E. SCHNEIDER.

TORPEDO LAUNCHING APPARATUS FOR SUBMARINE VESSELS.

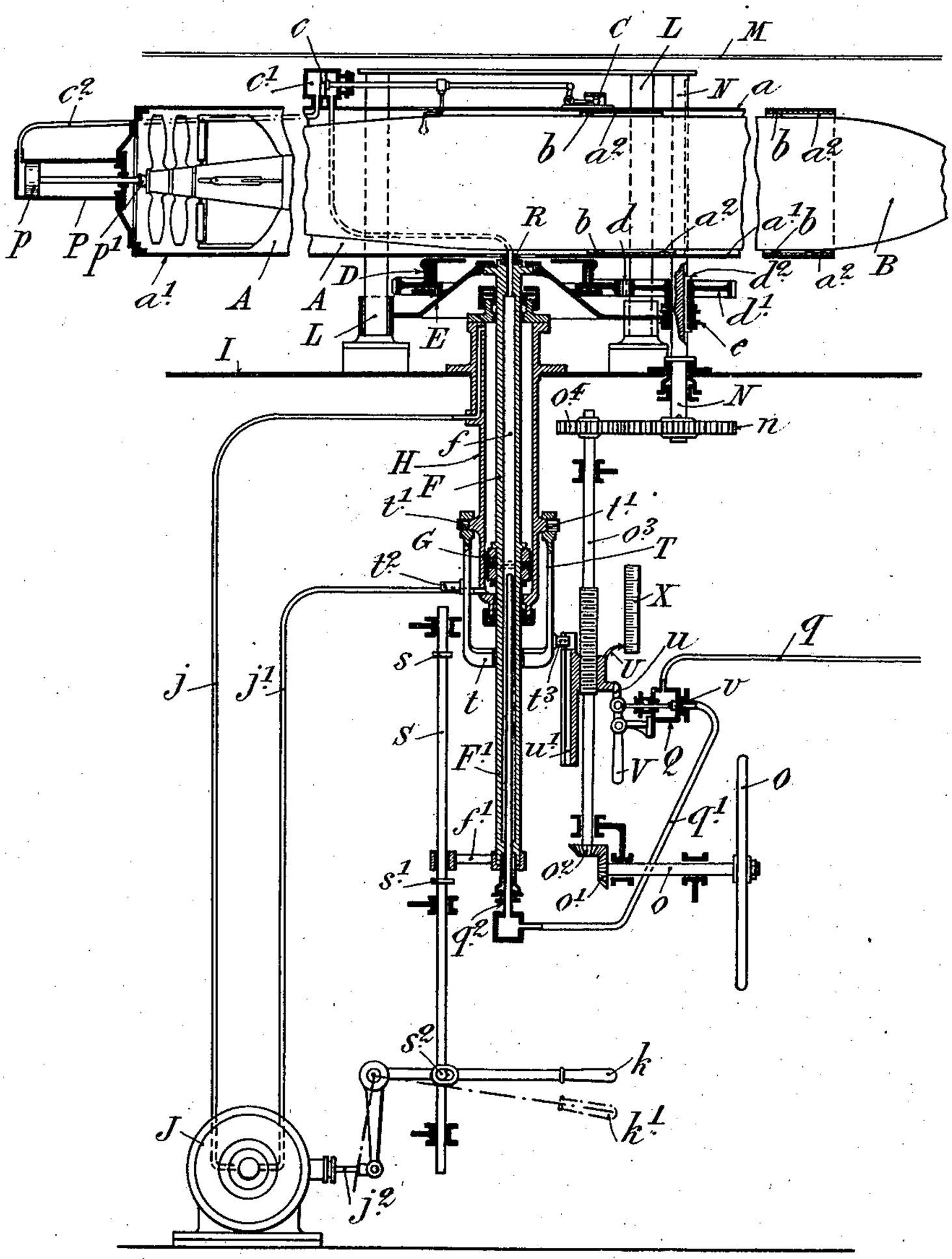
APPLICATION FILED JUNE 15, 1914.

