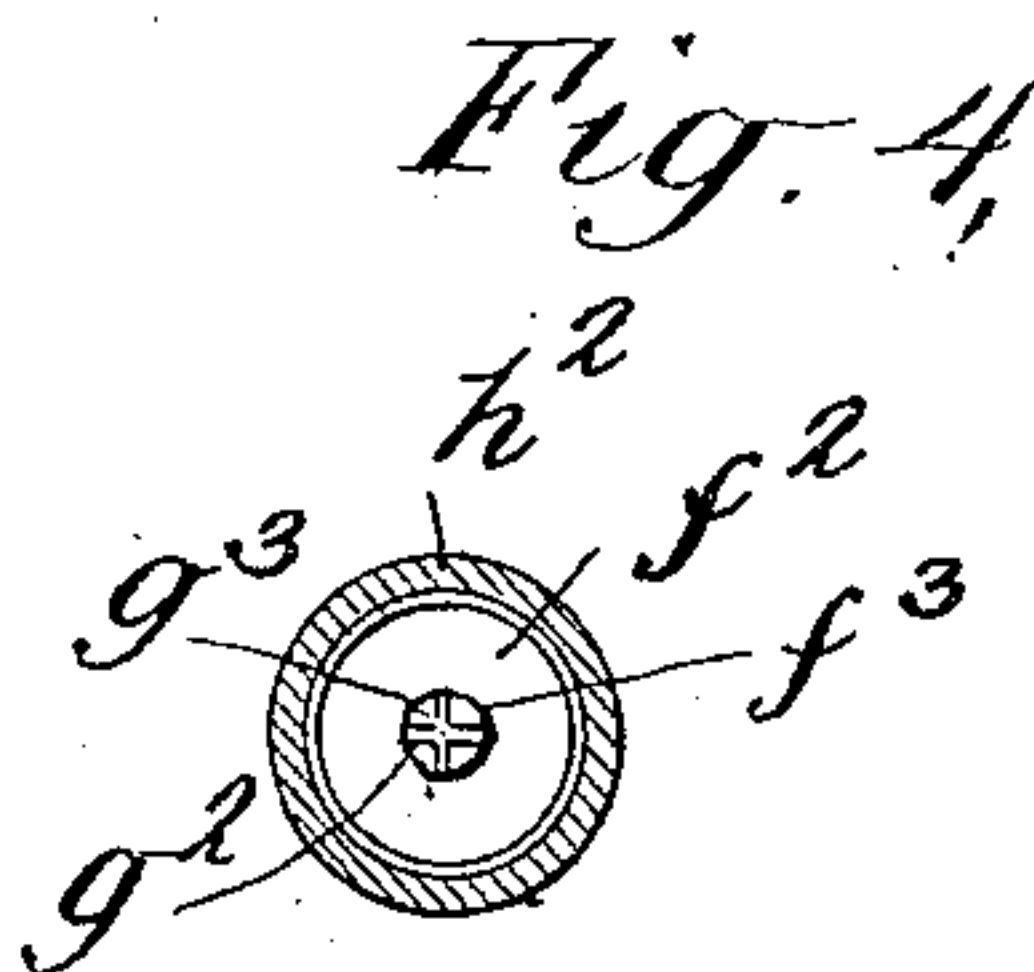
