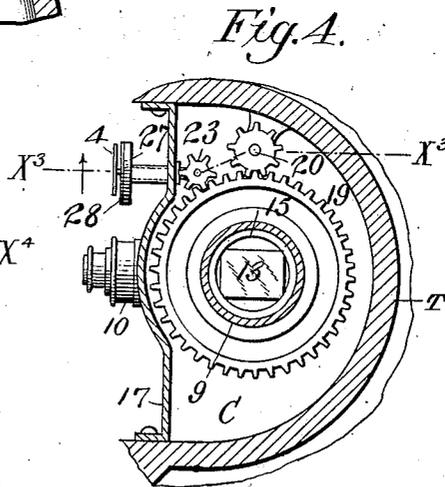
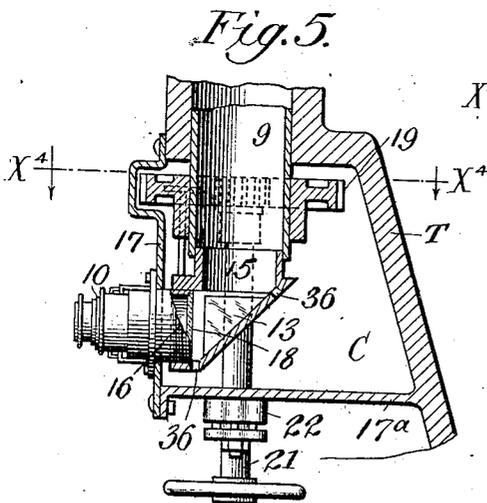
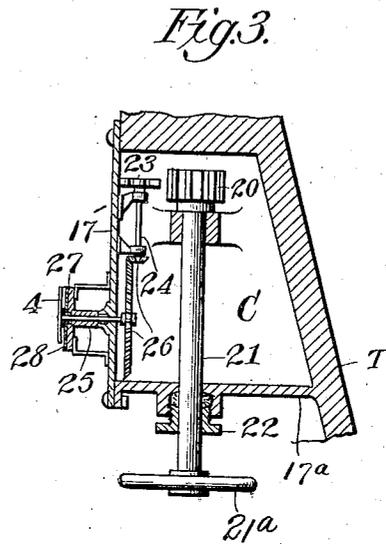
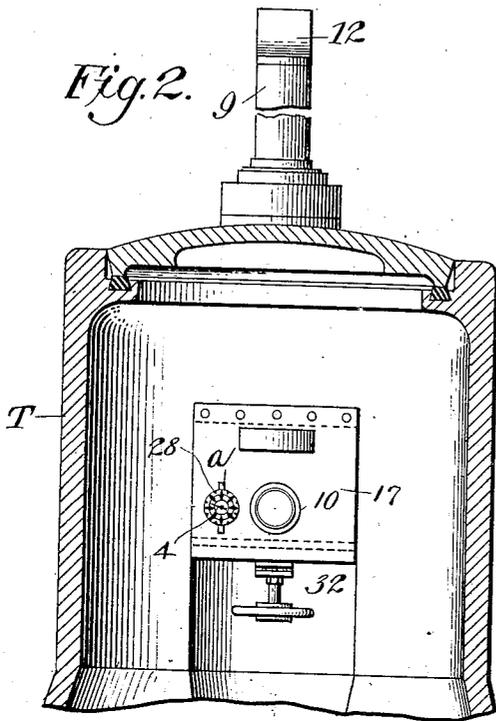


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 DEVICE FOR CONNING SUBMARINE BOATS.
 APPLICATION FILED DEC. 29, 1904.

954,707.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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DEVICE FOR CONNING SUBMARINE BOATS.

954,707.

Specification of Letters Patent. Patented Apr. 12, 1910.

Original application filed May 26, 1904, Serial No. 209,978. Divided and this application filed December 29, 1904. Serial No. 232,797.

