

No. 867,982.

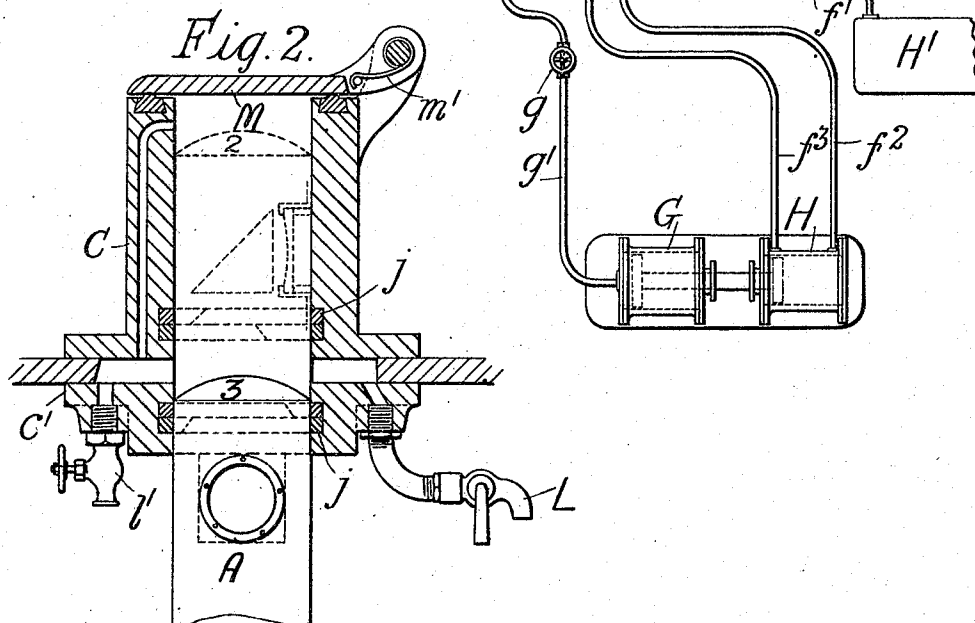
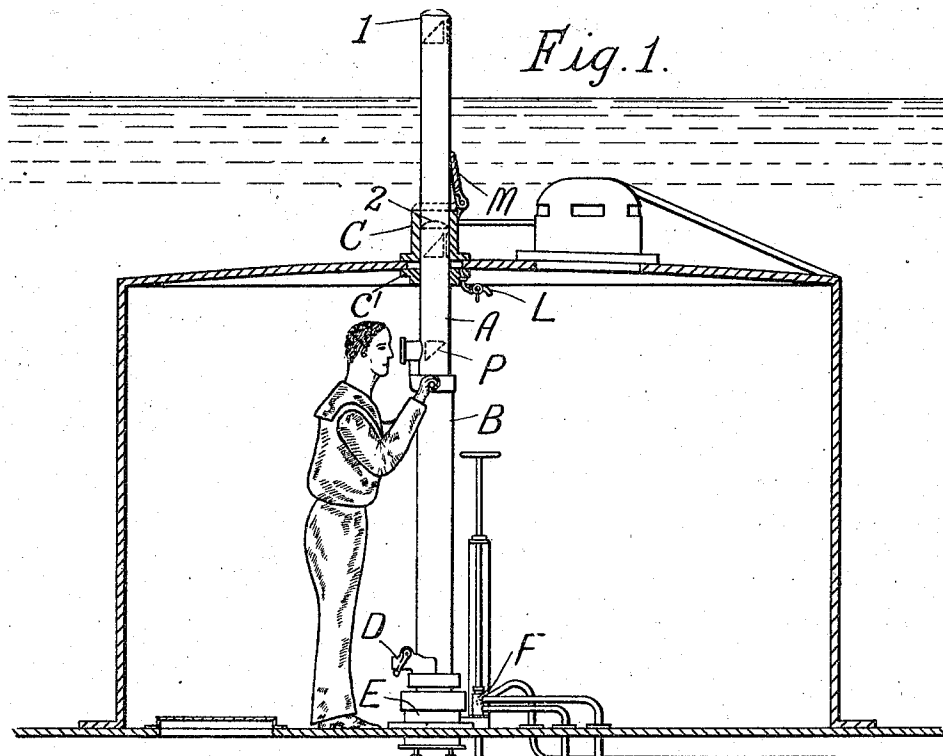
PATENTED OCT. 15, 1907.

