

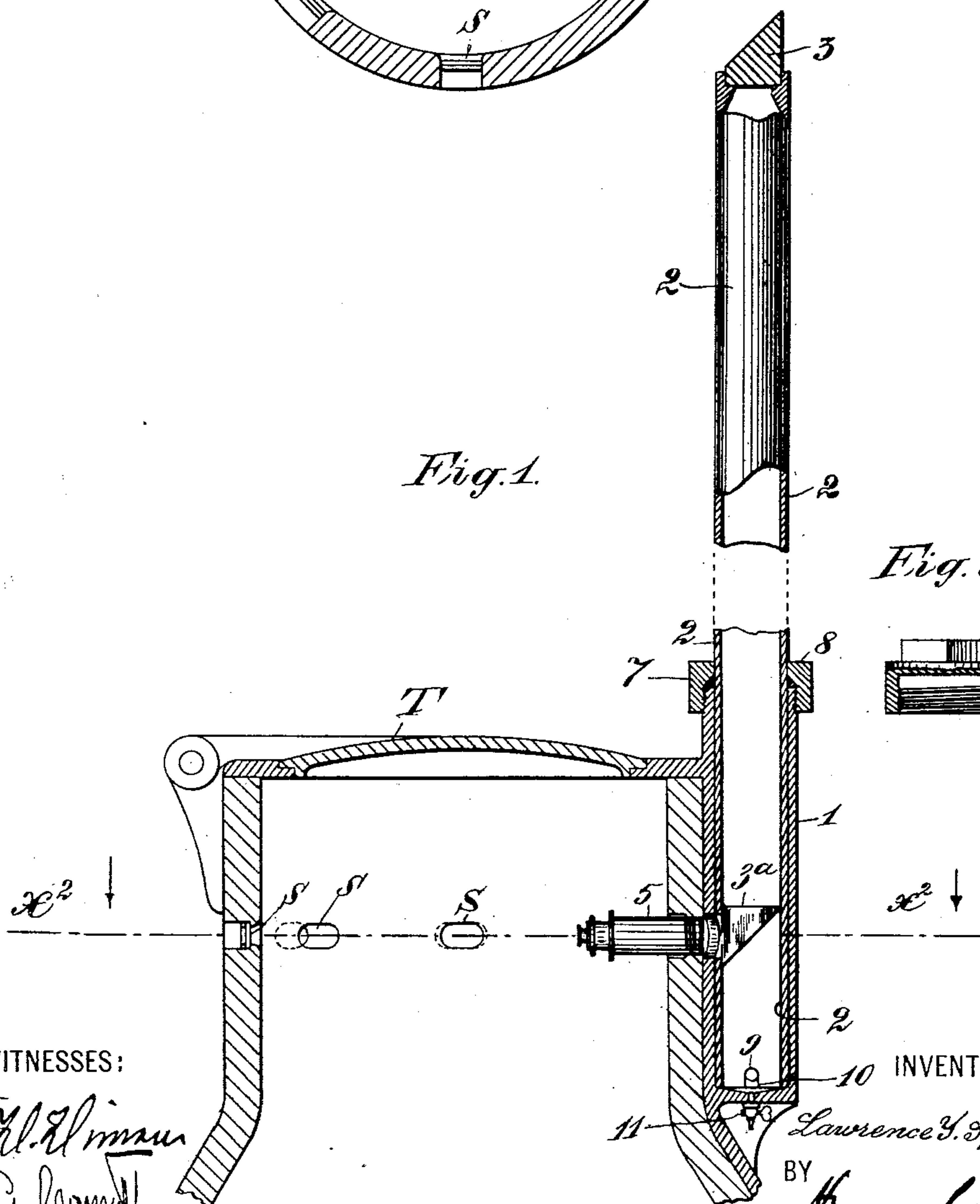
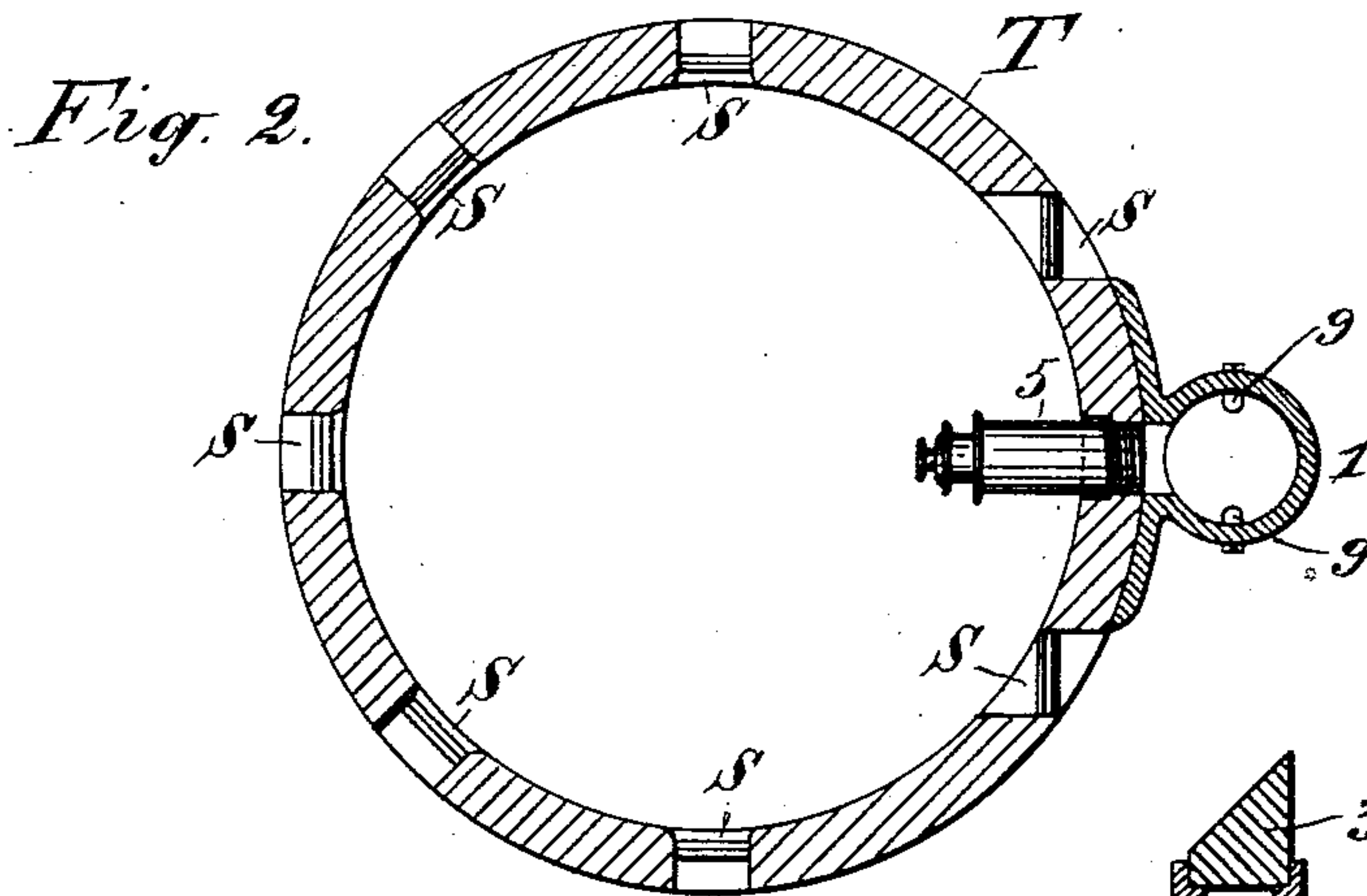
No. 751,569.