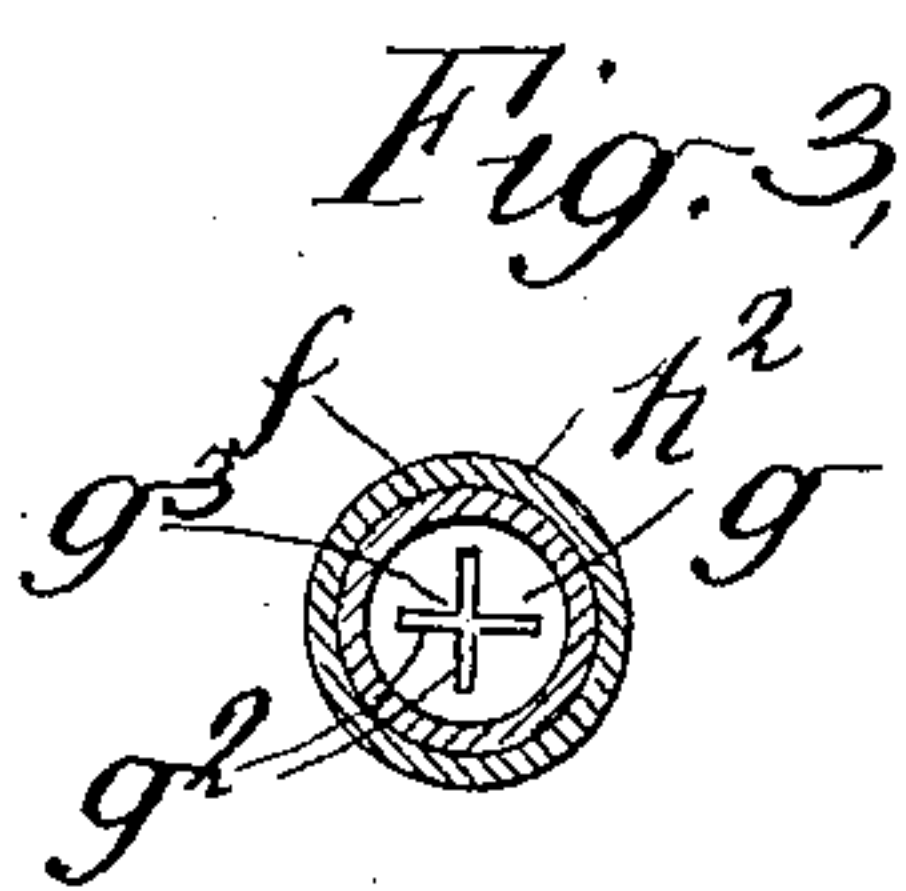
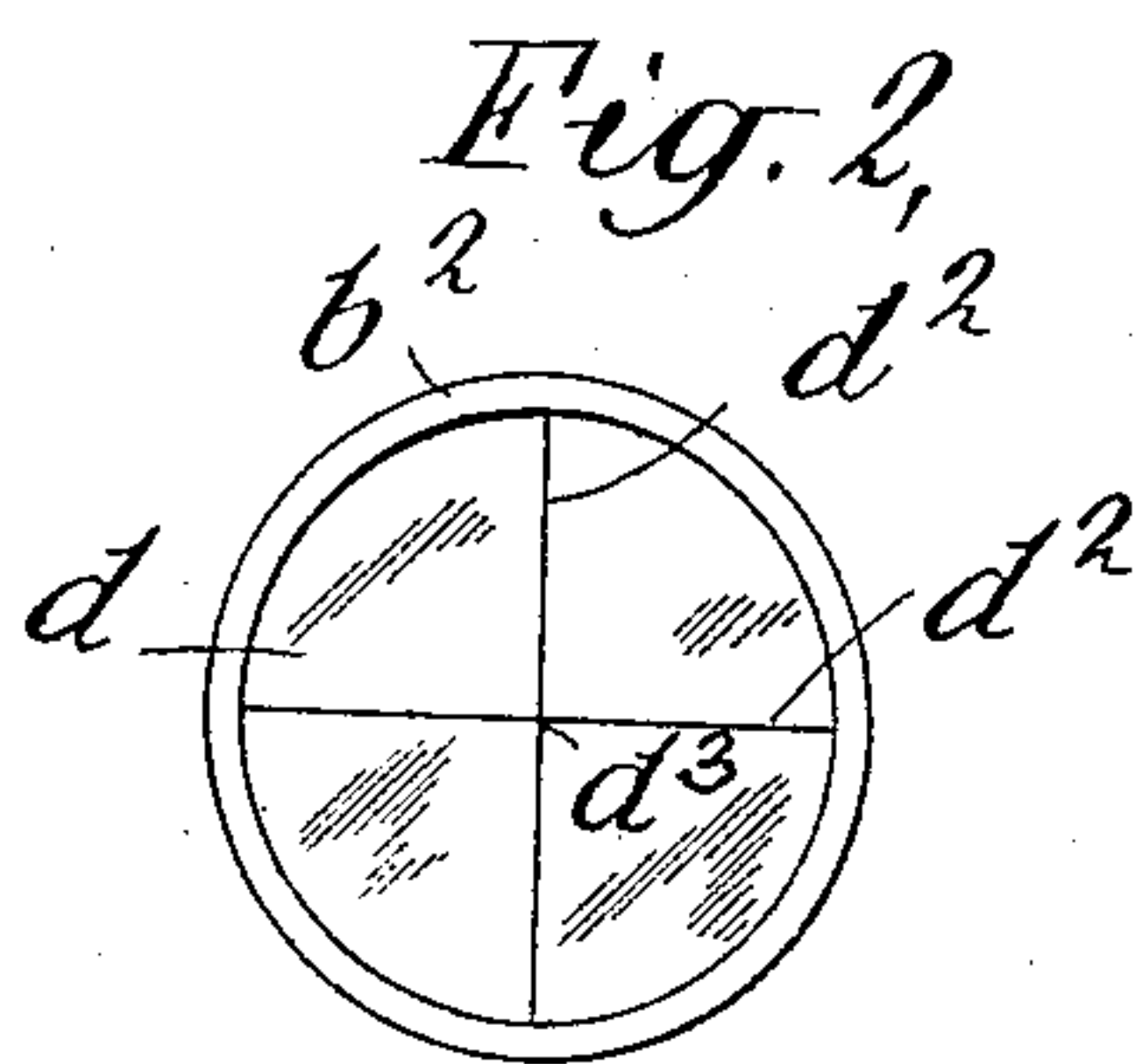
