

No. 749,754.

PATENTED JAN. 19, 1904.

L. Y. SPEAR.
ALTISCOPE FOR SUBMARINE BOATS.
APPLICATION FILED MAR. 14, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

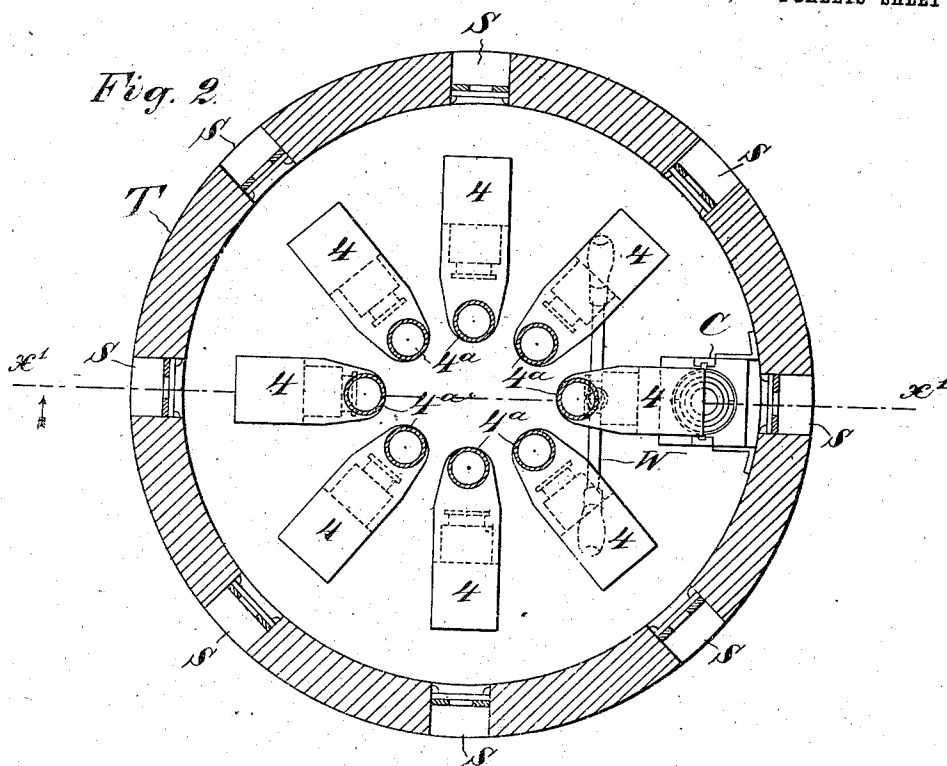
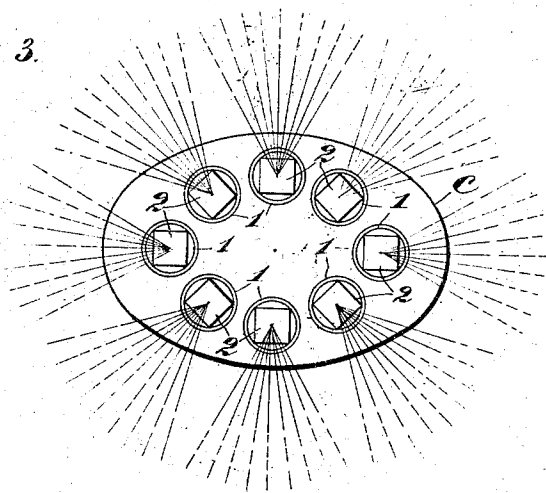


Fig. 3.



WITNESSES:

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LAWRENCE Y. SPEAR, OF GREENPORT, NEW YORK, ASSIGNOR TO ELECTRIC BOAT COMPANY, A CORPORATION OF NEW JERSEY.

ALTISCOPE FOR SUBMARINE BOATS.

SPECIFICATION forming part of Letters Patent No. 749,754, dated January 19, 1904.

Application filed March 14, 1903. Serial No. 147,734. (No model.)

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 Altiscopes for Submarine Boats, of which the following is a specification.

This invention relates to the class of devices known as "altiscopes" and "periscopes" which are adapted to receive an image and deflect it down from a considerable elevation to a level with the eye of the observer, who may be in a submerged or partly-submerged boat or vessel; and the object of the present invention is to provide a group deflecting optical tubes so disposed that the observer or steersman in the conning-tower or turret of a submarine or other boat may observe or scan the water in any desired direction and ascertain by comparison with his compass in what direction an object bears. This he effects without shifting the optical tubes axially and without materially shifting his position in the boat.

