W. Stackpole.

Altitude Instrument.

No. 50,182. Patented Sept. 26, 1865.

Fig. 1

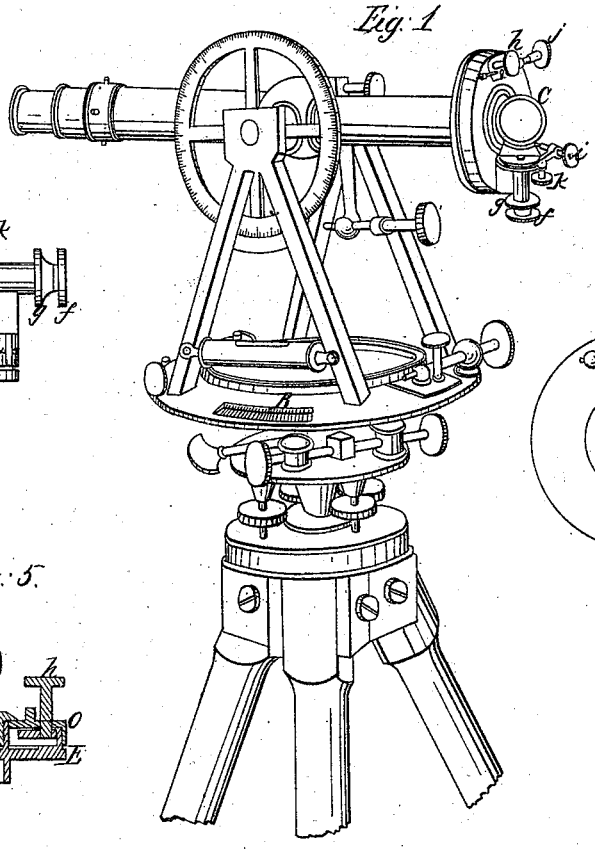


Fig. 2.

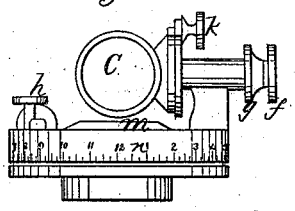


Fig. 3

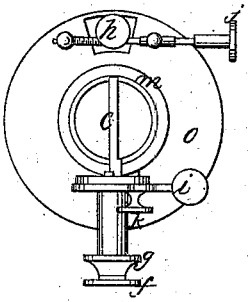


Fig. 5.

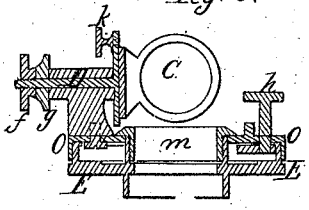


Fig. 4.

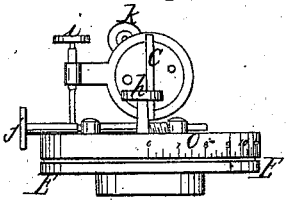
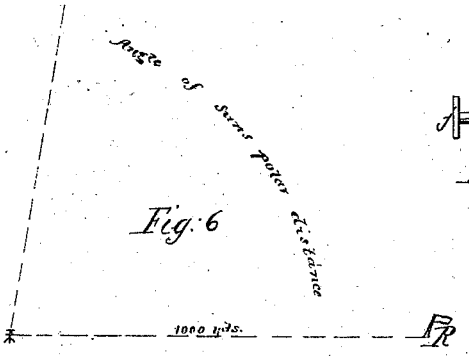


Fig. 6



Witnesses;

R. MacAfee

James S. Morgan

Inventor;

Wm Stackpole

UNITED STATES PATENT OFFICE.

WM. STACKPOLE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MERIDIAN-FINDERS.

Specification forming part of Letters Patent No. **50,182**, dated September 26, 1865.

To all whom it may concern:

Be it known that I, WILLIAM STACKPOLE, of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Surveyors' Instruments, which I call a "Meridian-Finder;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification.

