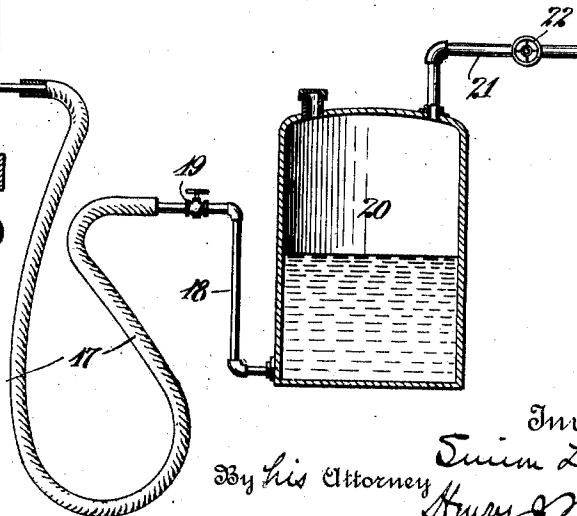
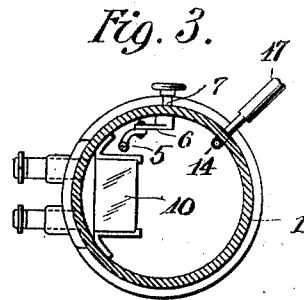
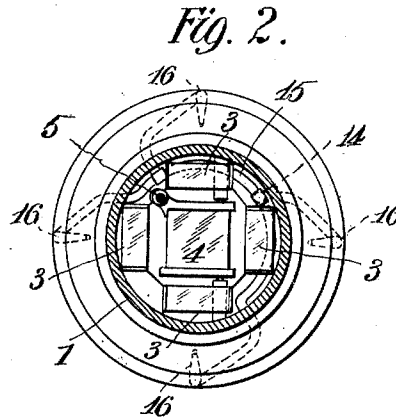
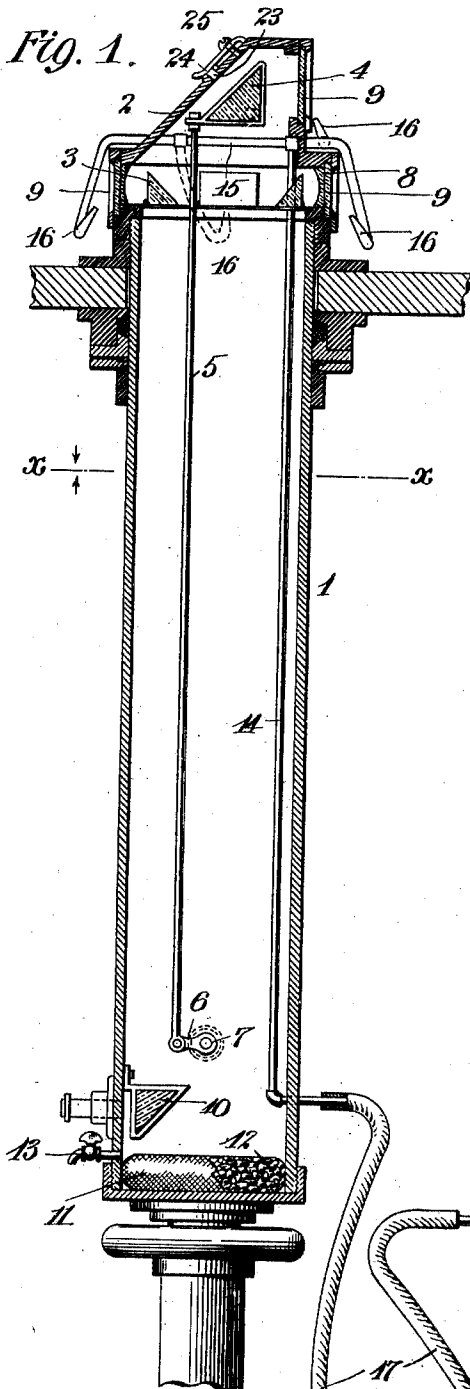


No. 759,622.

PATENTED MAY 10, 1904.

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

NO MODEL.



Witnesses
Frank S. Ober.
H. A. Konemann.

Inventor
S. Lake.
By his Attorney
Hury & Miller

UNITED STATES PATENT OFFICE.

SIMON LAKE, OF BRIDGEPORT, CONNECTICUT.

SIGHTING-TUBE FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 759,622, dated May 10, 1904.

Application filed November 12, 1903. Serial No. 180,836. (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-Tubes for Vessels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in that class of sighting-tubes for use particularly in connection with submarine boats forming the subject of the United States Patent No. 725,570, granted to me April 14, 1903; and it has for its object to maintain unclouded by adherence of moisture deposited by contact with the atmosphere or otherwise the surfaces of the one or more reflectors or reflecting members through which images of external objects are received and directed through the inclosing tube to the observer within the boat.

The invention consists, essentially, in the combination with a sighting-tube having in its upper or outer end a reflector for receiving and reflecting through said tube an image of an external object, of means for dispelling from the exposed faces of said reflector, or of preventing accumulations of moisture thereon.

