

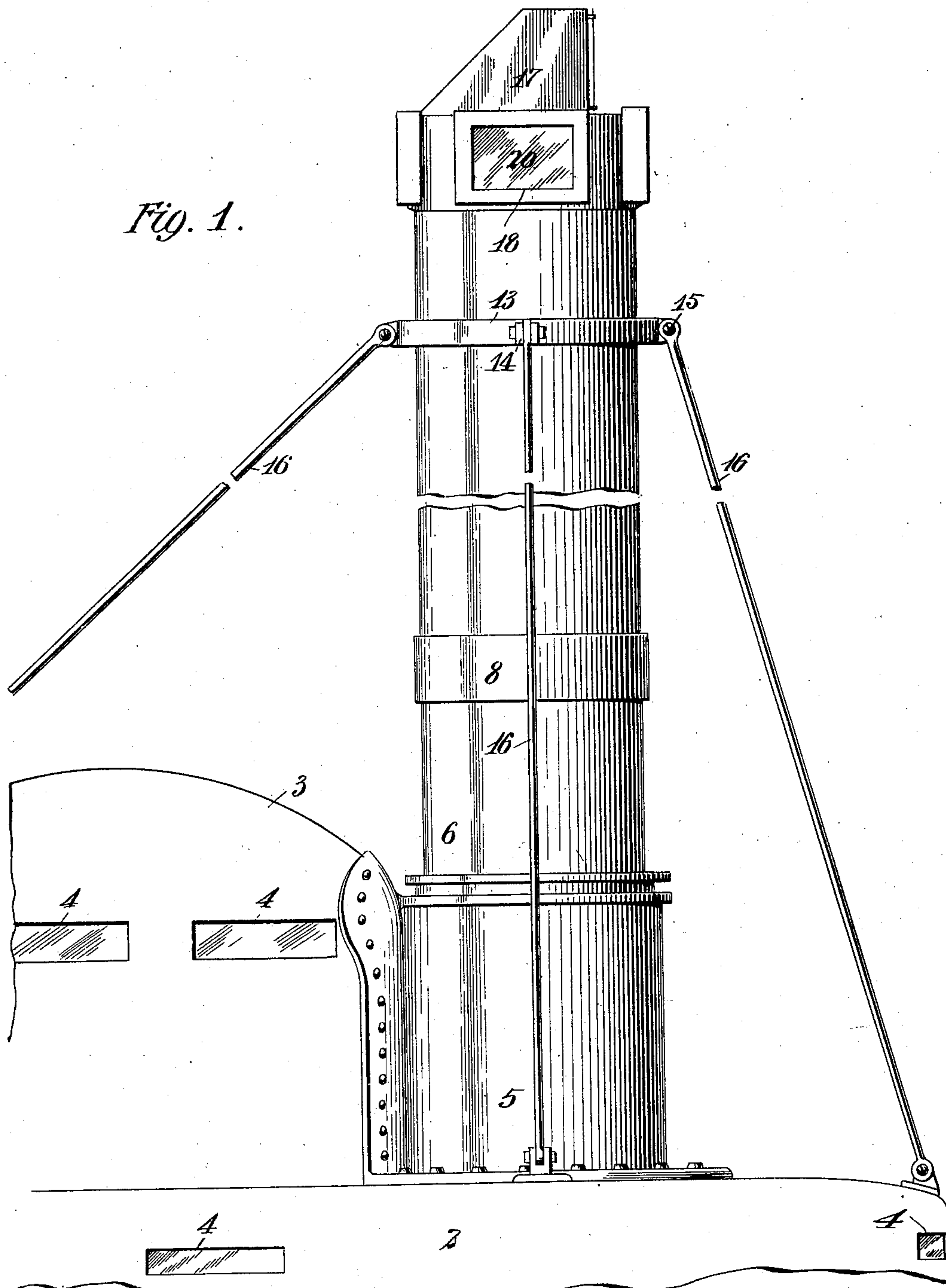
No. 754,464.

PATENTED MAR. 15, 1904.