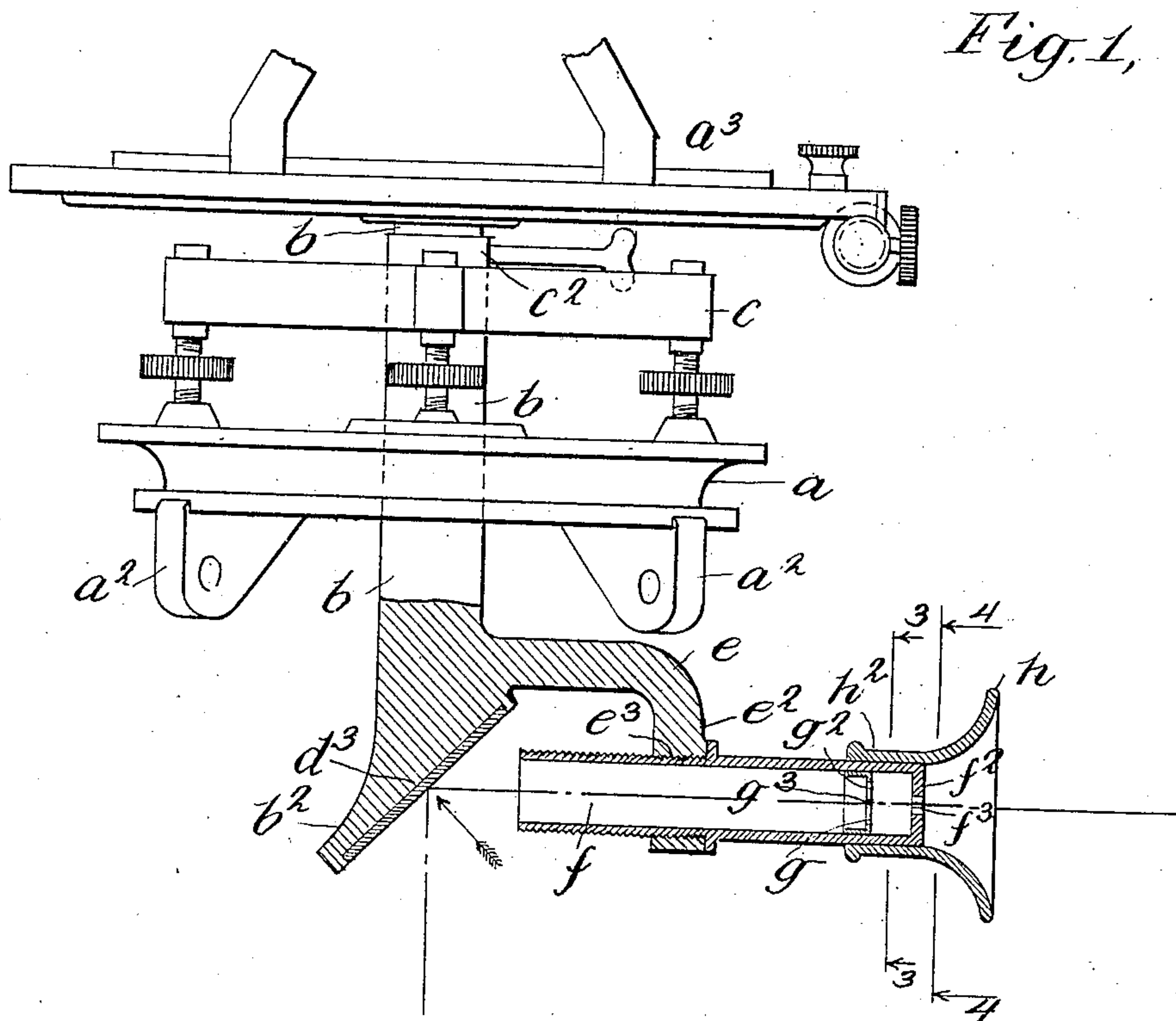