To all whom it may concern:

Be it known that I, LAWRENCE Y. SPEAR, a citizen of the United States, residing at Greenport, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Devices for Conning Submarine Boats, of which the following is a specification.

This invention relates to the class of submarine and submergible boats wherein the boat is fitted with optical instruments or devices known as altiscopes, periscopes, etc., which are designed to enable the steersman or observer in the vessel to observe surrounding objects from a point considerably below the level of the water.

The object of the present invention is to improve the construction, mounting and operativeness of the conning means or devices, as will be hereinafter explained. The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which illustrate an embodiment of the invention—Figure 1 is a sectional elevation of the device taken along the axis of the boat, showing the conning tower of the boat, and the optical tube in section; and Fig. 2 is a sectional view showing the devices embodied in this application in elevation as seen from the left in Fig. 1. Figs. 3, 4 and 5 are enlarged fragmentary detail views illustrating the construction of the lower part of the optical tube and the mechanism for operating it. Fig. 3 shows the gearing for driving the indicator taken at x^3 in Fig. 4; Fig. 4 is a section at line x^4 in Fig. 5, and Fig. 5 is an enlarged sectional view of the lower part of the optical tube and the eyepiece. Figs. 6 and 7 are enlarged detail views of the indicator, the former being a section and the latter a face view.

B designates (in Fig. 1) a fragment of the hull of the boat, and T a part of the conning tower mounted thereon. At the side of the turret, or tower T, and preferably in a vertical plane passing through the boat's longitudinal axis forward, is an upright socket or sheath 8, to receive an optical tube 9 (see in axial longitudinal section in Fig. 1). The socket 8 may be cast or made in one piece with the tower, as

shown, but this integral construction is not essential to the present invention. The optical tube is fitted or supplied in any desired manner with reflectors, and if desired, with lenses, in order to receive at its upper exterior end the light rays from an observed object and deflect the same down the tube and from its lower, interior end into a horizontal eyepiece 10. The tube 9 is fitted removably in its socket and mounted rotatably about its vertical axis, and it has the necessary means for preventing access of water to the outer end of the socket and to enable it to rotate axially without undue friction. The means for effecting these ends, illustrated in Fig. 1, are substantially the same as those shown in my United States Patent No. 751,569, and are not herein claimed.

In the present construction the reflector at the upper and outer end of the optical tube, is a prism 11, inclosed in a box or casing 12, borne on the upper end of the tube; this prism turns with the tube so as to face in any direction desired. The lower reflector, however, which is a prism 13, is not carried by nor rotative with the tube 9, but is set or fitted in a fixed casting or hollow support 14, (seen in section in Fig. 1), which has on its upper face a short cylindrical tube 15, that fits accurately into the lower end of the optical tube and forms a bearing to support and center the lower end of the tube 9 and connect it operatively with the eyepiece 10 and lower prism 13. The socket 16 of the eyepiece is screwed or otherwise secured in the inner upright face of the casting 14, and has a watertight connection with the upright front plate 17 of a chamber C, which incloses the lower prism 13, and the adjacent parts. The inner end of the eyepiece socket—that is to say, the end within the chamber C,—is closed water-tight by a transparent plate 18, seen in Fig. 5. The tube of the eyepiece may be telescopically slidable in the socket 16.

On the optical tube 9, within the chamber C, is secured a gear wheel 19, which gears with a toothed wheel 20, fixed on the upper part of an upright shaft 21, which passes down through the bottom plate 17^a of the chamber C, and is rotatable in a stuffing-box 22 therein. The shaft 21 may be ro-

tated by any known means as a crank or hand-wheel 21^a thereon. It is not material to this invention how this shaft is rotated; it is only necessary to explain that through the medium of this shaft and the gears the optical tube may be turned about its upright axis, while the lower prism or reflector 13 remains stationary with respect to the tube 9.