It also consists in certain specific means to this end, substantially as hereinafter set forth and described.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a sectional elevation of a sighting-tube and connected apparatus embodying my present improvement. Fig. 2 is a transverse section on line *xx* of Fig. 1 looking upward, and Fig. 3 is a similar sectional view looking downward from the section-plane.

As in my United States patent above mentioned, the tube 1 is shown projecting outwardly through the upper wall or roof *a* of the conning-tower of the vessel and provided at its upper end with a hood or cap 2, within which is disposed a series of four prisms 3, having inclined reflecting-faces each directed toward a different point of the compass and above which is a single prism 4, directed simi-

larly to one of the prisms of the series and pivotally mounted for adjustment of the inclination of its reflecting-face by means of a rod 5, connected thereto at the upper end and at the lower end with a crank 6 upon a spindle 7, passing through the wall of the tube and provided with suitable means for turning the same to adjust the position of said pivotally-mounted prism.

In front of each prism 3 is disposed a plano-concave condensing-lens 8 for extending the scope of the prism, and in front of such lens, as well as of the prism 4, is disposed a plane glass plate 9 to close the opening in the hood for the reception of the image to be viewed by the observer within the boat, and thus exclude water from the tube during submergence. While the prisms of the series are designed more particularly as "finders" for scrutiny of the entire horizon for vessels or other objects of which the occupants are in search while the vessel is submerged, which objects as viewed upon a reduced scale by means of such finders may be seen in their natural size when the upper prism 4 is trained upon them by rotation of the sighting-tube, it is evident that the field of vision of the prism 4 may also be extended to any desired degree by the addition of a condensing-lens similar to the lenses 8 of the series with a corresponding reduction of the scale upon which the image may be seen by the operator. In any case it is to be understood that for the purposes of the present invention the parts 3, 8, and 9 and the parts 4 and 9, combined with a condensing (or even a magnifying) lens, if desired, together constitute a compound member which I term a "reflector," which member has operative faces exposed to both the exterior and the interior of the tube 1, which faces, together with those of the lower prism or reflector 10, when used it is the object of the present improvement to maintain bright and unclouded when the sighting-tube is in use in order to avoid obscuring the image of the external object to be observed through it. The term "reflector" employed in the appended claims is therefore to be understood as covering any or all of the component members of the sys-

tem of glasses through or by means of which images of external objects are received by the observer within the vessel.

As shown herein, the closed bottom of the tube 1 is provided with a porous or otherwise pervious bag or envelop 11, containing some hygroscopic substance, preferably carbid of calcium 12. In case the air confined within the tube 1 contains any moisture this becomes absorbed by the calcium carbid, which at once generates a volume of acetylene gas, which, being lighter than air, rises to the top of the tube and displaces the air surrounding the reflectors. Being in a dry state, this gas further operates to absorb any moisture deposited in the upper end of the tube and upon the inwardly-exposed surfaces of the reflectors or their component members, by which any fog caused by such previous deposit will be removed and the surfaces cleansed.

By inclosing the hygroscopic substance in an envelop or otherwise confining it from the body of the tube 1 the small particles of powder separated from the mass of the carbid are not permitted to float upward and to lodge upon the surfaces which are to be kept clean, but are confined in the lower portion of the tube, where their presence is not detrimental to the operation of the apparatus.

As a means of relieving the internal pressure within the tube, which is raised by the action of the calcium carbid in conjunction with the moisture absorbed from the confined air, a cock 13 is provided in the lower portion of the tube 1 to permit the escape of the air displaced by the acetylene gas thus generated.

In order to free or to maintain clear of any adhering moisture the externally-exposed surfaces of the reflector or reflectors or their component members, (as the glass plate 9,) a longitudinally-extending pipe 14 is shown arranged within the tube 1 and having at its upper end branches 15, passing through the walls of the cap 2 and terminating in the nozzles 16, each directed toward one of the plates 9. Connected with the lower end of the pipe 14, passing through the wall of the tube 1 is shown a flexible pipe 17, which is connected in turn with an outlet-pipe 18, having a faucet 19 and communicating with the lower portion of a tank or reservoir 20, containing some fluid, such as alcohol, having a greater affinity for glass than water. This reservoir is connected at its upper end with a pipe 21, having a faucet 22, communicating with some suitable source of compressed-air supply, which may, however, be replaced by a suitable force-pump.

When it is desired to spray the several outer surfaces of the plates 9 or of the prisms 3 or 4 in case they are set directly in their respective openings in the cap 2, the faucets 22 and 19 are opened, the air forcing the fluid from the reservoir 20 through the pipes 14 and 17, the branches 15, and nozzles 16 upon the sur-

faces to be cleansed, the nozzles being preferably formed to direct the fluid thereon in the form of a fine spray, which serves to displace the particles of water which may have previously formed thereon, causing the latter to run down the surface and drop off, while the fluid sprayed thereon forms a fine transparent film, which remains to protect the surface sprayed until it finally evaporates, thus leaving the surface clear and clean. It is evident that the fluid sprayed on in this manner will remove the moisture from the exposed surfaces of the reflecting member, whether in the form of frost, by which they are likely to become coated in cold weather, or in liquid form.