S. LAKE.  
SIGHTING OR OBSERVING TUBE FOR VESSELS.  
APPLICATION FILED NOV. 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses  
*Frank D. Ober*  
*H. A. Kornemann.*

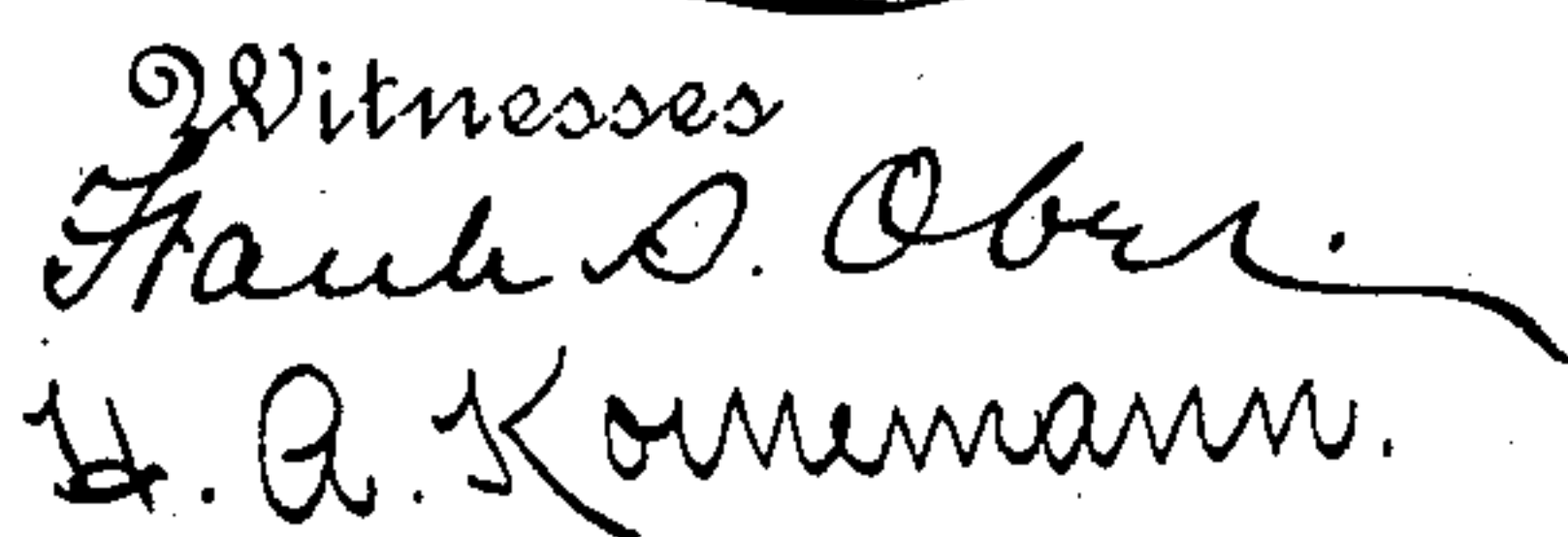
Inventor  
*Simon Lake,*  
By his Attorney *Henry J. Miller.*

PATENTED MAR. 15, 1904.

### SIGHTING OR OBSERVING TUBE FOR VESSELS.

NO MODEL.

2 SHEETS—SHEET 2.



Inventor  
Simeon Lake,  
By his Attorney Henry J. Miller.



# UNITED STATES PATENT OFFICE.

SIMON LAKE, OF BRIDGEPORT, CONNECTICUT.

## SIGHTING OR OBSERVING TUBE FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 754,464, dated March 15, 1904.

Application filed November 12, 1903. Serial No. 180,835. (No model.)

*To all whom it may concern:*

Be it known that I, SIMON LAKE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Sighting or Observing Tubes for Vessels, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to an improvement in sighting or observing tubes for vessels, particularly of the class shown and described in the United States Patent No. 725,570, granted to me April 14, 1903; and it has for its primary  
15 object to increase the effectiveness of such devices.

The invention consists partly in a means of maintaining the operative face of the reflecting member in the upper or outer end of the  
20 tube constantly at such inclination, irrespective of the condition of fore-and-aft trim of the vessel, that both the inner end of the tube and the external object to be inspected by the observer within the vessel may be constantly  
25 in range of the same; partly in a gage device for indicating the total submergence of the vessel while the upper portion of the sighting-tube is still in operative relation above the surface of the water; partly in a particular  
30 means of staying the tube while permitting its rotation in respect of the vessel carrying the same, and partly in certain other features of construction, which will be hereinafter described.

35 In the drawings annexed, Figure 1 is an external elevation of the upper portion of a submarine boat provided with a sighting-tube embodying the present invention; and Fig. 2 is a sectional elevation of the same with the  
40 sighting-tube indicated as in operative relation with its upper end portion exposed above the surface of the water, while the lower part of the same, with the vessel by which it is carried, is wholly submerged beneath the surface.  
45 Fig. 3 is a plan of the upper portion of the sighting-tube with the top removed at the line *x x* of Fig. 2 to expose the parts beneath. Figs. 4 and 5 are sectional elevations, respectively, of the lower and upper portions of the

sighting-tube, taken at a right angle to that of Fig. 2.