1,166,940.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

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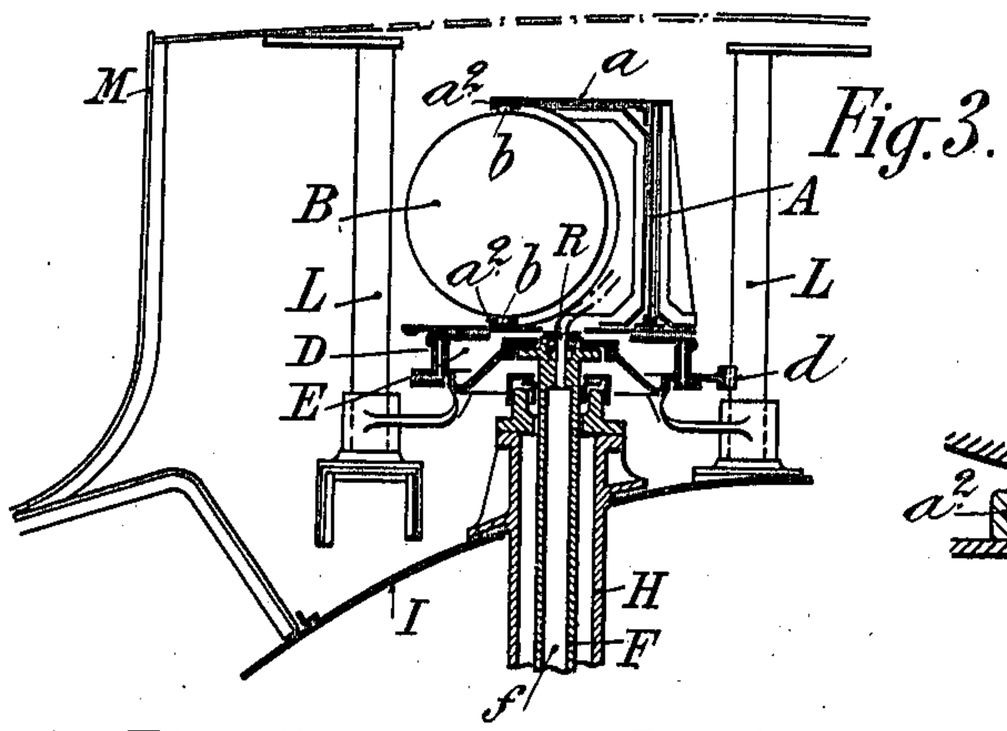


Fig. 3.

Fig. 4.

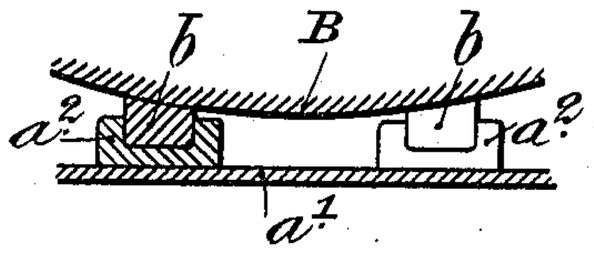


Fig. 5.

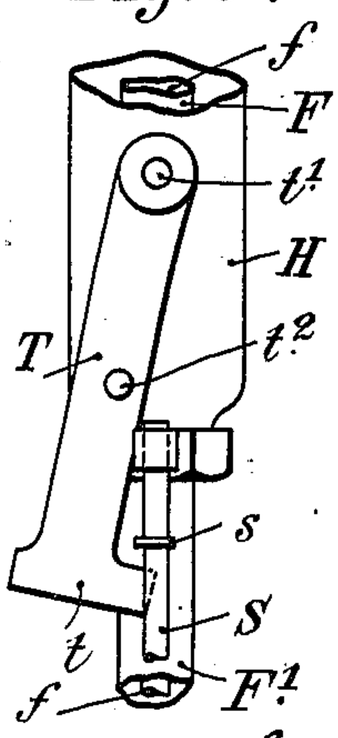


Fig. 6.

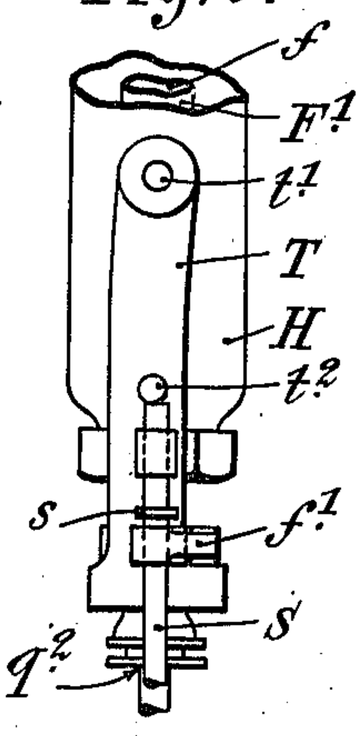


Fig. 7.

