No. 680,066. Patented Aug. 6, 1901.

L. OBRY.

APPARATUS FOR DISCHARGING SHIPS' GUNS.

(Application filed Dec. 7, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

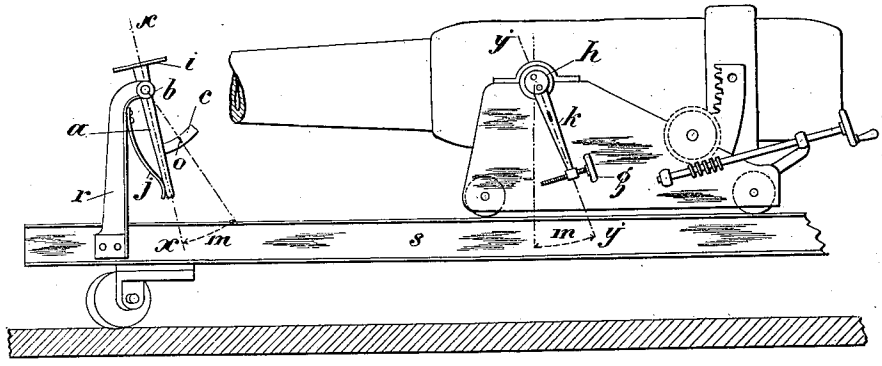


Fig. 2

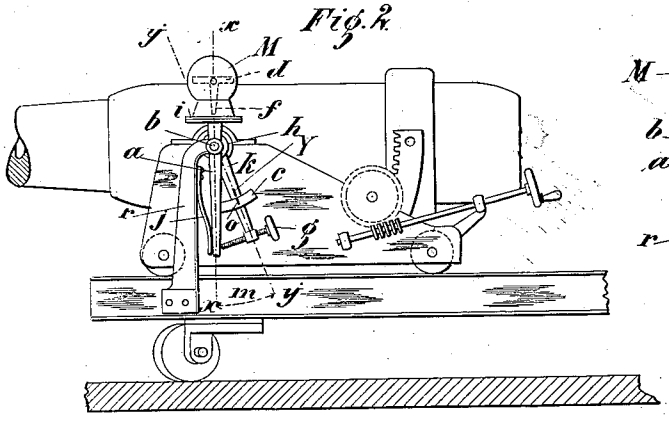


Fig. 4

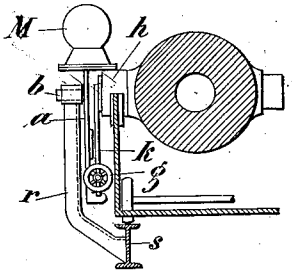


Fig. 5.

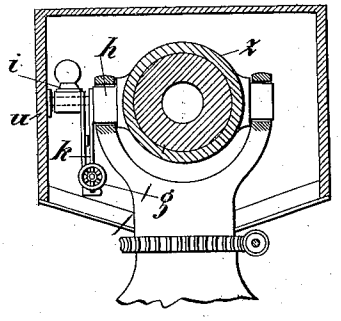
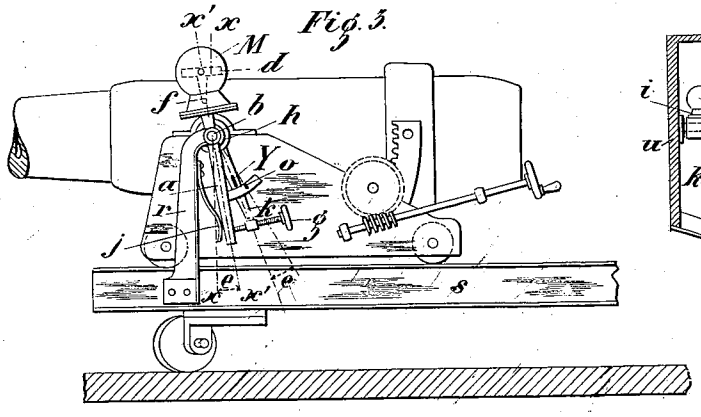


Fig. 3.



Witnesses
S. Brashears
M. C. Lyddane.

Inventor
Ludwig Obry
by G. Dittman Atty

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L. OBRY.