PATENTED FEB. 9, 1904.

L. Y. SPEAR.  
ALTISCOPE OR THE LIKE.  
APPLICATION FILED MAR. 14, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

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INVENTOR

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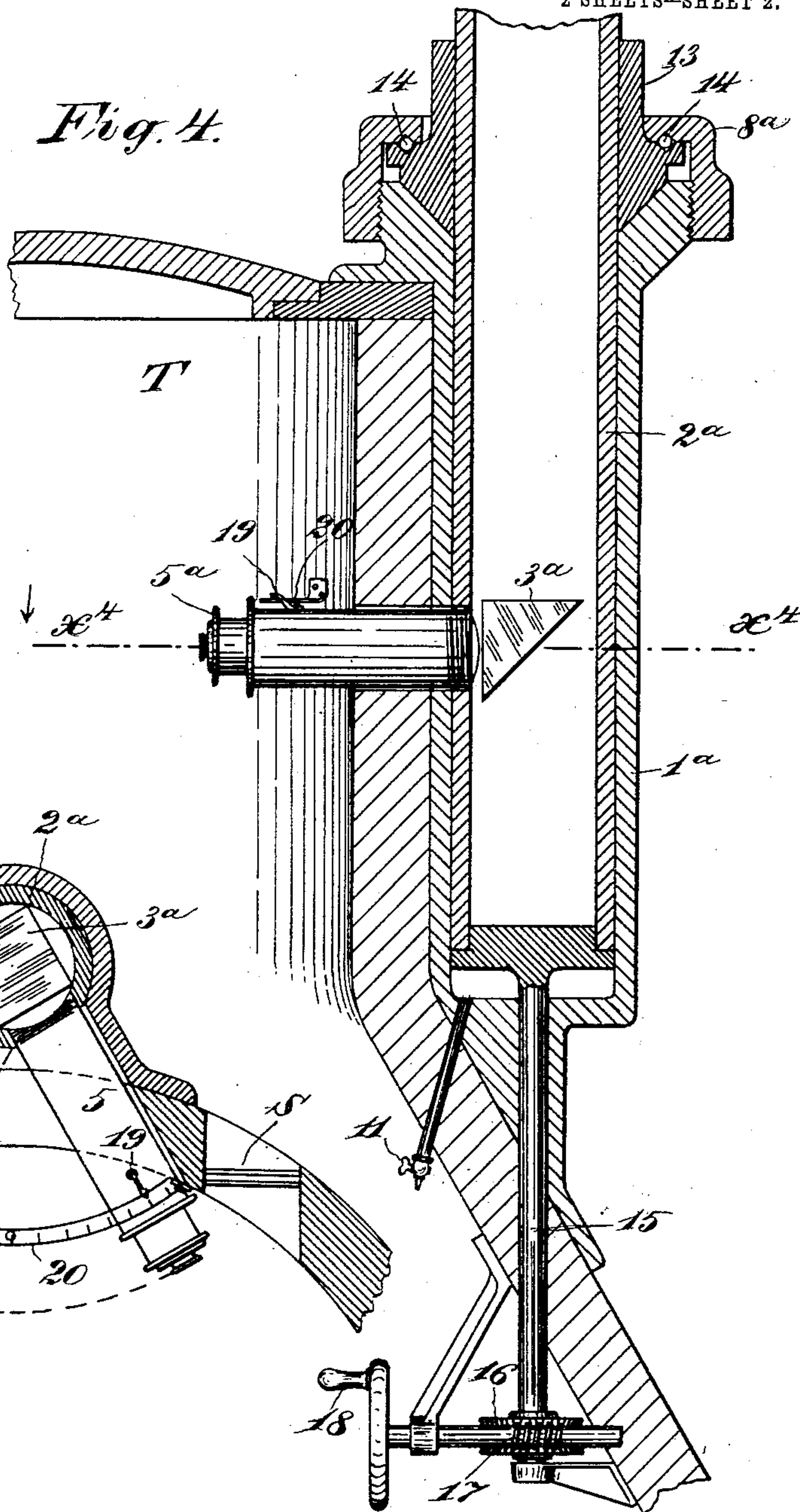
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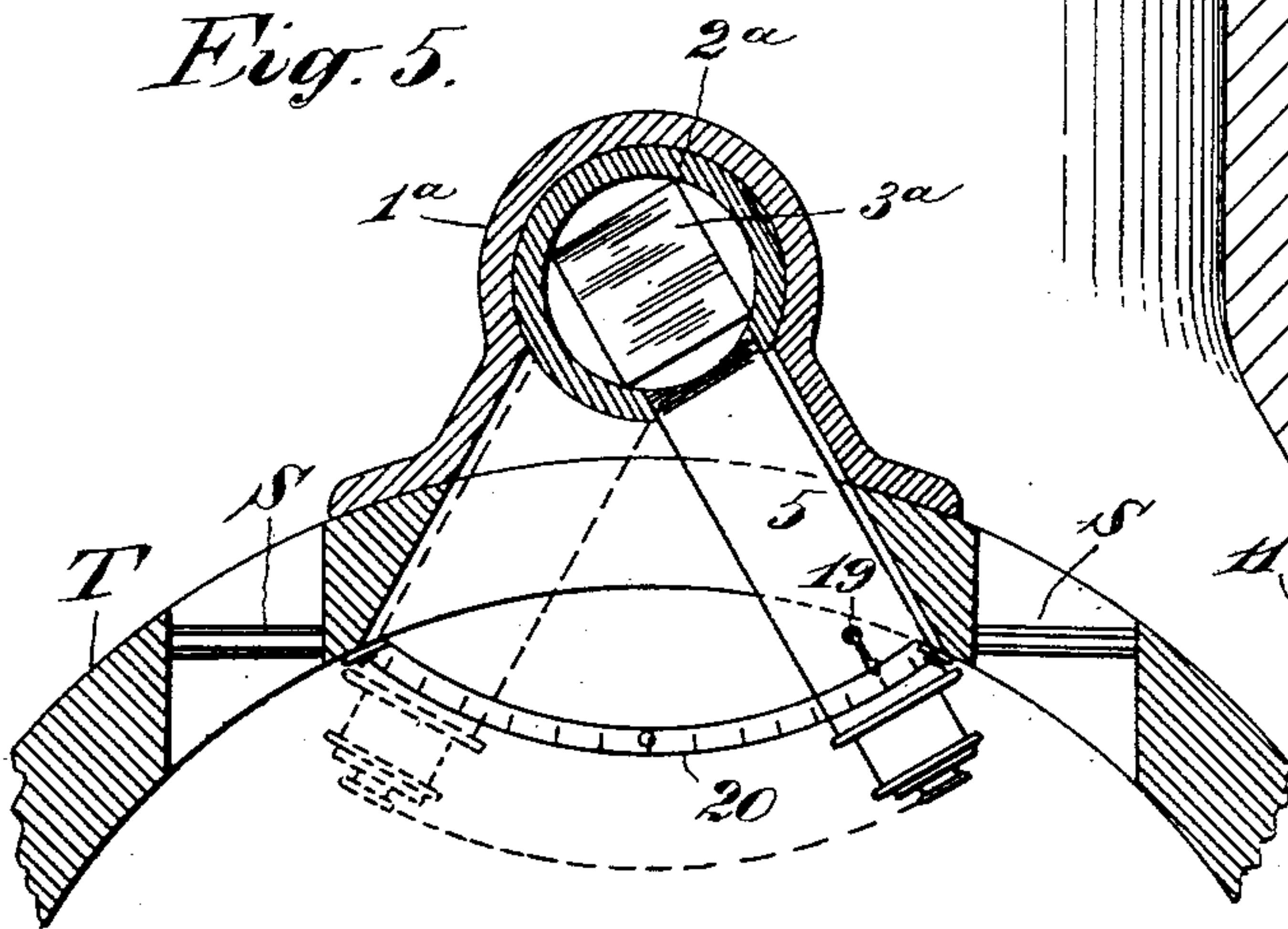
NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