S. LAKE.

APPARATUS FOR TAKING OBSERVATIONS FROM A SUBMARINE VESSEL.

APPLICATION FILED APR. 27, 1906.

2 SHEETS—SHEET 1.



Witnesses
D. O. Brinn
H. A. Kornemann.

Inventor
Simon Lake, by
Henry J. Miller, Atty.

No. 867,982.

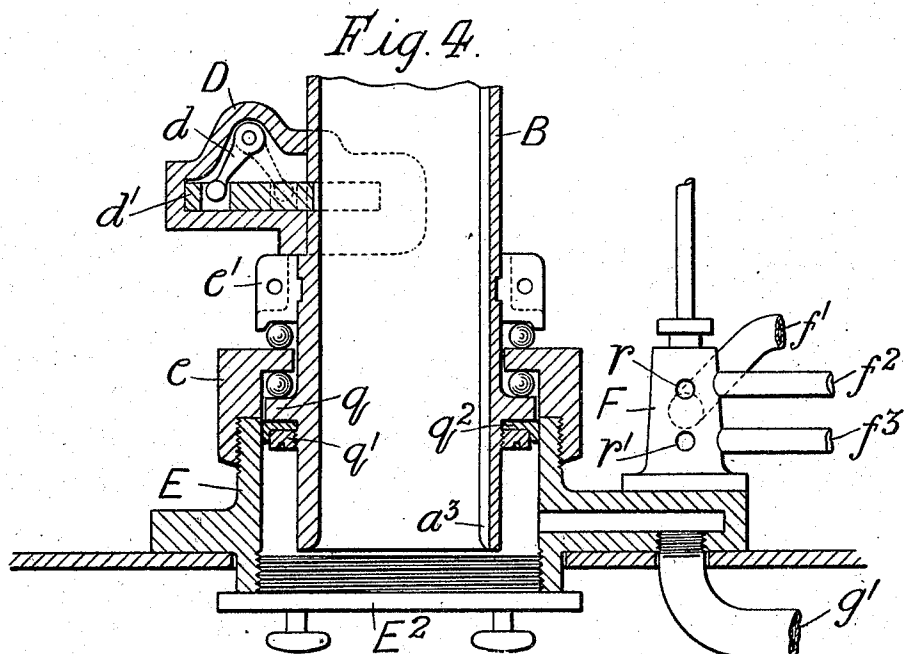
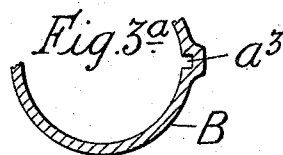
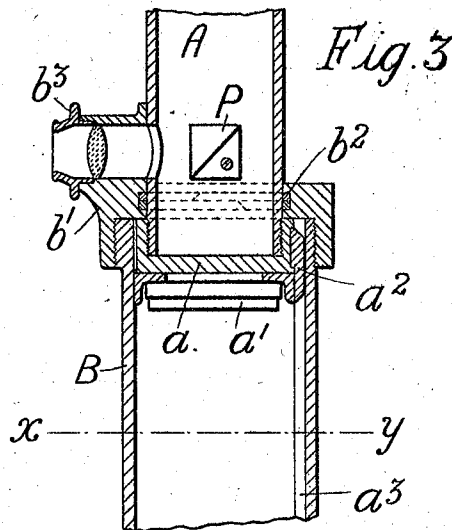
PATENTED OCT. 15, 1907.

S. LAKE.

APPARATUS FOR TAKING OBSERVATIONS FROM A SUBMARINE VESSEL.

APPLICATION FILED APR. 27, 1906.

2 SHEETS—SHEET 2.



Witnesses
D. C. Brame
H. A. Reinemann.

Inventor
Simon Lake, by
Henry J. Miller, Att.

UNITED STATES PATENT OFFICE.

SIMON LAKE, OF BERLIN, GERMANY.

APPARATUS FOR TAKING OBSERVATIONS FROM A SUBMARINE VESSEL.

No. 867,922.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed April 27, 1906. Serial No. 313,917.

To all whom it may concern:

Be it known that I, SIMON LAKE, a citizen of the United States of America, and a resident of Berlin, Germany, have invented a certain new and useful Improvement in Apparatus for Taking Observations from a Submarine Vessel, of which the following is a specification.

