

Fig. 1.

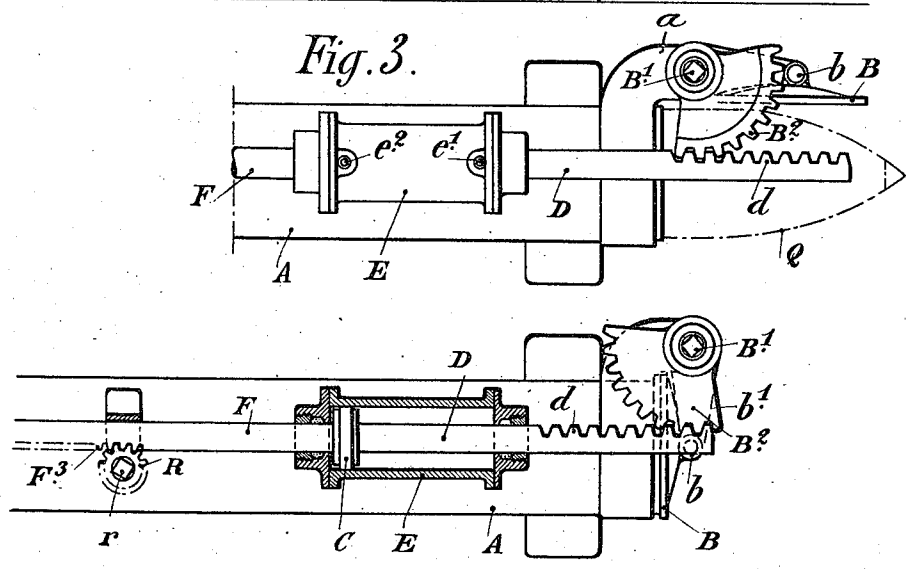


Fig. 2.

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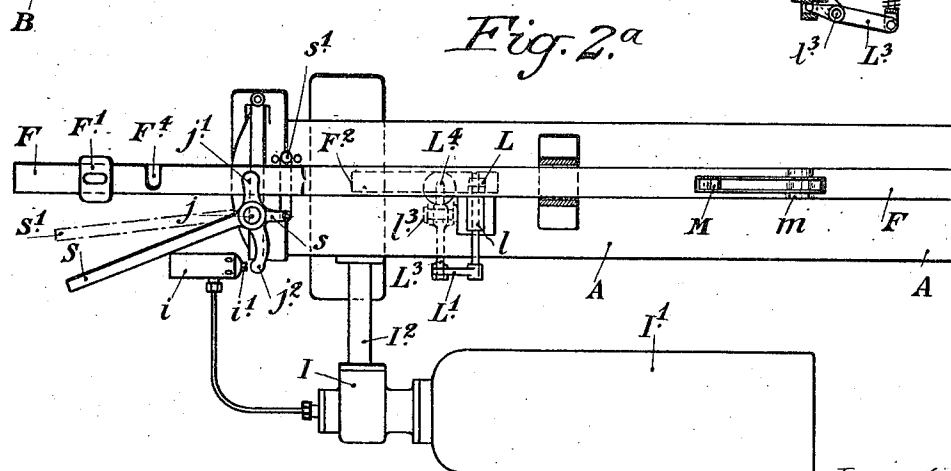
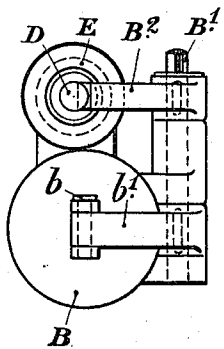
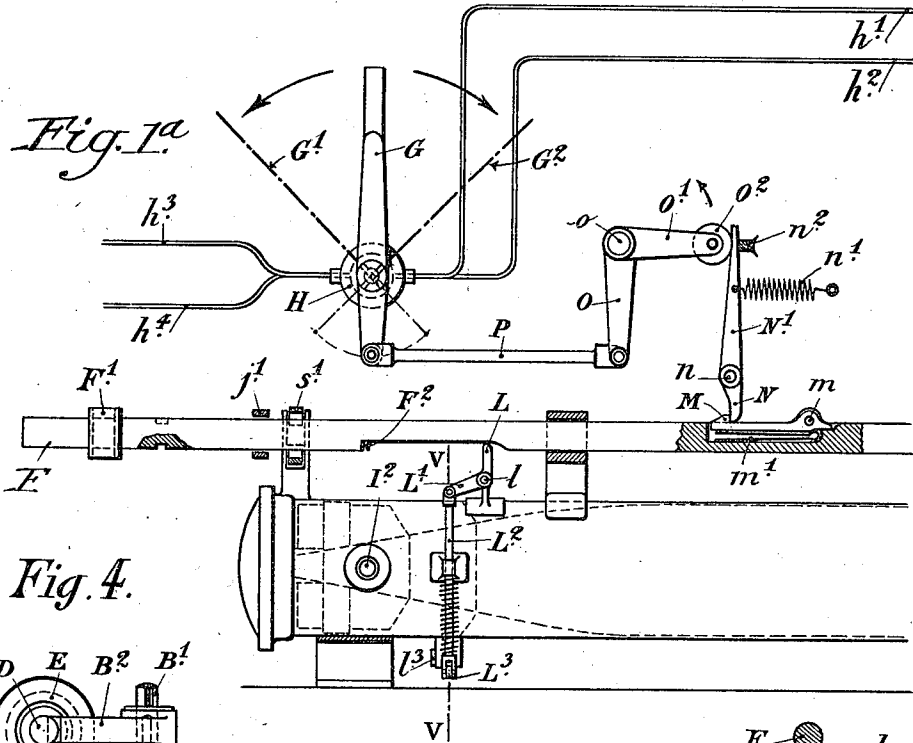
APPARATUS FOR LAUNCHING TORPEDOES BY MEANS OF UNDER WATER TORPEDO TUBES.