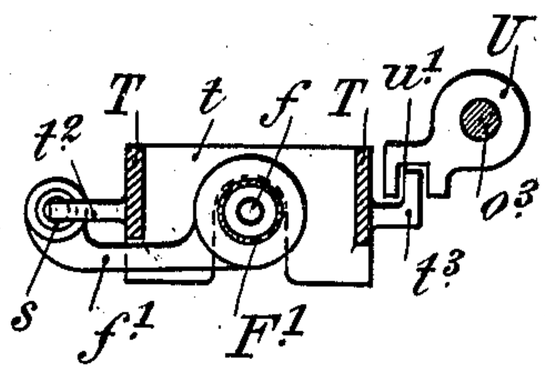


Fig. 8.

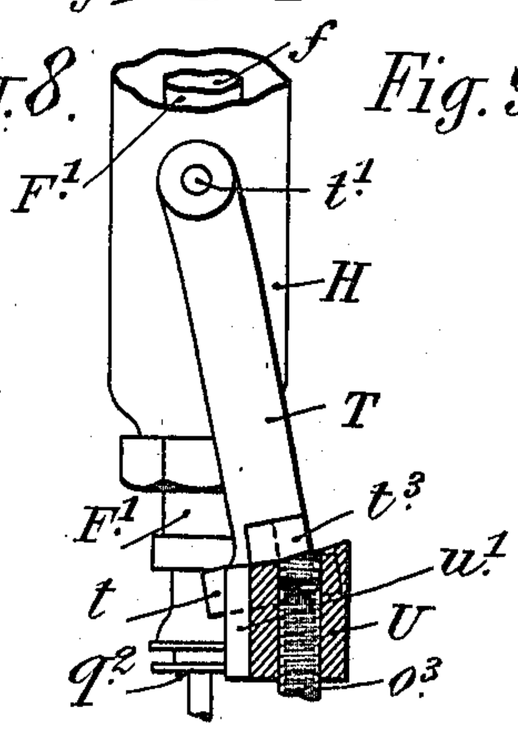


Fig. 9.

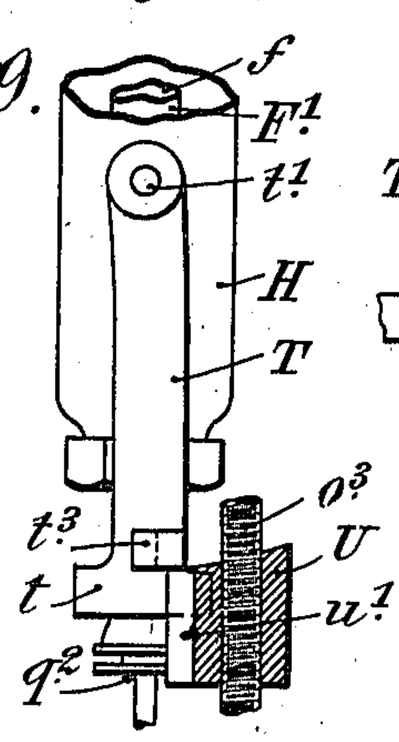
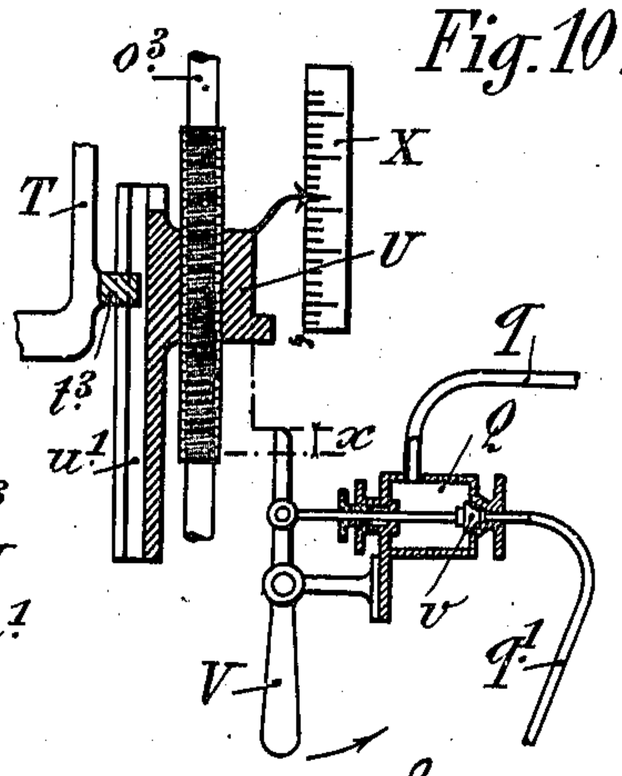