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

## ALTISCOPE OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 751,569, dated February 9, 1904.

Application filed March 14, 1903. Serial No. 147,735. (No model.)

*To all whom it may concern:*

Be it known that I, LAWRENCE Y. SPEAR, a citizen of the United States, residing in Greenport, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Altiscopes or the Like, of which the following is a specification.

This invention relates to the class of optical devices known as "altiscopes" and "periscopes." Such a device connected with the conning-tower, turret, or sighting-hood of a submarine or mainly submerged vessel is designed to enable the steersman or observer in the vessel and whose head is below or near the level of the water of flotation to observe surrounding objects from a point considerably above the level of the water.

The object of the present invention is to improve the mountings and construction of the instrument, as will be hereinafter explained.

In the accompanying drawings several embodiments of the invention are illustrated.

Figure 1 is a vertical axial section of the instrument and the turret of the vessel. Fig. 2 is a horizontal section taken substantially at line  $x^2$  in Fig. 1, and Fig. 3 is a sectional view of the cap for closing the socket or sheath. These views show the invention in its simplest form. Fig. 4 is a sectional view similar to Fig. 1, and Fig. 5 is a horizontal section substantially at line  $x^5$  in Fig. 4. These views illustrate a form of the instrument or device where the optical tube rotates axially through a part of a circle.

Referring, primarily, to the construction illustrated in Figs. 1, 2, and 3, T designates the conning-tower or turret of a submarine or submergible boat or vessel, and S the sight-apertures in the walls of the same. As herein shown, this turret is circular in plan; but this is not essential to my invention.

