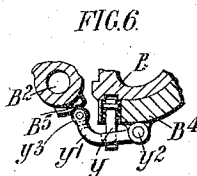
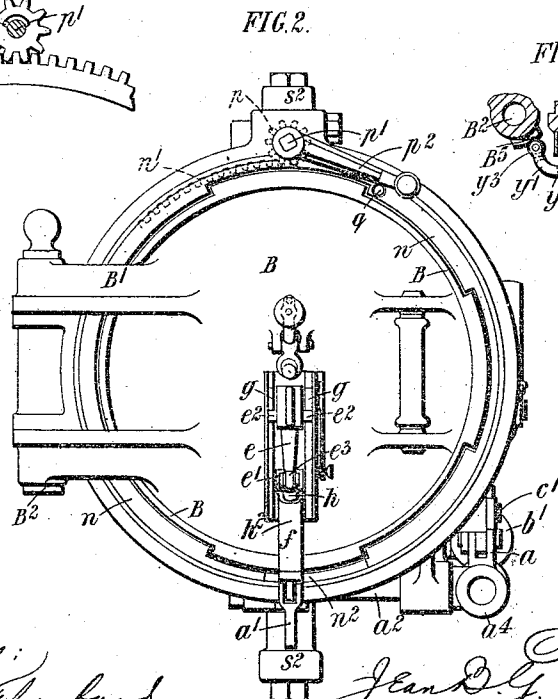
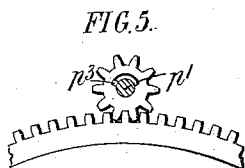
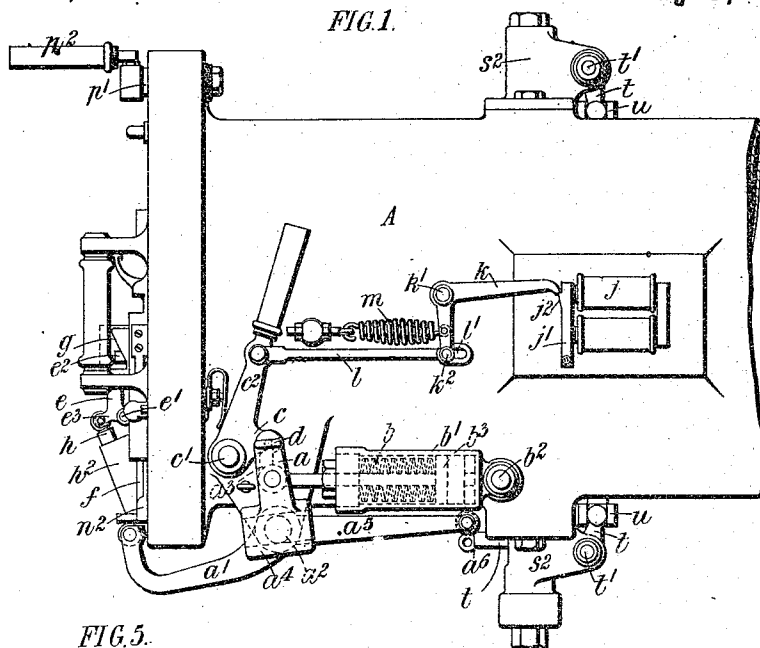


2 Sheets—Sheet 1.

No. 474,291.

Patented May 3, 1892.



Witnesses:
J. A. Rutherford
J. S. Daly.

Inventor:
Jean D. G. A. Canet.
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Attorney