Fig. 10.



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UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF LE CREUZOT, FRANCE.

TORPEDO-LAUNCHING APPARATUS FOR SUBMARINE VESSELS.

1,166,940. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed June 15, 1914. Serial No. 845,138.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, of Le Creuzot, France, have invented a new and useful Improvement in or Relating to Torpedo-Launching Apparatus for Submarine Vessels, which is fully set forth in the following specification.

The present invention has for its object to provide a torpedo launching apparatus which will enable a submerged submarine vessel to launch torpedoes at a training angle which can be regulated by an operator located inside the vessel, the said apparatus being also arranged in such a manner as to be capable of disappearing into the superstructure of the submarine except when torpedoes are actually being launched so that the apparatus offers no resistance to submerged navigation.

The essential characteristic of the apparatus is therefore that the support can be caused to disappear before and after firing and that the apparatus can be trained from the interior of the vessel.

The apparatus consists broadly of a framework for carrying the torpedo and which according to this invention is carried by a ring which can be given the desired direction and which for this purpose is pivoted to a guide plate which is itself capable of a vertical movement. This vertical movement enables the apparatus to be placed in the concealed position or in the raised position while the movement of rotation of the ring when it has been given the raised position enables the torpedo to be trained into the firing position and then the framework to be returned to the position in which it can be moved downward into its concealed position.

In order that the said invention may be more clearly understood and readily carried into effect, I will now proceed to describe the same more fully with reference to the accompanying drawings in which:—

Figure 1 shows the apparatus and its mechanism as a whole, the apparatus occupying the position in which it is withdrawn into the superstructure. Fig. 2 is a similar view but with the apparatus in the raised position ready to be trained in the desired direction. Fig. 3 is a sectional elevation of Fig. 1. Fig. 4 is a partial section on a larger scale, illustrating the method of guiding the torpedo during launching. Figs. 5 and 6 are partial detail elevations corresponding to Figs. 1 and 2 showing on an enlarged scale a safety device for the hoisting mechanism. Fig. 7 is a horizontal section of the safety device on the line 7—7 of Fig. 2. Figs. 8 and 9 are partial views corresponding respectively to Figs. 1 and 2 and illustrating on an enlarged scale the safety device for the training mechanism. Fig. 10 is a sectional elevation on a large scale of the safety device for the launching mechanism.

The aforesaid framework may be composed for example of a girder A, the upper and lower plates a and a' of which respectively carry slideways a^2 provided with slots in which snugs b fixed in appropriate positions on the torpedo B engage, these snugs being for example at the two ends of the air reservoir; the said slideways are arranged, as will be hereinafter described, in such a manner that all the snugs leave them simultaneously when the torpedo is launched.

The torpedo is maintained in the framework in the known manner by a brake C of any suitable type operated by a piston c sliding in a cylinder c' (Figs. 1 and 2). By means of its lower sole plate a', the framework A is fixed to a ring D pivoted around the vertical axis of a guide plate E. This plate is integral with the rod F of a piston G sliding in a vertical cylinder H fixed to the deck I of the ship. This piston is able to rise and fall in the cylinder H under the influence of fluid under pressure supplied by a suitable variable delivery pump J. Two pipes j and j' proceed from the pump J and terminate respectively at the upper and lower parts of the cylinder H; the pipe j serves for the suction and the pipe j' for the delivery or vice versa according to the position given to a rod j^2 controlled by a lever k.

In order to produce the upward and downward movements of the unit constituted by the framework and the torpedo

and to permit this unit to be trained when in the raised position, the support of the framework A is divided into two parts, the guide plate E and the ring D, the former being guided during its vertical movement upon the uprights L rigidly fixed to the deck I and to the superstructure M of the vessel.

