

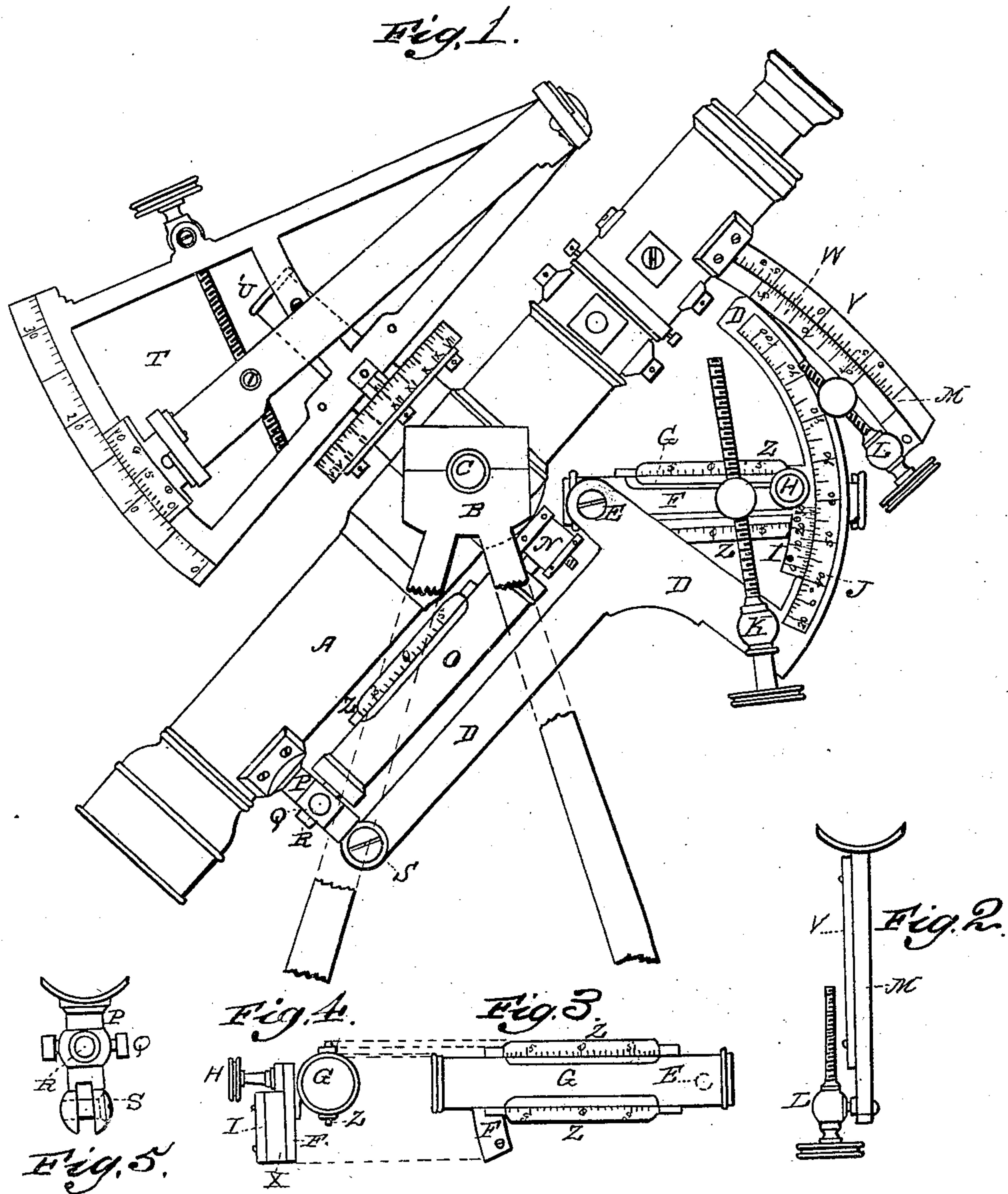
(No Model.)

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SOLAR ATTACHMENT FOR TRANSIT INSTRUMENTS.

No. 270,679.

Patented Jan. 16, 1883.



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ROBERT M. JONES, OF SANTA FÉ, TERRITORY OF NEW MEXICO.

SOLAR ATTACHMENT FOR TRANSIT-INSTRUMENTS.

SPECIFICATION forming part of Letters-Patent No. 270,679, dated January 16, 1883.

Application filed September 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. JONES, a citizen of the United States, residing at Santa Fé, in the county of Santa Fé and Territory of New Mexico, have invented certain new and useful Improvements in Solar Attachments to Engineers' or Surveyors' Transit-Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to certain improvements in surveyors' or engineers' transits; and it consists in solar attachments to the same, which will be more fully described in the specification and shown in the accompanying drawings.

My invention further consists in a double latitude-arc to the solar attachments of a transit-instrument.