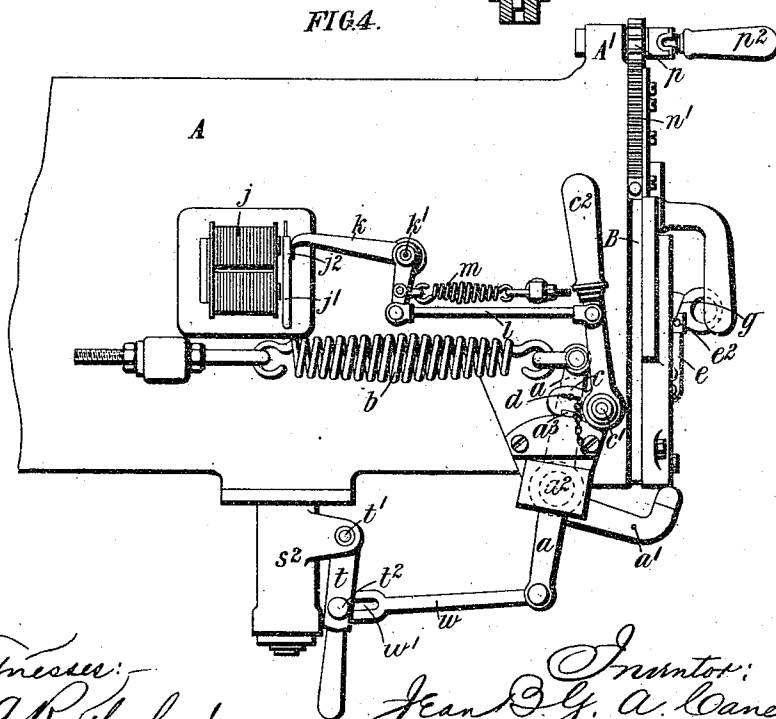
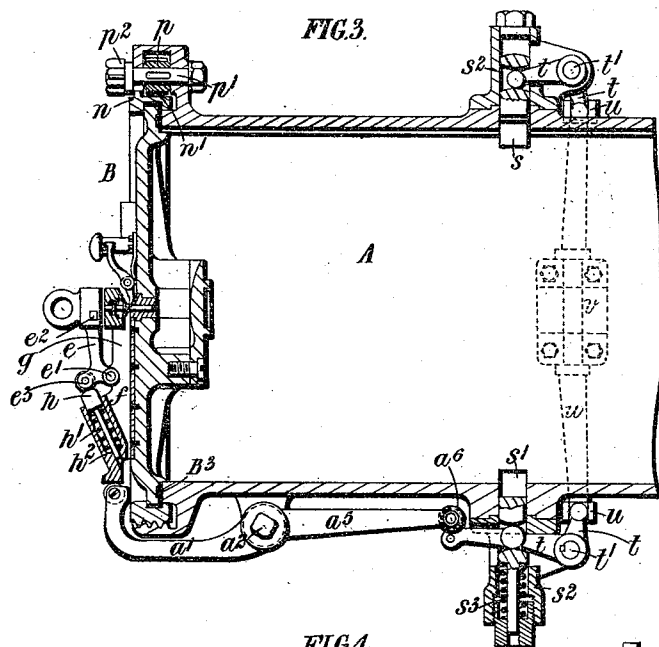
(No Model.)

2 Sheets—Sheet 2.

J. B. G. A. CANET.
TORPEDO LAUNCHING APPARATUS.

No. 474,291.

Patented May 3, 1892.



Witnesses:
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UNITED STATES PATENT OFFICE.

JEAN BAPTISTE GUSTAVE ADOLPHE CANET, OF PARIS, FRANCE, ASSIGNOR
OF ONE-HALF TO THE SIR JOSEPH WHITWORTH & COMPANY, LIMITED,
OF OPENSHAW, ENGLAND.

TORPEDO-LAUNCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 474,291, dated May 3, 1892.

Application filed June 9, 1891. Serial No. 395,658. (No model.) Patented in France October 8, 1883, No. 157,914.

To all whom it may concern:

Be it known that I, JEAN BAPTISTE GUSTAVE ADOLPHE CANET, engineer, a citizen of the Republic of France, and a resident of Paris, France, have invented certain new and useful Improvements in Firing Mechanism for Torpedo-Launching Apparatus and other Purposes, (for which I have obtained a patent in the following country: in France, certificate of addition to No. 157,914, dated October 8, 1883, which invention was formerly included in my application for Letters Patent of the United States, Serial No. 304,204, filed on the 21st of March, 1889,) of which invention the following is a specification, reference being had to the accompanying drawings.

This invention has for its object to provide novel firing mechanism for torpedo-launching apparatus and other purposes; and it consists in the features of construction and the combination or arrangement of devices hereinafter described and claimed.

Figure 1 is a side elevation, Fig. 2 a rear elevation, and Fig. 3 a vertical longitudinal central section, illustrating one form of my improved gun or torpedo-tube. Fig. 4 is a side elevation showing another form or modification of my invention. Fig. 5 is a sectional rear elevation showing details of construction, and Fig. 6 is a sectional view illustrating further details of construction.

A is the tube or barrel of the gun, which is to be mounted upon a suitable carriage, and the breech end of which is closed by means of a breech-plug or breech-screw B, formed with spiral projections or interrupted screw-threads.