In order to provide a suitable vent for acetylene gas generated within the tube after the air has been displaced through the cock 13, a hole 23 is formed in the top of the cap 2, surrounded upon the exterior with a raised boss, forming a seat for a flat spring-valve 24, pressed to the same by means of a screw 25, passing through a hole therein and entering a suitably-threaded hole in the cap 2. The relief-valve thus formed permits the escape of any superfluous acetylene gas outwardly, so as not to foul the atmosphere within the vessel while preventing any abnormal rise of pressure within the sighting-tube.

From the foregoing description it will be understood that the present invention is not limited to the specific means herein shown and described for maintaining the inner and outer operative faces of the reflector or reflectors free from fogging by adherence of fine particles of water deposited by contact of the external atmosphere or otherwise, but that it is susceptible of wide variation without departure therefrom. Thus the spray may be employed for the internal as well as external exposed surfaces of the reflector or reflectors, or the nozzles 15 may be employed to direct thereon jets of dry air or of acetylene or other gas. It is also evident that the present improvement is equally applicable to sighting-tubes having only one or a plurality of reflectors or reflecting members in the upper or outer end; but in any installation in this class of instruments it is important that the devices for maintaining clear from fogging the reflectors located inaccessibly to the occupants of the vessel should be disposed permanently out of the range of reflection of the surfaces to be so projected, as shown and described herein.

It will be observed that the function of the calcium carbid employed as herein described is to produce a dry gaseous substance surrounding the surfaces to be cleansed, whether air or acetylene gas, in sufficient quantity to displace the same, of such character that its contact with the exposed surfaces of the reflector or reflectors will not only prevent a deposit of moisture thereon, but will remove any such deposit by absorption, so as to in-

sure a clean transparent surface through which a clear view may be had of the external object to be observed.

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

1. A sighting-tube for vessels provided in its upper end with a device having faces exposed both to the interior and exterior of said tube for receiving and reflecting through said tube an image of an external object, and means disposed within and external to said tube outside of the range of reflection of said device for maintaining free from adherence of moisture thereto the internally and externally exposed faces of said device.

2. A sighting-tube for vessels provided in its upper end with a reflector for receiving and reflecting through said tube an image of an external object, and containing also a substance adapted to absorb any moisture held in suspension in the confined air and to thereby generate a dry gas to displace said air and absorb any moisture upon the exposed faces of said reflector.

3. A sighting-tube for vessels provided in its upper end with a reflector for receiving and reflecting through said tube an image of an external object, and containing also a small quantity of calcium carbide adapted to absorb any moisture contained in the confined air and to generate acetylene gas for displacing the air around said reflector and absorbing any moisture adhering to the exposed faces of the latter.

4. A sighting-tube for vessels provided in its upper end with a reflector for receiving and reflecting through said tube an image of an external object, and having therein also a pervious envelop containing carbide of calcium for absorbing any moisture in the confined air and displacing the latter around said reflector with acetylene gas thus generated.

5. A sighting-tube for vessels provided in its upper end with a reflector having faces exposed both to the interior and exterior of said tube for receiving and reflecting through said tube an image of an external object, a pervious envelop within said tube containing a hygroscopic substance, and means exterior to said tube for spraying the externally-exposed face of said reflector.

6. A sighting-tube for vessels provided in its upper end with a reflector having a face exposed up to the exterior of said tube for receiving and reflecting through said tube an image of an external object, and means ap-

plied to and operated from the exterior of said tube for spraying the exposed face of said reflector.

7. A sighting-tube for vessels provided in its upper end with a reflector having a face exposed to the exterior of said tube and adapted for receiving and reflecting through said tube an image of an external object, a pipe extending longitudinally of said tube and terminating in a nozzle directed toward the externally-exposed face of said reflector, a reservoir containing a liquid more adhesive to the material of said reflector than water with which said pipe is connected, and means for forcing said liquid through said pipe and its nozzle against the externally-exposed face of said reflector for displacing the moisture adhering thereto.

8. A sighting-tube for vessels provided in its upper end with a reflector having a face exposed to the exterior of said tube and adapted for receiving and reflecting through said tube an image of an external object, a pipe extending longitudinally of said tube and terminating in a nozzle directed toward the externally-exposed face of said reflector, a reservoir containing alcohol with which said pipe is connected, and means for forcing such alcohol through said pipe and its nozzle against the externally-exposed face of said reflector for displacing the moisture adhering thereto.

9. A sighting-tube for vessels provided in its upper end with a reflector having faces exposed both to the interior and exterior of said tube for receiving and reflecting through said tube an image of an external object, a pervious envelop containing a hygroscopic substance disposed in the lower portion of said tube, a pipe extending longitudinally of said tube and terminating at its upper end in a nozzle directed toward the externally-exposed face of said reflector and connected at the other end with a reservoir containing alcohol, and means for admitting compressed air to said reservoir and thereby forcing such alcohol through said pipe and its nozzle against the externally-exposed face of said reflector in a spray, when desired.

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.