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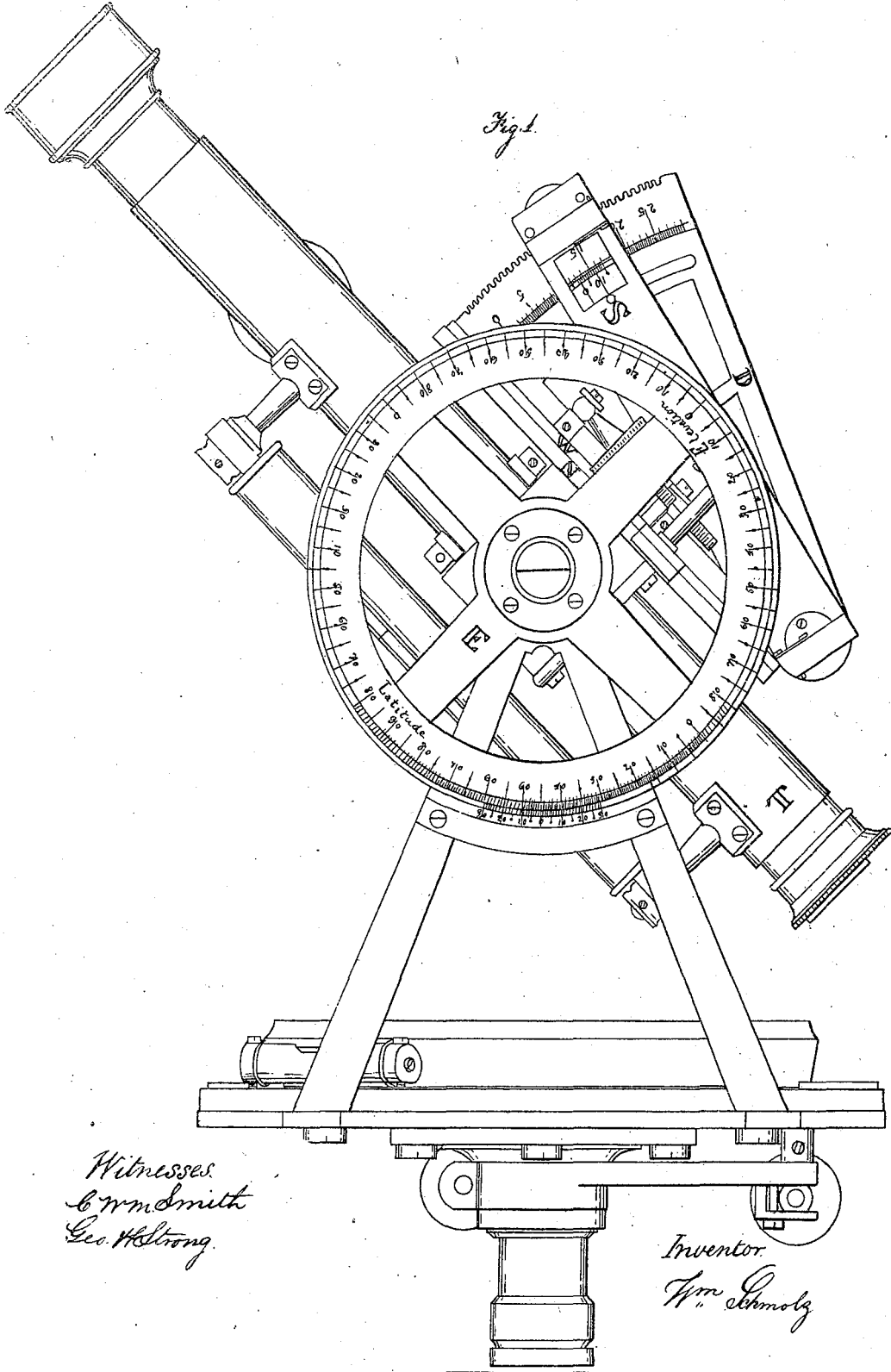
W. Schmolz.

Sheet 1.

Solar & Transit-Instrument.