The movement of rotation of the ring D around the plate E is produced by teeth *d* fixed to the ring D and constantly in mesh with a pinion *d'*, the hub of which is prevented from moving longitudinally by means of a bearing *e* carried by the guide plate E. In the vertical movement of the guide plate E, the pinion *d'* slides by means of a key or feather d^2 in a keyway in a vertical shaft N which may be rotated by a hand wheel O located inside the ship by the intermediary of appropriate mechanism comprising, for example, a shaft *o*, bevel pinions *o'*, o^2 a shaft o^3 and toothed wheels o^4 and *n*. The movement of rotation of the shaft N is transmitted to the ring D by the feather d^2, the pinion *d'* and the teeth *d*.

In the known manner, the launching mechanism comprises a compressed air cylinder P the piston *p* of which acts upon the torpedo by means of a head *p'* which engages with the hollow shaft at the tail of the torpedo. The compressed air which is furnished by a source not illustrated, passes through the conduit *q* to a launching valve *v*; it then proceeds through the pipe *q'* and the telescopic joint q^2 to the passage *f* formed in the rods F' and F and thence to a step bearing R. No matter what the height of the framework and the direction imparted to it may be, the compressed air then passes to the cylinder *c* and finally to the cylinder P, as hereinafter explained.

The apparatus also comprises various accessory parts hereinafter referred to in the description of the operation.

Assuming the apparatus to occupy the normal or concealed position for navigation (Fig. 1) the framework is directed in a plane parallel or substantially parallel with the longitudinal plane of the vessel; the guide plate E occupies the lowest point in its travel and the brake C of the torpedo is applied. The lever *k* of the pump occupies the zero or cut off position indicated in full lines in Fig. 1. In this position no portion of the apparatus projects above the superstructure M of the vessel.

In order to bring the torpedo into the firing position, the following operations have to be effected:—The lever *k* is depressed into the position *k'* which causes a distribution of the fluid in the pump J such that the pipe *j'* serves for the delivery and the pipe *j* for the suction. Under the influence of the compressed fluid, the piston G rises, raising the unit constituted by the guide plate E, the ring D and the framework A carrying the torpedo.

When the piston G is at the top of its stroke, a finger *f'* fixed to the lower extremity of the rod F' lifts a rod S by means of a shoulder *s* with which the rod S is provided; this rod S is suitably guided and in proximity to its lower extremity it carries a stud S^2 engaging a slot in the lever *k*. This lifting of the rod S by the finger *f'* returns the lever *k* to the position in which the pump effects no delivery. At this moment the members occupy the position indicated in Fig. 2. The guide plate E is at such a height that the frame A protrudes completely above the superstructure M of the vessel and is able to rotate freely. The guide plate E still remains firmly held by the four guides L. It is then possible to lower beneath the lower end of the rod F', the base *t* of a yokepiece T pivoted at *t'* to the cylinder H (Figs. 1, 2, 5, and 6). Before the piston G had reached the top of its stroke, this movement was impossible as the base *t* was bearing against the rod F'. In the lowered position represented in Fig. 7, the base of the yokepiece engages beneath the head of the rod F', and bears by means of the bottom of a recess against the telescopic joint q^2.

The depression of the base *t* produces the following effects:—

1. The yokepiece T maintains the piston and the entire apparatus at the top of their stroke even if the pump J should be damaged (Fig. 2).

2. A projection t^2 integral with the yokepiece T comes into the path of the upper end of the rod S which, as shown in Figs. 2 and 6, renders it impossible to raise the rod S, and it is consequently impossible to unintentionally bring the control lever *k* of the pump into the "descending" position k^2 indicated in broken lines in Fig. 2.

3. A projection t^3 on the right hand side of the yokepiece T has hitherto prevented any training movement by blocking a member U in the form of a nut upon a threaded portion of the shaft o^3 as shown in Fig. 8. When the parts occupy the position indicated in Figs. 2 and 9, the member U is released.

It is then possible by operating the hand wheel O to give the framework the desired training angle by means of the gearing described above with the certainty that the frame cannot be turned until clear of the super-structure.