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1,310,896.

Patented July 22, 1919.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR LAUNCHING TORPEDOES BY MEANS OF UNDER-WATER TORPEDO-
TUBES.

1,310,896.

Specification of Letters Patent.

Patented July 22, 1919.

Application filed September 10, 1918. Serial No. 253,455.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, a citizen of the French Republic, and a resident of 42 Rue d'Anjou, Paris, France, have
5 invented a new and useful Improvement in Apparatus for Launching Torpedoes by Means of Under-Water Torpedo-Tubes, which invention is fully set forth in the following specification.

10 This invention relates to torpedo-launching apparatus, and it has for its object to provide an improved apparatus, especially adapted for underwater torpedo-launching tubes for submarines and other vessels,
15 which will enable the launching operations to be performed very quickly while permitting the forward door of the tube to be kept closed up to the very instant of the actual ejection of the torpedo, thus leaving the torpedo dry although the tube be situated
20 under water.

Heretofore the launching of a torpedo has comprised three successive operations, namely:

25 (1) Opening the door that closes the forward end of the tube,

(2) Releasing the torpedo that is being held in the tube by means such as brakes, bolts or other devices,

30 (3) Releasing the ejecting mechanism proper, as by firing a powder charge, or admitting a blast of compressed air, or operating an ejecting piston, etc.

In some cases the above stated operations
35 (2) and (3) are conjugated.

The present invention consists in an apparatus wherein these three operations are conjugated in an extremely simple manner, said operations being further effected, in the
40 desired order and without interruption, by a single movement on the part of the person intrusted with the launching.

According to this invention the member for opening the front door of the torpedo-launching tube (which may consist, in the usual manner, of a suitable piston actuated by a fluid under pressure) actuates at the proper time, through the tail rod of the piston, the device (such as a retaining finger or
50 brake) which keeps the torpedo in the tube, and the device for ejecting the torpedo.

The invention also comprises various devices designed to prevent any wrong maneuver and to permit an emergency operation by hand.

The invention is capable of receiving a variety of mechanical expressions, one of which is shown on the accompanying drawings, but it is to be expressly understood that the drawings are for purposes of illustration only, and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

In said drawings:

Figures 1 and 1^a are side elevations, partly in section of connected portions of a torpedo-launching apparatus embodying the present invention;

Figs. 2 and 2^a are corresponding plan views thereof;

Fig. 3 is a partial plan showing the front door open;

Fig. 4 is an end view;

Fig. 5 is a cross section taken on the right of the torpedo-retaining bolt, on the line V—V of Fig. 1.

In all these figures, A is a torpedo-launching tube provided at its front end with a door B the opening and closing movements of which are obtained in the usual manner by the rod D of a piston C which moves in a cylinder E and may be subjected alternately on its two faces to the action of a fluid under pressure.

The operation of the door B by the rod D may be effected in any suitable way, such for instance as shown in Figs. 1, 2 and 3, wherein the door B is supported by an axle pin *b* at one end of an arm *b*¹ which is fixed on an axle B¹ journaled in a bracket *a* formed on the tube A. The axle B¹ has also fixed thereon a toothed sector B² engaging with teeth *d* formed on or carried by the rod D.