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Fig. 6

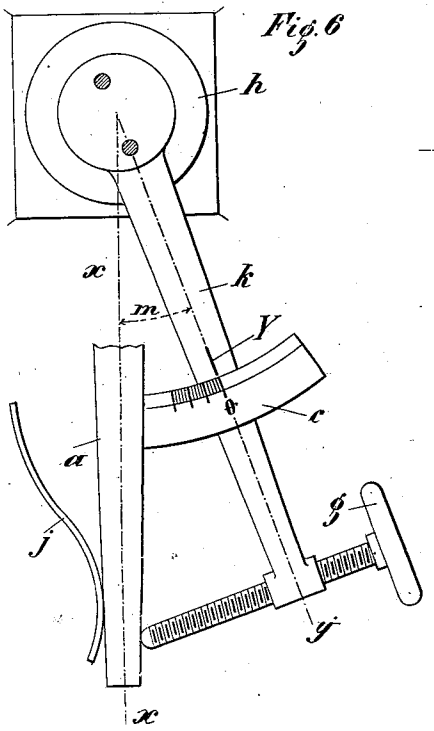


Fig. 8.

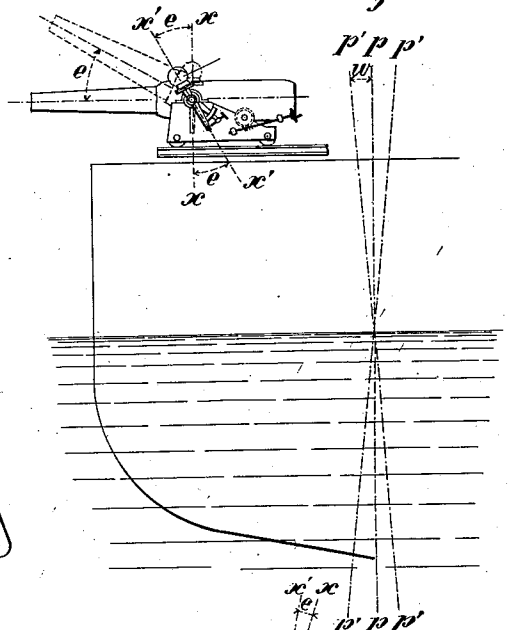


Fig. 7.

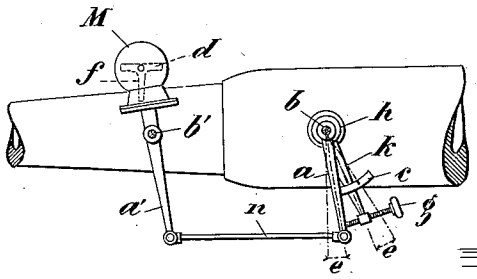
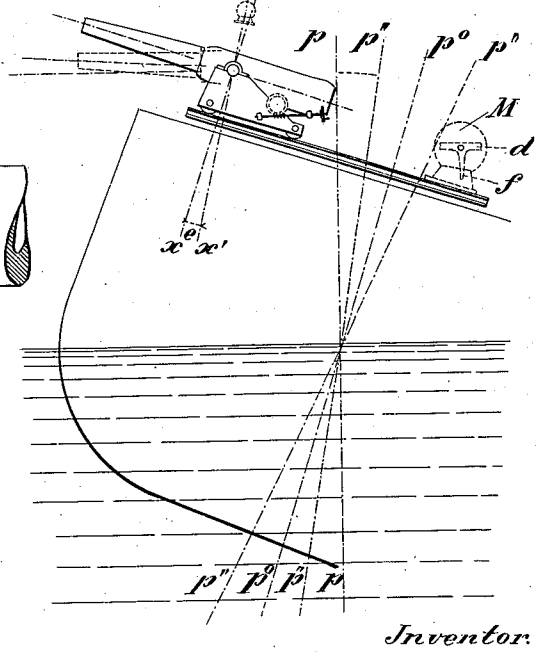


Fig. 9.



Witnesses.
S. Brusheau
W. C. Syddall.

Inventor.
Ludwig Obry
by G. Dittman, Atty

UNITED STATES PATENT OFFICE.

LUDWIG OBRY, OF TRIEST, AUSTRIA-HUNGARY.

APPARATUS FOR DISCHARGING SHIPS' GUNS.

SPECIFICATION forming part of Letters Patent No. 680,066, dated August 6, 1901.