Referring to Figs. 1, 2, and 3, a and a' are levers fixed upon a shaft a^2 , carried in suitable bearings attached to the tube A.

b is a spring, which is inclosed in a cylinder b' , pivoted at b^3 to the tube A and provided with a piston b^3 , the rod of which is coupled to the lever a . This spring bears at one end against the said piston and at its other end against the rear end of the said cylinder.

c is a catch, which is pivoted at c' to the tube A and is provided with a long arm or lever c^2 to facilitate its operation. This catch

is adapted to engage with a stud or projection a^3 on the lever a when the said lever a is moved backward and the spring b is compressed. The shaft a^2 is provided with a socket a^4 , adapted to receive a bar or hand-spike, whereby the said shaft may be turned by hand to move back the lever a and compress the spring b until the projection a^3 engages with the catch c .

d is a safety or locking pin, which is passed through a hole in the lever a and into a corresponding hole in the catch c . The lever a' is designed to operate the firing mechanism, which comprises a firing-hammer e , pivoted at e' to a slide-piece f , working in a groove in the breech-screw B. This slide-piece f is arranged to be moved upward by the lever a' to fire the gun when the said lever is released and is actuated by the spring b . The hammer e is provided with studs e^2 , which are adapted to move upon inclined planes g when the slide-piece f is raised, and thus cock the said hammer. The short arm e^3 of the hammer is provided with an anti-friction roller, which bears against a piston h , and when the hammer is cocked compresses a spring h' , arranged in a casing h^2 , formed on or attached to the said slide-piece f . Therefore as soon as the studs or projections e^2 have in the upward movement of the slide-piece f passed the upper end of the inclined surfaces g the hammer will be actuated by the said spring h' , and thus caused to fire the gun.

To provide for disengaging the catch c from the lever a by the aid of electricity I attach to the side of the tube A an electro-magnet j , having an oscillating armature j' of soft iron arranged in proper relation to the poles of the magnet and held away from the said poles by a suitable spring. This armature is provided with a shoulder j^2 , which is adapted to engage with the long arm of a bell-crank lever k , pivoted at k' to the tube A. The other arm of the said lever k is coupled by a connecting rod or link l to the arm c^2 of the catch or sear c . A small spiral or other spring m , attached at one end to the tube A and at its other end to the short arm of the lever k , keeps the end of the long arm of the said lever k against the shoulder j^2 until released by the action of the

magnet. When the electric circuit in which the magnet j is included is closed, the armature j' is drawn toward the said magnet, thereby releasing the long arm of the lever k from the said shoulder j^2 . The spring m by acting upon the other arm of the lever k then pushes backward the arm c^2 of the catch or sear c through the medium of the connecting-rod l , (the safety-pin d having been previously removed,) and thus disengages the said catch and permits the discharge of the gun in the manner hereinbefore explained under the action of the spring b , which in this arrangement consists of a set of so-called "Belleville disks."

The breech-plug B is formed with extensions B' and is connected to the breech end of the tube A by a hinge-joint B^2 , about which it can swing to open and close the breech. The said breech-plug is formed with helical projections or interrupted screw-threads, with which are adapted to engage corresponding projections or interrupted screw-threads on a movable nut n , screwed into the breech end of the tube or gun A. The said nut n is provided with a circular or segmental rack n' , with which is geared a pinion p , fixed on a short shaft p' , fitted to rotate in suitable bearings on the tube A. On this shaft p' is also fixed a crank-handle p^2 for operating it. By means of the said movable nut n the breech-plug B can be pressed tightly against the rear surface of the breech, a washer or packing-ring B^3 of asbestos or other suitable material being preferably arranged between these parts to insure tightness of the joint. The operating-crank p^2 when it has been turned to release the breech-plug rests against a stop q on the nut n , thus insuring the retention of the said nut in such a position during the opening and closing of the breech that the interrupted screw-threads of the breech-plug will, when the latter is swung upon its hinge to close the breech, enter the segmental grooves or slots in the said nut, so that the turning of the latter will lock the said plug in the tube A.

To prevent premature action of the firing mechanism, I provide a safety device consisting of a strip or piece n^2 , forming part of or attached to the breech-nut n , and so situated thereon that as long as the breech is not properly closed this strip or piece projects into the path of the lever a' , as shown more clearly in Figs. 1 and 2, and prevents the action of the said lever upon the slide-piece f carrying the firing-hammer.

The lever k is connected to the rod l by means of a pin k^2 on the said lever adapted to work in a slot l' in the said rod l , so as to allow a certain amount of play, and thus permit the discharge to be effected by hand, if desired, without the aid of the electric device and without disturbing this device.