No. 835,711.

PATENTED NOV. 13, 1906.

P. M. OLSEN & T. E. TORGENSEN.  
PLUMB DEVICE FOR SURVEYORS' INSTRUMENTS.

APPLICATION FILED DEC. 13, 1905.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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NEW YORK.

## PLUMB DEVICE FOR SURVEYORS' INSTRUMENTS.

No. 835,711.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed December 13, 1905. Serial No. 291,506.

*To all whom it may concern:*

Be it known that we, PETER M. OLSEN and THORVALD E. TORGERSEN, citizens of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Plumb Devices for Surveyors' Instruments, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to plumb devices for use in connection with surveyors' instruments and other instruments of this class; and the object of the invention is to provide an improved plumb device which is adapted to be connected under an ordinary surveying instrument and which will take the place of an ordinary bob and line.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvement are designated by suitable reference characters in each of the views; and in which—

Figure 1 is a sectional side view of the invention attached to a surveying instrument; Fig. 2, a face view of a reflector, which forms a part of our improved plumb device; Fig. 3, a section on the line 3 3 of Fig. 1, and Fig. 4 a section on the line 4 4 of Fig. 1.

The surveying instrument proper is secured to or on the head  $a$  in the usual way, and in the practice of our invention we provide a plumb device comprising a hanger  $b$ , which is secured to the instrument centrally of the bottom thereof in any preferred manner. The lower end of the hanger  $b$  is enlarged to form a head  $b^2$ , which is preferably circular in form and provided with a face, which ranges at an angle of forty-five degrees to the central axis of the hanger  $b$  and which is provided with a reflector  $d$ , having transverse diametric lines  $d^2$  on its surface, which cross each other at the center of the head  $b^2$  or of the reflector  $d$ , as shown at  $d^3$  in Fig. 2. The reflector can be set at other angle than forty-five degrees and the tube set to correspond. The hanger  $b$  is also provided with a laterally-directed arm  $e$ , which projects a predetermined distance from said hanger, and is provided with a downwardly-directed member  $e^2$ , having a screw-threaded aperture  $e^3$ ,

the axis of which is in horizontal line with the point  $d^3$  of the reflector  $d$ , and passing through the aperture  $e^3$  is a threaded tube  $f$ , the inner end of which is open and the outer end of which is closed by a plate or diaphragm  $f^2$ , having a central opening  $f^3$ , which is preferably circular in form, and inwardly of the closure-plate  $f^2$  the tube  $f$  is provided with a transverse partition plate or member  $g$ , having transversely-arranged slots  $g^2$ , which cross each other at the center thereof or at the point  $g^3$ , as shown in Fig. 3, said point and the slots  $g^2$  being shown in Fig. 4. The outer end of the tube  $f$  is also preferably provided with a bell-shaped attachment  $h$ , having a tubular shank  $h^2$ , adapted to receive the outer end of said tube.

The above-described construction is such that the center of the opening  $f^3$  in the closure-plate  $f^2$ , the point  $g^3$  where the transverse slots or openings  $g^2$  in the partition-plate  $g$ , the axial line of the tube  $f$ , and the center of the reflector  $d$  are all in the same line, and this line strikes the reflector  $d$  at an angle of forty-five degrees, and when the instrument has been leveled in the ordinary manner, which operation is accomplished by means of spirit-levels on the instruments, it will be seen that by looking through the tube  $f$  from the point  $x$  a point on the ground in line with the axis of the hanger  $b$  will be seen in the reflector at  $d^3$ , which point may be marked, fixed, or determined in the usual manner.

We claim—

In connection with a surveying instrument, a reflector attached to the under side of the instrument, the reflector having cross-lines on its surface, and a sight-tube rigidly supported at an angle to the reflector, the tube having a diaphragm with a cross-slit, and having another diaphragm with central opening, substantially as shown for purpose described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 6th day of December, 1905.

PETER M. OLSEN.  
THORVALD E. TORGERSEN.

Witnesses:

C. E. MULREANY,  
C. J. KLEIN.