The movement of rotation of the shaft o^3 during the aiming operation, displaces the nut U which has a vertical slot *u'* in which the projection t^3 from the yokepiece T engages from the commencement of the movement (Fig. 10), and thereby permits nut U to move in a vertical path but prevents it

from rotating during such travel. It is therefore only possible to raise the yokepiece and thereby release the control lever *k*, after the frame has been turned back from the training angle to a plane parallel with the longitudinal vertical plane of the ship (Fig. 2). The displacement of the nut U over a suitable scale X indicates the angle at which the frame has been set. Consequently the torpedo can be launched when it has been given the desired aim. To do this, it is only necessary to press the lever V in the direction indicated by the arrow in Fig. 10. This movement lifts the valve *v* in the casing Q and the air, in following the path *q'*, *q²*, *f*, and R, enters the cylinder *c'*, presses back the piston *c*, which releases the brake C and depresses the known air supply lever of the torpedo for starting the gyroscope and the motor of the torpedo. When the piston *c* has reached the end of its stroke, it uncovers the orifice of the pipe c^2 through which the air proceeds to the cylinder P, and finally acts upon the piston *p*. Under the influence of this piston, the torpedo is projected from the frame and liberated with an initial impulse. The gyroscope is thus able to act in the known manner if the torpedo should be deflected from its path by some accidental cause. It should however, be noted that the movement of the lever V cannot take place until after the nut has described a certain path *x* (Fig. 10) which varies with different types of vessels and which is such that the torpedo cannot be launched when there is any danger of its encountering any part of the hull of the vessel.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a submarine vessel, a torpedo holding frame within said vessel, means for vertically moving and training said frame, and means for launching a torpedo from said frame.

2. In a submarine vessel having a torpedo compartment, a torpedo carrying frame adapted to be moved into and out of said compartment, and means for moving said frame to firing position.

3. In a submarine vessel, the combination of a movable supporting frame, a torpedo launching mechanism carried by said frame, and means for operating said mechanism, means for moving said frame clear of the submarine deck, mechanism for training said frame, and means for normally locking said launching mechanism.

4. In a submarine vessel, the combination of a movable supporting frame, a torpedo launching mechanism carried thereby, means for operating said mechanism, means for moving said frame clear of the submarine deck, mechanism for training said frame and released by movement of said frame, and means for normally locking said launching mechanism.

5. In a submarine vessel provided with a torpedo compartment, the combination of a reciprocating support in said compartment, a rotatable torpedo carrying frame revolubly mounted in said support, and means for moving said frame into and out of said compartment.

6. In a torpedo launching apparatus for submarine vessels, a torpedo compartment, a torpedo carrying frame adapted to be moved in and out of said compartment, and means for training and launching a torpedo from said frame when the latter has been moved out of its compartment.

7. In a submarine vessel, a torpedo compartment having therein a movable torpedo support, guiding members for said support, a torpedo carrying frame pivoted on said support, a motor outside said compartment for moving said support clear of the vessel superstructure or deck, training mechanism released by a predetermined movement of said frame for rotating the latter into launching position, and means released by the operation of said training mechanism for launching a torpedo from said carrying frame.

8. In a submarine vessel, a torpedo compartment having therein a movable torpedo support, guiding members for said support, a torpedo carrying frame pivoted on said support, a motor outside said compartment for moving said support clear of the vessel superstructure or deck, means for holding said motor inoperative when said support is clear of said superstructure, training mechanism released by a predetermined movement of said frame for rotating the latter into launching position, and means released by the operation of said training mechanism for launching a torpedo from said carrying frame.

9. In a submarine vessel, a torpedo supporting means normally held within said vessel, and means for moving said supporting means into launching position.

10. In a submarine vessel, a torpedo supporting means normally below the surface of said vessel, and means for moving said supporting means into launching position above the surface of said vessel.

11. In a submarine vessel, a torpedo support adapted to carry a torpedo, means for elevating said support clear of the vessel superstructure for training and launching said torpedo, and automatic means successively operable for locking the elevating means and for releasing said training and launching means.

12. In a submarine vessel, a torpedo support adapted to carry a torpedo, means for elevating said support clear of the vessel superstructure for training and launching

said torpedo, and automatic safety means successively operable for locking the elevating means and for releasing said training and launching means and for automatically operating said safety means in reverse order when returning said support to normal position.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EUGÈNE SCHNEIDER.

Witnesses:

CHAS. P. PRESSLY,

C. GUÉRITA.