The device for retaining the torpedo and the device for ejecting the torpedo are operated according to this invention by the tail rod F of the piston C which rod is provided with the necessary operating and safety-locking parts hereinafter described. Thereby the movements of the door B and

the release and ejection of the torpedo can be produced in the desired order by the sole operation of the lever G that controls the pressure-fluid distributor for operating the piston C.

This distributor, which may be of any suitable construction, is shown as consisting of a simple four-way cock H. Two pipes h^1 , h^2 , leading from the distributor, communicate respectively at e^1 and e^2 with the front and rear ends of the cylinder E. h^3 , h^4 are pipes that connect the distributor with the supply of pressure fluid. According to the direction of movement of the piston C, the pipes h^1 , h^2 serve alternately for conveying the pressure fluid to the cylinder and for returning the said fluid to the source of supply by way of the distributor.

In order to operate the device for ejecting the torpedo by means of the tail rod F, the latter is provided with a member, such as a tappet F^1 , for actuating said device, the relative movements of the ejecting device and of the movable tappet being such that the said member will act to effect this operation at the desired point in the stroke of the piston C, that is to say, when the door B is completely open and the torpedo is released. It is to be understood that the ejecting device may be of any suitable type, said device being shown as comprising the usual discharge valve i to produce the operation of a launching valve I for the admission, into the tube A through a pipe I^2 , of compressed air stored in a reservoir I^1 . The valve i is shown as carrying a finger i^1 upon which is adapted to bear the arm j^2 of a rocking beam j^1-j^2 which is fulcrumed at j on the tube A. The other arm j^1 of the said rocking beam is bifurcated to embrace the tail rod F and is actuated by the tappet F^1 in the forward stroke of the piston C.

For operating the device that holds the torpedo, the tail rod F comprises a member, such as a stop F^2 , so situated that at the desired moment in the stroke of the piston C (that is to say, when the door B is almost completely open), this stop will strike the arm L of a bell crank lever $L-L^1$ fulcrumed at l on the tube A. This stop produces a retraction of the latch or tail bolt L^4 (Fig. 5) by means of said lever $L-L^1$ through a connecting rod L^2 and a rocking beam L^3 fulcrumed at l^3 on the tube A, a spring being shown on said rod L^2 to normally urge the parts to the position shown.

The tail rod F is also preferably constructed in such a manner as to be capable of operating at the desired moment various safety devices which prevent any wrong maneuver during or before the firing of the torpedo.

To this end the tail rod F may carry a latch M the operation of which will be conjugated with that of the lever G and which,

in the absence of the action of the pressure fluid upon the forward face of the piston C, or in case of want of tightness in the packing of the latter, will assure that the door B will be maintained closed. In the example shown, this latch M is pivoted at m to the tail rod and is subjected to the action of a spring m^1 which tends to keep it raised in such a position that its nose abuts against the arm N of a rocking beam $N-N^1$ fulcrumed at a fixed point n . In the position of rest (closed position of the door B), there bears against the arm N^1 of this rocking beam a roller O^2 carried by the arm O^1 of a bell crank lever O^1-O fulcrumed at a fixed point o . The arm O of this lever is connected by a rod P to the operating lever G.

The operation of the improved apparatus as described is as follows:

In the position of rest, with the torpedo Q situated inside the tube A, the front door B is closed and can be pressed against its seat by the sector B^2 . The pressure fluid confined in the cylinder E prevents any movement of the rack d and thus keeps the door B closed. The safety device $N-M$ further assures that the door will be kept closed if the packing of the piston C is not tight.

For launching, the lever G is pulled over from right to left into the position G^1 . Thereby the tail rod F is unbolted, the lever G moving the connections $P-O-O^1$ to cause roller O^2 to move out of the way and release the rocking beam $N-N^1$. At the same time the distributor moves into a position such that the pressure fluid is admitted through the pipe h^2 on to the rear face of the piston C, while the forward side of the cylinder E is placed in communication with the exhaust by way of the pipe h^1 . The tail rod F being moved by the piston, it causes the rocking beam $N-N^1$, which has been released, to rock out of the way of the latch M. The sector B^2 is now rotated by the rack d and opens the door B. At the moment when this opening is completed, the stop F^2 meets the arm L of the bell crank lever $L-L^1$ and causes the bolt L^4 , which is holding back the torpedo, to move out of the way. Immediately afterward, the tappet F^1 strikes the fork j^1 and as above described causes the discharge valve i^1 to operate and produce the ejection of the torpedo.