In the accompanying drawings, which serve to illustrate an embodiment of the invention, Figure 1 is a vertical section of the device, taken substantially in the plane indicated by line *z-z'* in Fig. 2; and Fig. 2 is a horizontal section of the same, taken in substantially the plane indicated by line *z-z'* in Fig. 1. Fig. 3 is a plan of the altiscope, showing its top.

T designates a conning-tower or turret of a submarine or similar boat to which the altiscope is applied. This turret may be circular in plan, and it is so disposed or mounted on the boat that the line of the section in Fig. 1 is taken vertically along the longitudinal axis of the boat. In the walls of the turret are sight-holes S, placed at suitable intervals. C designates the compass, and W a part of the steering-wheel. All of these parts may be constructed and disposed in the usual way or in any way preferred.

Mounted in the crown or top of the turret is a group of optical tubes 1, forming the altiscope. Preferably these will be grouped,

as best seen in Fig. 3, in an elliptical field, where seen in plan, and be inclosed below their tops in a casing *c*, which is also of elliptical form in plan. The object of this is to permit the altiscope to move through the water with less resistance and less disturbance of the water than would be the case if the series of tubes were disposed in a circle. The tubes are also grouped closely together for the same reason—viz., that the inclosing casing may not encounter undue resistance in its movement through the water. The optical tubes are all fitted up in the same way, and each has at its upper end a receiving-prism or oblique mirror 2 and suitable lenses 3. At their lower ends the optical tubes are secured in apertures in the top or crown of the turret, and each tube connects at said lower end with an angular continuation tube 4, the form of which will be best seen in the sectional view, Fig. 1. It is not very important just how this angular tube is constructed, but as here shown the exterior tube 1 has at its lower end a screw-threaded nipple 1^a, which screws down into the top plate of the turret and the inner angular tube 4 has a nipple 4^a, which screws upward into the nipple 1^a. In the upper horizontal portion of the tube 4 are two oblique mirrors 5^a and 5^b, and the latter mirror deflects the image received down to an oblique mirror 5^c, which again deflects it to the eyepiece of a horizontally-disposed telescope 5, fixed to the pendent or vertical portion of the tube, in which the mirror 5^c is mounted. The tube 4 may be square and of sheet metal. The dot-and-dash line at the right in Fig. 1 shows how the image is received and deflected down to the telescope.

The object of the angular tubes 4 in the turret or conning-tower is to separate the several telescopes 5, so that the observer may apply his eye to either of them, as will be readily understood. These telescopes are arranged in a circle about and concentric with the vertical axis of the turret, as herein shown, and there are eight of the optical tubes, with their receiving mirrors or prisms so disposed as to face in as many radial directions, and thus take

in or embrace the view from all points of the compass, as indicated by the convergent rays seen in Fig. 3.

It is not important to my invention just how many of these optical tubes are employed in the group or series nor whether they are mounted in or on a conning-tower or turret of the particular form or kind shown. The object is to provide a group of optical tubes with their receiving-mirrors facing outwardly in such a manner as to practically afford observation of the surface of the water in all directions.

Having thus described my invention, I claim—

1. An altiscope for submarine and other boats, comprising a group of upright, altiscope optical tubes connected with the turret or conning-tower of the boat, said tubes having their image-receiving mirrors faced outwardly in different directions and having their observing-telescopes within the turret directed radially inward, substantially as set forth.

2. An altiscope for submarine and other boats, comprising a group of upright, altiscope optical tubes mounted on the top of a turret of the boat with their image-receiving

mirrors facing outwardly in different directions, angular tubes 4 within the turret and connected optically with the respective outer optical tubes, oblique mirrors in said angular tubes, and telescopes connected with the latter for observation, substantially as set forth.

3. The combination with a turret of a submarine boat, of a group of upright optical tubes mounted on turret in elliptical order as described, each of said tubes having at its upper end an oblique receiving-mirror which faces radially outward from the center of the group, the angular tubes 4 within the turret and connected optically with the respective outer tubes, the deflecting-mirrors in said tubes, and the telescopes at the lower extremities of said tubes, said telescopes being disposed in a circle and having their axes radial, substantially as set forth.

In witness whereof I have hereunto signed my name, this 26th day of February, 1903, in the presence of two subscribing witnesses.

LAWRENCE Y. SPEAR.

Witnesses:

H. G. TUTHILL,
F. L. BRAKE.