my improved apparatus to illustrate its construction and mode of operation. Fig. 2 is a detail plan view of the universal or gimbal joint for suspending the pendulum, and Fig. 3 is a transverse sectional view of a vessel showing my invention applied thereto.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein the letter A indicates a pendulum suspended from the deck through the medium of a universal or gimbal joint A′, so that the pendulum can oscillate in two directions. An upright post, standard, or frame A^2 is rigidly fixed to a part of the vessel, and at its upper end portion is provided with a boxing A^3 and bracket A^4, to which latter is pivoted between its extremities, as at D, a lever C, pivotally connected at one extremity with a vertical rod B and at its opposite extremity with a vertically-movable contact-pin F. The contact-pin is movable vertically through the top plate of the boxing A^3 and is connected with one pole of an electric generator or battery, while the upper extremity of the pendulum A is connected by a conductor with the other pole of the generator or battery and in practice is suitably arranged to fire the gun when a contact is made between the pendulum and contact-pin. The rod B extends through the deck of the vessel, from which the pendulum is suspended.

The post or standard A^2, and consequently the contact-pin F, follows all the movements of the vessel, and when the vessel is in its normal position the contact-pin is directly under the lowest point of the pendulum. If at this instant the electric circuit is closed, by raising the contact-pin through the medium of the levers B and C the gun is fired at the precise moment when it is at the desired angle of firing.

The gun being aimed at a determined angle for firing, if pressure is applied to the rod B the lever C is operated to elevate the contact-point F, so that when the vessel reaches the normal position the pendulum will make contact with the contact-pin and thereby close the circuit and fire the gun. It will be obvious that when the vessel is in its normal position the axis of the gun will be in the determined angle for firing, but in all other positions of the vessel the angle chosen for firing is changed, and although the pendulum remains perpendicular it does not come in contact with the contact-pin unless the latter be raised by the lever mechanism or other contrivances suitable for the conditions required to raise the contact-pin and enable the pendulum to make contact therewith.

Having thus described my invention, what I claim is—

The combination, with a vessel and a gun thereon, of a pendulum suspended from a part thereof and having a conductor for electrically connecting with one pole of a generator or battery, a post, standard, or frame having a suitable lever carrying a vertically-movable contact-point located beneath the lowest point of the pendulum and having an electric conductor, and means for moving the lever to

elevate the contact-pin for the purpose of making contact with the pendulum to close an electric circuit which includes the charge in the gun for firing the latter when the vessel is in its normal position, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

MANUEL JOSÉ CUADROS.

Witnesses:
R. J. PRESTON,
D. T. S. FULLER.