After firing, the operating lever G is returned into the closing position G^2 which brings the distributor into the proper position for causing the pressure fluid to act upon the forward face of the piston, while the rear end of the cylinder is brought into communication with the exhaust. The tail rod F now moves to the rear, and the latch M slips under the end of the arm N of the rocking beam $N-N^1$, which has been returned by a spring n^1 into the position shown in Fig. 1 wherein it abuts against a

stop n^2 . The safety-locking of the door B is thus reestablished.

The tail rod F may also be so constructed as to be capable of actuation by hand if required. For this purpose it may be provided with lateral teeth F^3 meshing with a pinion R fixed on an axle r carried by the tube A, which axle may be actuated directly by means of a key or a ratchet wheel mounted on a squared portion of said axle.

When this hand actuation is employed, it is advisable to move the tappet F^1 out of the way. Launching will then be effected by hand by moving from S to S^1 a lever S that is fixed on the axle j . An extension s of this lever is shown as carrying a ring s^1 which encircles the tail rod F and prevents the lever S from moving from S to S^1 so long as the said ring has not come opposite a notch F^4 , which event will occur only after the door B has been completely opened.

While the illustrated embodiment has been described with considerable particularity it is to be understood that the invention is not to be restricted thereto, as the same is capable of receiving a variety of mechanical expressions, some of which will readily suggest themselves to those skilled in the art while certain features thereof are capable of use without other features thereof. Reference is to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, means for opening said door, and means operated by said door-opening means for successively actuating said torpedo-releasing and said torpedo-ejecting mechanism.

2. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, a piston for opening said door, and means operated by the movement of said piston for successively actuating said torpedo-releasing and said torpedo-ejecting mechanism.

3. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, means for opening said door, means operated by said door-opening means as the door moves to open position for effecting the actuation of said torpedo-releasing mechanism, and means operated by said door-opening means for thereafter effecting the actuation of said torpedo-ejecting mechanism.

4. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, a piston for opening said door, means operated by the movement of said piston as the door moves to open position for effecting the actuation of said torpedo-releasing mechanism, and means actuated by

the movement of said piston for thereafter effecting the actuation of said torpedo-ejecting mechanism.

5. In combination with a torpedo tube, its door, a latch for retaining a torpedo in said tube, and torpedo-ejecting mechanism, a piston for opening said door, a rod connected to said piston, and means on said rod for successively tripping said latch and actuating said torpedo-ejecting means.

6. In combination with a torpedo tube and its door, means for opening said door, means for locking said first-named means with the door in closed position, means for effecting the actuation of said door-operating means, and means operated by said last-named means for releasing said locking means.

7. In combination with a torpedo tube and its door, a piston for opening said door, a rod connected thereto, a latch for locking said rod and piston in position to maintain said door closed, means for effecting movement of said piston to open said door, and means operated by said last-named means for releasing said latch.

8. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, a piston for opening said door, a rod connected thereto, means on said rod for successively effecting the actuation of said torpedo-releasing and said torpedo-ejecting mechanism, a latch for retaining said rod and piston in position to maintain the door closed, means for effecting the operation of said piston, and means operated by said last-named means for releasing said latch.

9. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, a piston for opening said door, a rod connected thereto, means on said rod for successively effecting the actuation of said torpedo-releasing and said torpedo-ejecting mechanism, a latch for retaining said rod and piston in position to maintain the door closed, a valve for controlling the admission of fluid under pressure to said piston, and means operated by the movement of said valve for releasing said latch.

10. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, automatic means for opening said door, means operated by said last-named means for successively effecting the actuation of said torpedo-releasing and said torpedo-ejecting mechanism, and manual means for operating said door.

11. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, a piston for opening said door, a rod connected thereto, means operated by said rod for successively effecting the actuation of said torpedo-releasing and said torpedo-ejecting mechanism, a rack on said rod, 130

and a pinion in mesh with said rack for manually operating said door.

12. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, automatic means for opening said door, means operated by said last-named means for successively effecting the actuation of said torpedo-releasing and said torpedo-ejecting mechanism, manual means for operating said door, manual means for effecting the actuation of said torpedo-ejecting mechanism, and means for preventing operation of said last-named means prior to the opening of said door.

13. In combination with a torpedo tube, its door, and the torpedo releasing and ejecting mechanism, a piston for opening said

door, a rod connected thereto, means operated by said rod for successively effecting the actuation of said torpedo-releasing and said torpedo-ejecting mechanism, manual means for operating said door, manual means for operating said torpedo-ejecting mechanism, and means connected with said last-named means and co-acting with said rod to prevent the operation of said torpedo-ejecting mechanism prior to the opening of said door.

In testimony whereof I have signed this specification.

EUGÈNE SCHNEIDER.

Witnesses:

ANDRÉ MOSTICKER,
JOHN F. SIMONS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."