As herein shown, the conning-tower 2 of the vessel has a sighting-hood 3 with suitable windows or dead-lights 4, having attached to its forward portion a casting 5, constituting  
55 the base portion of the sighting-tube, which is formed in two sections 6 and 7, united together by a coupling 8, preferably formed of a material of less strength than the parts of the tube which it unites, so that in case of  
60 collision during submergence the upper portion 7 of the tube will be broken off without danger to the occupants of the vessel, a glass disk 9, constituting a transparent diaphragm, being mounted in a supporting-ring 10, se-  
65 cured in the lower section 6, serving to prevent the inflow of water to the interior of the boat under such condition, while the base portion 5 is provided with the usual stuffing-box 11, surrounding such member of the tube  
70 for similarly preventing the penetration of water along the exterior of the tube. The tube is provided near the upper end with an external annular flange 12, to which is fitted so as to loosely embrace the tube a collar  
75 13, having a series of projecting lugs 14, to which are connected by pins 15 the eyes of a series of guy ropes or rods 16, shown in Fig. 1 as attached at the other ends to the top of the conning-tower for steadying the project-  
80 ing portion of the tube 6 7, while permitting it to be rotated in performing its normal function. The upper portion of the sighting-tube is surmounted by a cap 17, having a series of lateral openings 18 and a single opening 19,  
85 disposed above and upon the same side as one of the openings of said series, each of said openings being closed to exclude water by means of a glass plate 20. Adjacent each  
90 opening 18 is disposed a glass prism 21, mounted upon a metallic frame 22, swinging upon fixed centers 23, the operative faces of each of said prisms forming the upwardly and outwardly inclined inner walls of the same. Interposed between the glass plate 20 and each  
95 prism 21 of the series is shown a condensing-lens 24, adapted to increase the range of such reflecting member, while reducing the scale



of the image of an external object which it receives through the lateral opening 18 and reflects downwardly through the tube 6 7 upon the receiving-prism 25, which transmits the  
 5 same through the eyepiece 26 to the observer. Adjacent the other opening, 19, in the upper portion of the cap 17 is disposed a glass prism 26, which is also mounted in a frame 27, adapted to swing upon the fixed bearing-centers 28.  
 10 The swinging frames 22 and 27 are provided with crank-pins 29, connected together and to the corresponding pin 30 upon one of the swinging lever-arms 31 in the lower portion of the tube by means of a rod 32, which  
 15 is also shown provided with a suitable coupling for a purpose similar to that of the coupling 8 and located slightly above the transparent partition 9, through which it passes by means of a suitable stuffing-box. The lever-arms 31, in conjunction with the weight 33,  
 20 attached to and connecting the lower ends of the same, together constitute a pendulum which maintains a vertical position in all conditions of trim of the vessel and through the  
 25 connecting-rod 32 operates to tilt the prisms 21 and 26 sufficiently to compensate for any defect in trim of the vessel in the direction faced by the prism 26 and the corresponding primary prism 21 of the series below it, which is  
 30 similarly directed. In order that the compensation afforded by the pendulum shall not be excessive, as would be the case were the inclination of the tilting prisms varied equally with that of the boat, the eccentricity of the  
 35 crank-pins 29 upon the swinging frames 22 and 27 is made double that of the pin 30 upon the pendulum-lever 31, thereby receiving only one-half the degree of oscillation of the pin 30 upon the pivotal screws 34, sustaining the  
 40 pendulum.

To afford facility in picking up an external object by the reflecting member 26 when the latter is directed toward the same general portion of the horizon, the weight 33 is shown  
 45 pivotally connected with a jointed hand-lever 35 36, extended laterally through the cut-away portion 37 of the tube-section 6 into the sighting-hood, where it may be readily manipulated by the lookout operating the sighting-tube.  
 50

As indicated in Fig. 2, the lower portion of the section 6 of the sighting-tube is cut away at 37 to permit the partial rotation of the tube without interference with the fixed eyepiece  
 55 26 and the operating-lever 36, and to effect this rotation the lower end of this tube-section is formed with an axial bearing-stud 38 and with a segmental series of bevel-gear teeth 39, meshing with a bevel-pinion 40,  
 60 mounted upon a spindle 41, having fixed thereon a hand-wheel 42, by which said intermeshing gears may be actuated to turn the tube.

