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APPARATUS FOR TAKING OBSERVATIONS FROM A SUBMARINE VESSEL.

APPLICATION FILED APR. 27, 1906.

PATENTED OCT. 15, 1907.

Fig. 1.

Fig. 2.

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Application filed, April 27, 1906. Serial No. 315,917.

To all whom it may concern:

Be it known that I, Simon Lake, of the United States of America, and a citizen 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 is an Improved system of installation of periscopes, ormilloscopes, and other observing instruments in use 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The invention consists of a sighting tube adapted to be projected above the water from a submerged vessel and to be withdrawn into the vessel as desired, and mounted in such a way as to be turned around at pleasure so that the location of an object having been noted, the vessel may be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direction, with respect to such object, and the sighting tube turned to face the object and then projected and again withdrawn without loss of time and at a minimum risk of detection.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.

Figure 2 is an enlarged sectional view of the automatic closing valve and stuffing box located at the top of the conning tower. Figure 3 is an enlarged sectional view of the lower end of the sighting tube and the upper end of the carriage or guiding cylinder. Figure 4 is a sectional view of a part of the guiding cylinder through the line x-y of Figure 3. Figure 5 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 Figure 1 as illustrated, so that the upper leaves 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 round or conical cap at the top, the construction being such that the tube will readily pass through the stuffing box C as shown in Figure 2. The stuffing box is fitted with packing rings J of any well-known construction, which serve to prevent water from penetrating into the interior of the boat.

Figure 3 shows a hydraulic cylinder G with a pipe P leading to the elevating cylinder D. 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 H 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. In Figure 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 Figure 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. O is the lower portion of the stuffing box and guide also fitted with packing rings. P is the pet cock of the drain pipe. D is an air relief valve.

Referred to Figures 3 and 4, B represents the guiding cylinder. O is the cylinder head provided with packing rings B through which the sighting tube A passes. A is a piston screwed on the lower end of the sighting tube A. This piston B is provided with a cup leather packing ring held in place by the disk D. O 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 E. The cylinder head B carries the eye-piece B 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 in line with the same when the sighting tube A is at its highest point of elevation.

Referred to Figure 4 the lower end of the cylinder D is formed with an external flange q and is carried in the base piece E. Q is a ring which holds in place the cup leather packing ring q. O is a cap which forms a bearing to carry the cylinder D. Ball bearings are preferably located as shown between the flange q and the cap O and the clamping ring P which arrangement holds the cylinder D in place both as to upward or downward movement as will be understood. P is an air valve which may be of well-known construction. F is the air pipe leading to one end of the cylinder H. T represents a relief from the same end of the cylinder H. D is the air pipe leading to the other part of the cylinder and R 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 R through the pipe F the exhaust from the opposite end takes place through D. D is a case containing a crank arm d which serves to reciprocate the sliding piece or bolt d. When the said sliding piece D is pulled for the ward into the cylinder by the crank action, as is shown in dotted lines, it forms a stop which prevents the tube D being withdrawn further than position No. 2 above referred to. When the sliding piece is withdrawn into the casing B its inner face coincides with the form of the cylinder and permits the passage of the piston c.

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 pres-
ence of the submarine. The handle controlling the
valve F is now turned to the proper position and air
is admitted into the chamber of the cylinder H next to the
hydraulic cylinder G, and the hydraulic piston, shown in
dotted lines, is thereby caused to move to the op-
posite end of the cylinder G, which withdraws the hy-
draulic 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 F is immediately closed and seals the
upper end of the guide piece G. The direction of the
course has been determined, the submarine
may now be put on a course designed to intercept the
enemy, still maintaining the same depth of submer-
gence. 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 de-
sired 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 eyepiece and
turns the handle of the valve F wherupon a stroke of the
air piston in the cylinder H acting through the
valve F again withdraws the instrument as pro-

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 piston g. This piston g is provided with
a throttling-valve g whereby the speed of flow of hydra-
ulic 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 slid-
ing piece d is withdrawn into the case D and the sight-
ing 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

If it is desired to remove the sighting tube A for re-

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 into 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 stored in forward and against indepen-
dent rotary movement, said cylinder mounted to
move rotatably.

3. Apparatus for taking observations from a submarine
vessel when submerged, comprising a sighting tube, hy-
draulic apparatus to project it into the field of vision and
to withdraw it wholly therefrom, including a rotating
cylinder by which the sighting tube is carried and by
which it has an independent right line up and down move-
ment, and means to restrain the sighting tube from inde-
pendent 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-
light, 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.

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