At the side of the tower T and preferably disposed in the vertical plane passing through the boat's longitudinal axis forward is secured to the tower an upright sheath or socket 1 to receive the optical tube 2. This tube is fitted at its upper end or head with a prism 3 to receive the image and deflect it down through

the tube 2 to a similar prism 3<sup>a</sup>, which deflects the image again into a substantially horizontal plane, so that it may be observed by a telescope 5, fitted into an aperture in the wall of the turret.

The telescope-tube is fitted or screwed into the wall of the turret, so as to effect a watertight connection, and the tubular sheath 1 is bored out to snugly fit the optical tube 2, which latter has about it a circumferential packing-ring 7, at the top of the sheath on which bears a screw-collar 8, thus making a water-tight joint about the tube 2. At the bottom of the sheath 1 are one or more guide-pins or projections 9, which engage corresponding recesses 10 in the lower end of the tube 2, and thus always insure that the prisms in the tube shall face in the proper direction and insure also that the sight-aperture on the side of the tube 2 below shall be always in register with the telescope 5. In the bottom of the sheath is a drainage-cock 11 to draw off any water that may accidentally enter and collect in the sheath. When the optical tube is removed from the sheath, the top of the latter is tightly closed by a screw-cap, as 12. (Seen detached in Fig. 3.) The optical tube 2 is omitted from Fig. 2.

Referring now to the embodiment illustrated in Figs. 4 and 5 where the optical tube (of which only the lower part is shown) is rotatively mounted in the sheath, the said tube has fixed on it a conical sleeve 13, and a screw-collar 8<sup>a</sup> screws down onto the top of the said sleeve and presses it down into a conical seat in the sheath 1<sup>a</sup>. Balls 14 may be interposed between the collar and sleeve to lessen the friction when the optical tube 2<sup>a</sup> is rotated. At its lower end said tube has a stem 15, which extends into the turret T, through its flared base portion, and carries on said inner end a worm-wheel 16, which is engaged by a rotatively-mounted worm or screw 17, provided with a crank 18. By means of this worm-gearing the optical tube may be rotated axially. In this construction the telescope 5<sup>a</sup> extends through the walls of the turret and sheath and screws into the optical tube and



the coincident apertures in the walls of the turret and sheath, through which the telescope extends, are enlarged laterally in a suitable manner, as represented in Fig. 5, so as to  
5 allow the telescope to swing horizontally when the optical tube is rotated. In order that the extent of angular movement of the optical tube may be conveniently measured, the telescope carries a pointer 19, which when the  
10 telescope is turned traverses a scale 20, which may be calibrated to degrees. This scale is mounted on the wall of the turret T. It may be explained here that in the sectional view, Fig. 5, only the walls of the turret, the sheath,  
15 and the optical tube are represented in section. The telescope, the scale, and the deflecting prism are represented in plan. The partial axial rotation of the optical tube imparts greater range of vision than in the case where  
20 the tube is non-rotative, and the scale and pointer 19 gives the bearing of the object observed with reference to the course of the boat or vessel. The prisms may be replaced by oblique mirrors, which will serve the same  
25 purpose as deflectors; but for practical reasons the prism is preferred.

Having thus described my invention, I claim—

1. The combination with the turret or con-  
30 nning-tower, and an upright socket connected with the said tower, of an altiscope comprising an optical tube mounted removably in said socket, a telescope within the turret and extending out through a slot in the wall of said  
35 turret and sheath and connected optically with

said optical tube, and means for excluding water from said socket.

2. The combination with the turret or con-  
ning-tower, and an upright socket connected  
40 with the tower, of an altiscope mounted removably in said socket and axially rotative therein, a telescope operatively connected with said tube and turning with it, and a scale and  
45 pointer to indicate the extent to which the optical tube is rotated in either direction from the normal.

3. The combination with the turret or con-  
ning-tower, and an upright socket connected  
50 with the tower, of an optical tube mounted removably and rotatively in said socket, means for turning said tube axially in the socket, means for closing the socket against the entry  
55 of water thereto, a telescope which projects through an aperture in the wall of the tower and is connected with the said optical tube, a scale 20 which the telescope traverses, and a  
pointer 19 on the telescope.

4. A conning-tower, an upright socket exterior to and connected with the said tower,  
60 an altiscope mounted removably in said socket and means within the tower for observing the image deflected down to the range of vision by the altiscope.

In witness whereof I have hereunto signed  
my name, this 11th day of March, 1903, in the  
65 presence of two subscribing witnesses.

LAWRENCE Y. SPEAR.

Witnesses:

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