Application filed December 7, 1900. Serial No. 39,088. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG OBRY, engineer, a citizen of the Empire of Austria-Hungary, residing at Triest, Austria-Hungary, have invented certain new and useful Improvements in and Connected with Apparatus for Discharging Ships' Guns, of which the following is a specification.

This invention relates to improvements in that type of apparatus for discharging ships' guns described in specification belonging to Letters Patent No. 595,820, granted to me. As described in the said specification, the apparatus whereby the automatic discharge of the ship's gun is effected is fixed to the gun-barrel or the lower part of the gun-carriage, so that the same will participate in the training movements of the gun.

The present invention has for its object to provide a device for fixing the apparatus described in the specification hereinbefore referred to which will render the same reliable in action however much the ship may careen and in normal cases will replace the elevation device of the gun. This fixing device is mounted on an axis parallel to the gun-trunnion axis and may be turned independently of the same to a predetermined angle and when having been turned will remain rigidly connected with the gun-trunnions, so that the device will oscillate synchronously with the gun-barrel.

In order that my invention may be more fully understood, I will now proceed to describe the same in connection with the accompanying drawings, marked with letters of reference indicating like parts in the various figures.

Figures 1, 2, and 3 show one form of my apparatus in which it may be carried out fixed upon the part of the gun-carriage adapted to turn shown in three different positions. Fig. 4 is a cross-section on the broken line X X of Fig. 2. Fig. 5 shows a cross-section of the device arranged on a cradle-like gun-carriage. Fig. 6 is a detail view, on an enlarged scale, of the device shown in Figs. 1 to 5. Fig. 7 is a detail view of a modification in which the axis of oscillation of the apparatus does not coincide with the gun-trunnion axis. Figs. 8 and 9 are diagrams which explain the working of the fixing device.

Referring to Fig. 1, to the bottom gun-carriage part *s* is secured a support *r*, at the upper end *b* of which is pivotally suspended an arm *a*, the axis of oscillation of which coincides with that of the gun-trunnion *h* when the gun is in its outer position. The arm *a* is pressed by a strong spring *j*, fixed to the support *r*, to the right to the position shown in Fig. 1, in which it is arrested by an abutment. The said arm carries a graduated sextant *c*, which is in the plane of oscillation thereof and the center of which coincides with the axis *b* and on which to the left of the point O are marked the elevation-angles corresponding with the various fire distances, (up to two thousand or three thousand meters.) The point O is a certain angle *m*—say, of about thirty to thirty-five degrees distant from the center line *x* of the arm *a* perpendicular on the plane of the table *i*.

Upon the gun-trunnion *h* at the side next to the support *r* is keyed an arm *k*, pointing downward, having a set-screw *g* and whose center line *y y* when the axis of the gun-barrel is in a perfectly horizontal position will also incline to such an angle *m* at which the mark O of the sextant *c* is distant from the line *x* of the arm *a*. If the gun is moved from the position shown in Fig. 1 toward the firing position shown in Fig. 2, axis of oscillation *b* of the arm *a* coincides with that mathematical axis of the gun-trunnions *h*, and the end of the set-screw *g* thus abuts against the arm *a*, and when the axis of the gun-barrel is perfectly parallel with the water-line this arm *a* is thereby displaced until the mark Y on the arm *k* coincides with the point O on the sextant. Having regard to the equity of the angles *m*, the line *x x* in Fig. 2 must be vertical to the water-line and the table *i*, carried by the arm *a*, horizontal or parallel to the water-line. Upon the table *i* thus in a horizontal position is fixed by suitable clamp-screws the gun-discharging device in such a manner that the axis of oscillation of the horizontal ring *d* is perpendicular with the elevation-plane of the gun.