To more effectually provide for holding the torpedo steady in the tube A, and to prevent the displacement of its rudder by any motion

of the vessel on which the said tube is employed, stop-bolts or catches $s s'$, Fig. 3, are in some instances provided, whereby the torpedo will be held from above and below. These stop bolts or catches are fitted to slide up and down in sockets s^2 and are arranged to be simultaneously operated by the reaction of the spring b through the medium of the following mechanism—that is to say, crank-levers t are pivoted at t' to the sockets s^2 , and are connected with each other by a rod u , carried in a bearing v , fixed upon the side of the tube A. A lever a^5 , fixed upon the shaft a^2 , has at its forward extremity a grooved anti-friction roller a^6 , which bears against the long arm of the lower lever t . The said lever a^5 , levers t , and rod u therefore form the medium through which the stop bolts or catches $s s'$ are operated by the spring b , to withdraw them and release the torpedo previous to its discharge. A spring s^3 is arranged in the lower socket s^2 for the purpose of effecting the return movement of the said stop bolts or catches $s s'$.

In the form or modification of my invention shown in Fig. 4 there is a spiral spring b , which is attached at one end to the tube A and at its other end to the upper arm of the lever a . The lower arm of the said lever a is connected by a link w with the lever t , for the purpose of withdrawing the stop-bolt or retaining-catch, which holds the torpedo in place in the tube A. This connection is effected by means of a pin t^2 , fixed in the lever t and extending through a slot w' in the link w , so that the said lever t can be operated by hand to release the torpedo.

To facilitate the opening and closing of the breech, I sometimes arrange the breech-screw B in a bracket or carrier B^4 , Fig. 6, hinged or pivoted in the usual manner to the breech end of the gun, and I provide the said breech-screw with a circular or segmental rack n' , Fig. 4, with which is geared a pinion p , arranged to rotate upon a short shaft or stud p' , fixed in a lug A' on the launching-tube A and to be actuated by a crank-handle p^2 . The extreme positions of the said crank-handle which correspond with the positions of the breech-screw when locked and unlocked, are accurately determined by a stop p^3 on the said shaft or stud p' , Fig. 5, thus insuring the re-engagement of the teeth of the pinion with those of the rack without difficulty after the breech-screw B and carrier B^4 , have been swung upon the hinge B^2 to open the breech.

To fix the breech-plug B in its supporting bracket or carrier B^4 so that it cannot turn about its axis when the breech is open, I employ the automatic device shown in horizontal section in Fig. 6, in which y is a spring-catch connected to a lever y' , pivoted at y^2 to the bracket or carrier B^4 . The free extremity of the said lever y' is provided with a small roller y^3 , bearing against a cam B^5 upon the hinge-joint B^2 . As the said bracket or carrier is swung upon its hinge to open the

breech, this roller, moving upon the inclined surface of the cam B^5 , permits the catch y to enter a circular hole provided in the breech-plug, thus locking the two parts together. 5 As the bracket or carrier B^4 is swung upon its hinge to close the breech, the catch y is automatically disengaged by the cam B^5 and lever y' , so that the breech-plug when it arrives in contact with the breech will be free to turn 10 on its axis. Thus the exact correspondence of the interrupted threads of the breech-plug with regard to the interrupted female threads of the breech is insured and maintained during the opening and closing of the breech, so 15 that these operations can be performed without trouble and without loss of time.

What I claim is—

1. The combination, with the firing mechanism, of a spring-actuated lever for operating 20 the same, a spring-actuated retaining-catch for the said lever, and an electro-magnet the armature of which is adapted to lock and unlock the said retaining-catch, substantially as described.
- 25 2. The combination, with the firing mechanism, of a spring-actuated lever for operating the same, a retaining-catch for the said lever, a spring-actuated lever for operating the said retaining-catch, and an electro-magnet the 30 armature of which is adapted to lock and unlock the last-named lever, substantially as described.
3. The combination, with the firing mechanism,

of a spring-actuated lever for operating the same, a retaining-catch for the said lever, 35 a spring-actuated lever for operating the said catch and connected therewith by a pin-and-slot connection, and an electro-magnet the armature of which is adapted to lock and unlock the last-named lever, substantially as described, and for the purpose specified. 40

4. The combination, with the lever a and its actuating-spring b , of the catch or sear c , adapted to engage with the said lever, the bent lever k , connected with the said catch, 45 the electro-magnet j , provided with the armature j' , adapted to engage with the said bent lever, and the spring m , connected with the said bent lever, substantially as and for the purposes set forth. 50

5. The combination, with the torpedo-tube and the lever for operating the firing mechanism, of a stop-bolt for retaining the torpedo 55 in place in the said tube, and intermediate connections between the said lever and stop-bolt, whereby the said bolt will be disengaged or withdrawn in the operation of the firing mechanism, for the purposes above specified.

In testimony whereof I have hereunto signed my name in the presence of two subscribing 60 witnesses.

JEAN BAPTISTE GUSTAVE ADOLPHE CANET.

Witnesses:

ROBT. M. HOOPER,
DENIS P. KEOGH.