In order that the observer may note the bearing of the object of which he sees the image through the eyepiece, the following means are employed. Within the chamber C is a pinion 23, gearing with the wheel 19, and serving to transmit motion through shafts 24 and 25, and gear wheels 26 (Fig. 3), to the hand or pointer 4 of an indicator on the front plate of the chamber C. This indicator comprises a disk 27, with a sleeve-like stem in which the shaft 25, bearing the pointer, rotates. This disk is stationary, and in its face is mounted rotatively but frictionally, a compass card 28. This card may be turned about over the face of the disk but will be held by suitable frictional means in any position desired. (See Fig. 6). On this card is a lubber's line or mark *a* which, when the instrument has its optical tube so turned that the upper reflector or prism 11 receives the light rays from an object which is directly ahead, will be co-incident with the pointer 4 of the indicator; and in the optical tube is a cross wire *w*, which, under the same circumstances, will be co-incident with a vertical plane passing through the longitudinal axis of the boat. This wire divides the field of view into two equal parts, and serves as a direction index to show the direction in which the object lens is pointed. That is to say, when the object lens is pointed dead ahead the horizon appears as a horizontal line and the cross-wire as a vertical line. As the object lens is rotated the horizon line assumes an inclined position, remaining however, at right angles to the line formed by the cross-wire. When the object lens is pointing directly to the right, for example, the horizon appears as a vertical line and the line formed by the cross-wire is horizontal. When the periscope is pointing directly aft the horizon is again a horizontal line, and the line formed by the cross-wire is vertical, but the horizon is inverted.

This construction and disposition of parts is intended to permit the commanding officer of the boat, hereinbefore called the observer, to con the vessel when on the surface, awash, or submerged, either through the usual sighting ports of the conning tower or by means of the optical tube. He may search the horizon with the optical tube and take compass bearings with the combined dummy compass and indicator gear.

The present application is a division of my co-pending application Serial Number 65 209,978, filed May 26, 1904.

Having thus described my invention, I claim—

1. A submarine boat having an upright socket, a periscope tube mounted in said socket for axial rotation therein and provided at its upper end with a deflecting reflector for the light rays received, an eye piece extending laterally from the lower end of said tube, a lower deflecting reflector which deflects the light rays to said eye piece, a pointer moving as the optical tube moves, and a stationary scale associated with the pointer.

2. A submarine boat having an upright socket, a periscope tube mounted in said socket for axial rotation therein and provided at its upper end with a deflecting reflector for the light rays received, an eye piece extending laterally from the lower end of said tube, a lower deflecting reflector which deflects the light rays to said eye-piece, an indicator having a pointer which is driven by the rotation of the optical tube, and a rotatably adjustable compass card traversed by said pointer.

3. A submarine boat having a periscope tube provided with an object lens at its upper end, means for rotating the periscope tube on a vertical axis to sweep the horizon, a stationary eye piece, means within the periscope for deflecting the light rays to the eye-piece, a cross-wire fixed in the periscope tube, and a scale and pointer, one of which is fixed and the other of which is rotatable with the periscope tube, substantially as described.

4. A submarine boat having a periscope tube provided with an object lens at its upper end, means for rotating the periscope tube on a vertical axis to sweep the horizon, a stationary eye-piece, means within the periscope for deflecting the light rays to the eye-piece, a cross-wire fixed in the periscope tube and an indicator comprising a pointer which rotates with the periscope tube and a rotatably adjustable compass card traversed by said pointer, substantially as described.

5. A submarine boat, having an upright socket to receive the optical tube of an altiscope or like instrument, the said tube, axially rotative in said socket and provided at its upper end with a deflecting reflector for the image received, means for rotating said tube, a lower fixed deflecting reflector for deflecting the image to an eye piece, the said eye piece, and a cross wire fixed in the optical tube.

In witness whereof I have hereunto signed my name this 24th day of December 1904, in the presence of two subscribing witnesses.

LAWRENCE Y. SPEAR.

Witnesses:

BERGESS A. CRUDEN,
LEW. C. MOORE.