The manipulation and action of the device are as follows: If it is desired to shoot a certain distance, after having run out and trained the gun the latter is left undisturbed, while the arm *a*, carrying the apparatus M, when the set-screw *g* is turned back will be caused by its spring *j* to turn until the mark Y on

the arm k points to the division-line of the sextant c corresponding with the target distance desired, the angle e thus being equal to the desired elevation-angle. While during this operation the arm f of the apparatus has remained in its vertical position, (see Fig. 3,) the line $x\,x$ has also been turned from the vertical position into the position $x'\,x'$ to an angle e equal to the desired elevation-angle. When the ship rolls, the apparatus M makes contact when the line $x'\,x'$ has approached the vertical to the extent of the angle e, and as the gun-barrel oscillates synchronously with the apparatus the unelevated gun-barrel at that moment will form with the horizontal the elevation-angle e, and the gun thus discharged at the right elevation without having used the elevation device. When the gun is run back, the spring j causes the arm a to return again to the position shown in Fig. 1, which, however, does not vibrate through the firing, and when the gun is run out again will through the abutment of the screw g take up the position in which it has been during the previous shot. To cause in the example described ignition by the apparatus M, it is essential that the rolling motion brings the line $x'\,x'$ into the vertical position $x\,x$, but which, however, necessitates that the rolling motion is equal to or greater than the elevation-angle e. If the rolling motion w of the boat (see Fig. 8)—*i. e.*, half the angle between the end positions $p'\,p'$ of the perpendicle $p\,p$—is smaller than the elevation angle e given to the apparatus between the lines $x\,x$ and $x'\,x'$, the apparatus will not be brought into the ignition position by the rolling motion of the ship. In this case the gun, and thereby the apparatus M, will be raised by the elevation device (see dotted position, Fig. 8) until the apparatus will form contact, which takes place when the line $x'\,x'$ is vertical—*i. e.*, when the gun-axis inclines toward the horizontal the extent of the elevation-angle e. The manipulation is the same when the ship (see diagram Fig. 9) oscillates laterally from the normal position of rest $p^0\,p^0$, so that the smallest deviation v of the end position p'' of the pendulum from the vertical $p\,p$ is larger than the elevation-angle given to the apparatus between the lines $x\,x$ and $x'\,x'$, and therefore the latter would never get into the vertical through the rolling motion alone. Contact is formed by the lowering of the gun, and thereby the apparatus, by means of the gun-elevation device, Fig. 9. The contact, as previously, then takes place when the line $x'\,x'$ while elevating the gun passes vertical—*i. e.*, the barrel forms with the horizontal the elevation-angle e.

In the diagram Fig. 5 the apparatus is shown fixed to a shielded cradle-like gun-carriage. As will be seen from this figure, the arm a, which, as previously described, carries the table i, adapted for the reception of the apparatus, is in such a manner mounted on the inner side of the shield u that its center of oscillation coincides with the axis of the gun-trunnions h in cradle z. The arm a is furnished, as previously described, with a graduated elevation-scale, on which plays the arm k, keyed upon the trunnion h and furnished with a set-screw g. In fixing the apparatus the arm k is so set that its points y coincide with the point O of the graduated elevation-scale when the gun-barrel axis and the table i are horizontal.

Fig. 7 shows a modification wherein, according to the principle of the invention, the axis of oscillation b' of the arm a' is parallel with, but does not coincide with, the trunnion-axis. In this case the arm a', which is parallel with the arm a, is connected thereto by a link in such manner that it will join the oscillation imparted to the arm a. The action of the apparatus remains obviously the same.

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. An apparatus for discharging ships' guns by an electric contact made by a point swinging with the ship and a point maintained in the absolute vertical, said apparatus being mounted on an axis, parallel with the gun-trunnion axis, and capable of being angularly set thereon relative to the absolute vertical as may be required, and means for locking it therewith to cause the apparatus to oscillate synchronously with the gun-barrel in its elevation and depression, substantially as described.

2. An apparatus for discharging ships' guns by an electric contact made by a point swinging with the ship and a point maintained in the absolute vertical, said apparatus consisting of an arm suspended on a pivot fixed with relation to the gun-carriage and carrying the discharge apparatus, the suspension-axis of this arm, when the gun has been run out, coinciding with or parallel to the trunnion-axis of the gun, said arm being provided with a graduated elevation-scale, and an arm keyed upon the gun-barrel trunnion and furnished with a set-screw, all the parts being combined, and operating, substantially as described.

3. An apparatus for discharging ships' guns by an electric contact made by a point swinging with the ship and a point maintained in the absolute vertical, said apparatus being carried by an arm on a fixed pivot which coincides with the gun-trunnion axis, and means for varying the position of said arm, all the parts being combined, and operating substantially as described.

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

LUDWIG OBRY.

Witnesses:
J. Z. RIVOR,
G. DE CASTINEL.