This invention relates to an improved apparatus for taking observations from a submarine vessel, and to an improved system of installation of periscopes, omniscopes and like observing instruments used in submarine vessels for enabling the observer to see what is transpiring above the surface of the water while the vessel is submerged.

The invention consists of a sighting tube adapted to be projected above the water from a submerged vessel and to be withdrawn into the vessel as desired, and mounted in such way as to be turned around at pleasure so that the location of an object having been noted, the vessel may be steered in any direction, with respect to such object, and the sighting tube turned to face the object and then projected and again withdrawn without loss of time and at a minimum risk of detection.

In the accompanying drawings which illustrate the invention Figure 1 shows in vertical section the conning tower and part of a submarine boat equipped with a periscope embodying my improvements, the conning tower being submerged while observations are being taken through the periscope the sighting tube of which is elevated above the surface of the water. Fig. 2 is an enlarged sectional view of the automatic closing valve and stuffing box located at the top of the conning tower. Fig. 3 is an enlarged sectional view of the lower end of the sighting tube and the upper end of the carrying or guiding cylinder. Fig. 3^a is a section of a part of the guiding cylinder through the line *x-y* of Fig. 3. Fig. 4 is a sectional view of the lower end of the guiding cylinder mounted on a base provided with ball bearings.

As shown in said drawings, A is a sighting tube shown elevated in Fig. 1, as aforesaid, so that the upper lenses are above the surface of the water. This tube A is provided with the usual lenses and is of uniform diameter and is fitted with a rounded or conical cap at the top, the construction being such that the tube will readily pass through the stuffing box C as shown in Fig. 2. This stuffing box is fitted with packing rings *jj* of any well-known construction, which serve to prevent water from penetrating into the interior of the boat.

G is a hydraulic cylinder with a pipe *g*¹ leading to the elevating cylinder B.

H is an air cylinder the piston of which is connected to the piston of the hydraulic cylinder G by means of a common piston rod. The air supply is received from an air reservoir H¹ which may be located at any convenient part of the boat.

The stuffing box and guide piece C is provided at its

upper end with a flap valve M which valve is normally held to its seat by the coil spring *m*¹.

In Fig. 2 the instrument is shown in dotted lines in two positions. In the upper position designated 2 the instrument is shown with the lenses pointing forward (as shown in position 1 in Fig. 1.) In the lower position indicated by the numeral 3 the instrument is represented as rotated one quarter turn so that the objective lenses are seen in front elevation. *c*¹ is the lower portion of the stuffing box and guide also fitted with packing rings. L is the pet cock of the drain pipe. *l*¹ is an air relief pet cock.

Referring to Figs. 3 and 4, B represents the guiding cylinder. *b*¹ is the cylinder head provided with packing rings *b*² through which the sighting tube A passes. *a* is a piston screwed on the lower end of the sighting tube A. This piston *a* is provided with a cup leather packing ring held in place by the disk *a*¹. *a*² is a feather secured to the piston *a* and designed to maintain the tube A in alignment when the same is elevated or depressed, this feather traveling in a key-way extending the full length of the cylinder B as shown at *a*³. The cylinder head *b*¹ carries the eye-piece *b*³ fitted with suitable lenses. An opening is provided in the tube A so that the reflecting prism P may be opposite the eye piece *b*³ in line with the same when the sighting tube A is at its highest point of elevation.

Referring to Fig. 4 the lower end of the cylinder B is formed with an external flange *q* and is carried in the base piece E. *q*¹ is a ring which holds in place the cup leather packing ring *q*². *e* is a cap which forms a bearing to carry the cylinder B. Ball bearings are preferably located as shown between the flange *q* and the cap *e* and the clamping ring *e*¹ which arrangement holds the cylinder in place both as to upward or downward movement as will be understood. F is an air valve which may be of well known construction. *f*² is the air pipe leading to one end of the cylinder H. *r* represents a relief from the same end of the cylinder H. *f*³ is the air pipe leading to the other part of the cylinder and *r*¹ is the relief from the corresponding end of the cylinder. The construction of the valve F is such that when air is admitted from the reservoir H¹ through the pipe *f*¹ to the pipe *f*² the exhaust from the other end of the cylinder H takes place through *r*¹ and when air is admitted to the pipe *f*³ the exhaust from the opposite end takes place through *r*. D is a case containing a crank arm *d* which serves to reciprocate the sliding piece or bolt *d*¹. When the said sliding piece *d*¹ is pushed forward into the cylinder by the crank action, as is shown in dotted lines, it forms a stop which prevents the tube A being withdrawn further than position No. 2 above referred to. When the sliding piece is withdrawn into the casing D its inner face coincides with the form of the cylinder and permits the passage of the piston *a*.