My invention consists of a small reflector, mounted so as to turn on its axis, its surfaces being parallel to the center line of its axis, which axis shall always be at right angles to the line of collimation of the telescope, the mountings of the reflector to be again mounted so as to turn around a center concentric with the line of collimation of the telescope when the finder is attached to the telescope.

Figure 1 is a perspective view of a transit-instrument with the meridian-finder attached thereto. Fig. 2 is a side view of the finder. Fig. 3 is a top view of the same. Fig. 4 is another side view of the finder, and Fig. 5 is a section of the same. Figs. 2, 3, 4, and 5 are full-size drawings.

C is the reflector. D, Fig. 5, is its axis, on which it turns.

g is a collar, having a square hole through which the end of the axis passes, fitting the hole when in its proper position.

f is a nut, which screws onto the end of the axis, and when screwed fast clamps the reflector in the desired position. *i* is a screw operating as a tangent-screw, and has a movement around the mounting of the reflector.

The mounting of the reflector is securely fastened to a plate, O. This plate is constructed so as to turn freely on another plate, E E, around a center concentric with the line of collimation of the telescope.

The two plates O and E are held together by the thimble M, which screws into the plate E, and has a shoulder pressing against plate O.

j is a tangent-screw; *h*, its clamping-screw, by means of which the plate O is operated. There are adjusting-screws to adjust the reflector, so that its planes shall be parallel to a line passing through the center of its axis, and also adjustments to adjust its axis to a right angle with the line of collimation of the telescope; but as such kind of adjustments are well known I will not further describe them.

The edge of the plate O is divided into quarter-hour divisions, having an index on the edge of the plate E, the twelve-o'clock division being at a point where a line drawn at right angles to the axis of the reflector through the line of collimation cuts the hour-circle.

The operation of determining the true meridian is as follows, to wit: The finder being secured to the object end of the telescope in its proper position, as in Fig. 1, and the instrument leveled, turn the reflector on its axis to the position shown in Fig. 2. Set the telescope level by making the index of the vertical limb A mark 0°, and clamp the telescope. Set the cross-hairs of the telescope on the image of some prominent object, as R, (about one thousand yards distant,) Fig. 6, and, by means of the horizontal limb B, lay off an angle equal to the angle of the sun's polar distance at the time and place of observation. Clamp the instrument at this angle, and, by means of the collar *g*, turn the reflector on its axis till the image of the object R comes within the telescopic field Then, by means of the tangent-screw *i* and clamp-screw *k*, bring the image of the object R onto the cross-hairs, and, with the screw *f*, securely clamp the reflector in its position. Unclamp the telescope and raise the object end of the telescope till the index of the vertical limb A marks the latitude of the place of observation, and clamp it in that position. Turn the plate O till the index on plate E marks the nearest quarter-hour to the time of making the observation, and clamp the plate in this position. Turn the entire instrument on its principal center, so that the finder shall be toward the north till the image or brightness of the sun comes within the telescopic field. Then, by means of the tangent-screw *j* and the tangent-screw operating the instrument on its principal center, bring the image of the sun exactly on the cross-hairs, and the line of collimation of the telescope will be on the meridian.

The angle of the sun's polar distance being correctly fixed by the reflector and the latitude by the vertical limb, it is not necessary to be very exact in setting the index of the hour-circle, as the sun's image can be brought onto the cross-

hairs by the combined movement of the instrument on its principal center and the movement of the plate O around the line of collimation, and when the image of the sun is exactly on the cross-hairs (the angle of the sun's polar distance and the latitude being correctly fixed) the telescope invariably points to the north pole. The instrument may remain in this position, and by turning the plate O around its hour-circle the image of the sun can be kept continually on the cross-hairs, thereby proving the line of collimation to be coincident with the meridian.

I claim—

A meridian-finder, in combination with a transit or similar surveying-instrument, said finder consisting of a reflector mounted on an axis at right angles to the line of collimation of the telescope, and having a movement around a center concentric with said line of collimation, substantially as described, but I do not limit my invention to any peculiar form of mechanism in constructing and mounting said reflector.

WM. STACKPOLE.

Witnesses:
R. STACKPOLE,
JAMES G. MORGAN.