In the drawings, wherein similar parts are represented by the same letters in the several figures, Figure 1 is a front view of my improved transit, the standards being broken away to exhibit the beam of the latitude-arc and the level for adjusting the polar axis. Figs. 2, 3, 4, and 5 are detail views of parts of the instrument.

P represents the hanger at the object end of the telescope, and M a similar hanger at the sight end, by which the attachments are connected with the telescope.

G is a double-faced level attached to the plate F, and provided with the two scales Z, one above and one beneath.

E is a screw by which the plate F is attached to the beam.

A represents the telescope; B, the standards of transit, showing the broken ends below; C, the axis of the telescope, on which it revolves, all of which is the usual form makers adopt in making engineers' transits.

D is the beam of the latitude-arc, which is hinged at the object end of the telescope by the screw S, and moves vertically at the opposite end between the arc V and the vernier W.

F is a flat plate, on which is attached the level G and the vernier I, which is hinged at

one end by the screw E, and moves vertically at the other end between the arc J and the vernier I. The level-tube G is open at the upper and lower sides, the glass tube to be ground on upper and lower sides parallel to each other, and a scale, Z, attached to upper and lower edge of level-tube. The level G, the arc J, and the vernier I act as the limb-arc and vernier of the first latitude-arc, on which is taken the latitude of a place, as described hereinafter.

K is a tangent-screw, which operates the level and limb to latitude-arc.

H is a clamp-screw, which clamps the level G to the arc J.

L is a tangent-screw, which operates the long beam D and vernier W on its arc V, (second latitude-arc.)

O is a level set parallel to the telescope, with scale Z and usual capstan adjustment, for the purpose of adjusting the polar axis U.

T is the declination-arc.

U is the polar axis as previously patented.

In the accompanying drawings the letters in Figs. 1, 2, 3, 4, and 5 represent the same parts and pieces, but of different elevations.

In my improvement I claim all which is represented in the drawings below the telescope, and attached to the telescope by the hangers P and M, to be a new invention in form and principle—namely, a double latitude-arc to the solar attachment to surveyors' or engineers' transits. I also claim the principle of placing a level at an incline to the telescope in any form for the purpose of inclining a telescope to a parallel plane to the equator. I also claim the level, open at top and bottom faces, for the purpose of testing adjustments and for taking the latitude before and after noon.

To adjust the latitude-arcs, place the zero-points of the arc V and the vernier W opposite, raise the vernier I by the tangent-screw K to ninety degrees on the arc J, place the level O in position, and if the levels O and G remain in position during a complete revolution of the transit horizontally there is no index error in either of the latitude-arcs.

To use the latitude-arc and to ascertain the latitude of a place, place the zero-points of the vernier W and arc V even; set the declination of the sun on its arc for twelve m. As the sun passes the meridian, incline the telescope until the image of the sun falls in the equatorial lines,

raise or lower the end of the level G by the tangent-screw K until the level is in position, clamp the level G by the screw H, and the true latitude is given on the arc J by its vernier I. After this observation is made the latitude is set on its arc permanently for that parallel of latitude, and to use the instrument thereafter the level G is brought into position, when the declination-arc is used, and the true meridian is given and all changes of latitude to be computed and set off on the latitude-arc V by its vernier W, which reads to ten seconds of arc on a five-inch transit.

To take the latitude before or after noon, bring the level G in position, also the image of the sun, clamp the instrument horizontally, reverse the telescope one hundred and eighty degrees, and observe the sun through the opposite end of the declination-arc. If it does not test, turn the horizontal limb by its tangent-screw until the sun falls in the equatorial lines, read the error on the horizontal limb, and set it back one-half, incline the telescope until the sun appears in its proper position, raise or lower the level G until in position, and the latitude is taken.

I claim—

1. The double latitude-arc V J, attached to the telescope of an engineer's transit-instrument by the hangers P and M, in combination with the bent beam D, the clamp H, level O,

polar axis U, and the telescope A, all as described, and for the purpose specified.

2. The level G, placed at an angle to the telescope for the purpose of indicating the parallelism of the plane of the telescope to that of the equator, or its divergence therefrom, in combination with the double arc V and J, each provided with its vernier and tangent-screw, all as shown and described, and for the purpose specified.

3. The combination of the telescope A, beam D, arcs V and J, provided with verniers and tangent-screws, and levels O and G, all as described, and for the purposes specified.

4. The combination, with the telescope of an engineer's transit-instrument, of the double latitude-arcs and the declination-arc, all as hereinbefore described and specified.

5. The combination, in an engineer's transit-instrument, of the telescope A, plate F, clamp H, arcs V and J, and levels O and G, the latter having both upper and lower face open, and each face being provided with a scale Z, for the purpose hereinbefore set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT M. JONES.

Witnesses:

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