The operation is as follows:—Assume for the purpose

of illustration that the boat is intending to make an attack upon another ship. The boat is running along with the observing instrument above the surface, as shown in position No. 1. The enemy is sighted and it is desired to withdraw the instrument entirely below the surface of the water so as to prevent any wake or disturbance of the water which would betray the presence of the submarine. The handle controlling the valve F is now turned to the proper position and air is admitted into the end of the air cylinder H next to the hydraulic cylinder G, and the hydraulic piston, shown in dotted lines, is thereby caused to travel to the opposite end of the cylinder G, which withdraws the hydraulic fluid from beneath the piston *a* and tends to create a vacuum below said piston so that the sighting tube is consequently withdrawn into position No. 2, whereupon the valve M immediately closes and seals the upper end of the guide piece C. The direction of the enemy having been first ascertained, the submarine may now be put on a course designed to intercept the enemy, still maintaining the same depth of submergence. It is now possible to take instant observations from time to time without exposing anything above the surface except for a brief moment. When it is desired to take an observation the instrument is first pointed in the direction in which the enemy is known to be. The observer puts his eye to the eye-piece and turns the handle of the valve F whereupon a stroke of the air piston in the cylinder H acting through the medium of the hydraulic fluid passing through the pipe *g'* shoots the observing instrument above the surface again and the opening in the tube A is brought opposite the eye piece so that vision is secured. A turn of the valve F again withdraws the instrument as previously described.

From experiments it is found practical to take an observation during the brief interval of one second. The rapidity with which the sighting tube may be elevated or depressed depends upon the power available and the size of the pipe *g'*. This pipe *g'* is provided with a throttling-valve *g* whereby the speed of flow of hydraulic fluid may be regulated.

If the objective glasses become dirty or clouded from the drying of salt spray on the surface of the same or from any other cause and it is desired to clean them, the sliding piece *d'* is withdrawn into the case D and the sighting tube A is withdrawn to the position No. 3 as shown

in Fig. 2. This brings the objective glass inside the conning tower where the surface of the lens may, of course, be readily cleaned.

If it is desired to remove the sighting tube A for repairs or to replace it by another the cylinder head E² at the base of the cylinder carrier base E is removed and the tube may be entirely withdrawn.

While I have described in the foregoing specification the construction of parts preferred I am aware that numerous changes of construction and operation may be made without departing from the spirit of the invention, and I, therefore, do not wish myself to be understood as limiting myself by the positive terms employed in connection with the description, excepting such as the state of the art may require.

Having now described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. Apparatus for taking observations from a submarine vessel when submerged, comprising a sighting tube, means to project it into the field of vision and to withdraw it wholly therefrom, including a cylinder mounted upon anti-friction bearings and capable of being rotated so as to bring the sighting tube in conformity to the course of the vessel with relation to the sighted object.

2. Apparatus for taking observations from a submarine vessel when submerged, comprising a sighting tube, means to project it into the field of vision and to withdraw it wholly therefrom, including a cylinder, in which said sighting tube is slidable longitudinally and held against independent rotary movement, said cylinder mounted to move rotatably.

3. Apparatus for taking observations from a submarine vessel when submerged, comprising a sighting tube, hydraulic apparatus to project it into the field of vision and to withdraw it wholly therefrom, including a rotatable cylinder by which the sighting tube is carried and in which it has an independent right line up and down movement, and means to restrain the sighting tube from independent rotation in said cylinder, the rotation of the cylinder serving to turn the sighting tube in the direction of the object sought.

4. A periscope having a power cylinder, a base for said power cylinder in which the cylinder is mounted fluid-tight, an anti-friction bearing connecting the cylinder and its base and admitting of the rotation of the cylinder in the base and a sighting tube mounted in the cylinder and retained therein against independent rotary movement.

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

Witnesses:
WOLDEMAR HAUPT
HENRY HASPER.

SIMON LAKE.