In order to determine from the interior of

the vessel when the boat is traveling in the  
 65 most effective submerged condition while still maintaining a view of the horizon above the surface of the water, an aperture 43 is formed in the upper section 7 of the tube intermediate the cap 17 and the level of the highest  
 70 point of the vessel proper, and adjacent said aperture within the tube is secured a small glass prism 44. It will readily be seen that this prism when above the surface of the water will have a bright appearance when  
 75 viewed from the lower prism 25 by the observer within the boat; but as soon as its opening 43 becomes submerged the light reflected thereby is to a large extent cut off and the color of the water only is visible, while the  
 80 upper prisms 21 and 26 are still effective in performing their normal functions. As this prism 44 is disposed materially above the top of the highest portion of the hull of the vessel, it will be seen that it serves as a gage  
 85 in indicating to the occupants the total submergence of the vessel, thus constituting the sighting-tube a depth-indicator, as well as affording a means of scanning the horizon from beneath the surface of the water. By the use  
 90 of this gage device in connection with the sighting-tube any accidental rise of the vessel to expose a portion of its hull above the surface may be readily prevented, as the first appearance of a bright light reflected from  
 95 the prism 44 operates as a warning to apprise the navigator of the approach of the vessel to the surface and enables him to counteract such effect by suitable manipulation of the means provided for such purpose.  
 100

From the foregoing description it will be observed that the several features of the present improvement may be considerably varied without departure from the spirit of the invention and that the claims annexed hereto  
 105 are not to be understood as limited in scope to the particular constructive features herein shown and described. It will further be understood that while glass prisms are considered preferable as the reflecting members to  
 110 be employed in the sighting-tube, as herein set forth, other forms of reflectors may be substituted without changing the character of the present improvement, of which such feature is not an essential part.  
 115

Having thus set forth the nature of the invention, what I claim herein is—

1. The combination with a vessel, of a sighting-tube having in its upper or outer end a reflector movably mounted therein for receiving and reflecting inwardly an image of an external object, and means connected with said reflector and automatically controlled independently of the trim of the vessel for maintaining said reflector trained toward external  
 120 objects at the level of the water.  
 125

2. The combination with a vessel, of a sighting-tube having revolubly mounted in its up-



per or outer end a reflector for receiving and reflecting inwardly an image of an external object, and means connected with said reflector and automatically controlled independently of the trim of the vessel for maintaining said reflector trained toward external objects at the level of the water.

3. The combination with a vessel, of a sighting-tube, an inclined reflector movably mounted in the upper end of said tube, a pendulum, and a connection between said pendulum and said reflector whereby the degree of inclination of the latter is varied with the movement of the pendulum.

4. The combination with a vessel, of a sighting-tube, an inclined reflector pivotally mounted in the upper end of said tube, a pendulum mounted in the lower end of said tube, and a connection between said pendulum and said reflector whereby the degree of inclination of the latter is varied with the movement of the pendulum.

5. The combination with a submarine vessel, of a sighting-tube, an inclined reflector movably mounted in the upper end of said tube and adapted to receive and reflect inwardly through said tube an image of an external object, a second reflector disposed beneath and normally in the range of said first-named reflector, and means for controlling the inclination of said first-named reflector governed by a device operating independently of the trim of the vessel whereby said second-named reflector and said external object may be maintained constantly in the range of said first-named reflector.

6. The combination with a submarine vessel, of a sighting-tube, an inclined reflector mounted in the upper or outer end of said

tube and adapted to receive an image of an external object and to reflect it inwardly through said tube, and a second reflector intermediate said first-named reflector and the inner or lower end of said tube, disposed slightly above the level of the highest portion of said vessel and at a distance below said first-named reflector to serve as a gage for indicating the total submergence of said vessel while the first-named reflector remains above the surface of the water.

7. The combination with a submarine vessel, of a sighting-tube extending upwardly above the highest portion of the same, a reflector mounted in the upper end of the said tube and adapted to receive and to reflect inwardly through the same an image of an external object, and a gage carried by said tube materially below said reflector but above the highest portion of said vessel and adapted to indicate when the latter is totally submerged.

8. The combination with a submarine vessel, of a sighting-tube mounted revolvably upon the same, and provided in its upper end with a reflector adapted to receive and to reflect downwardly through said tube an image of an external object, a collar loosely embracing said tube and locked from longitudinal movement thereon, guys connecting said collar with said boat for staying said tube against lateral displacement, and means for turning said tube in respect of said boat.

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

SIMON LAKE.

Witnesses:

E. G. GALLAGHER,  
HENRY J. MILLER.