N<sup>o</sup> 72687

Patented Dec. 24, 1867.



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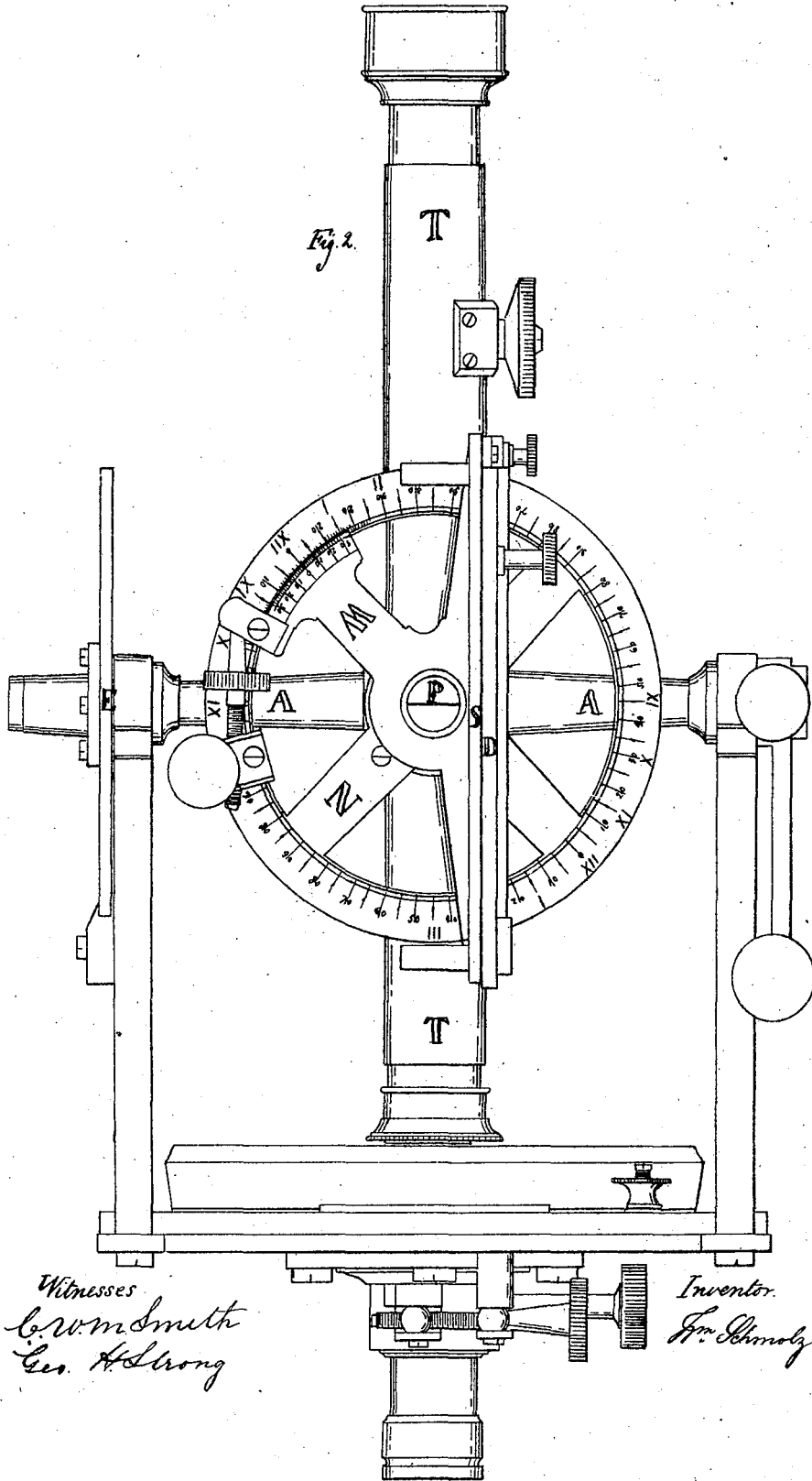
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Solar & Transit-Instrument.

N<sup>o</sup> 72687

Patented Dec. 24/1867.



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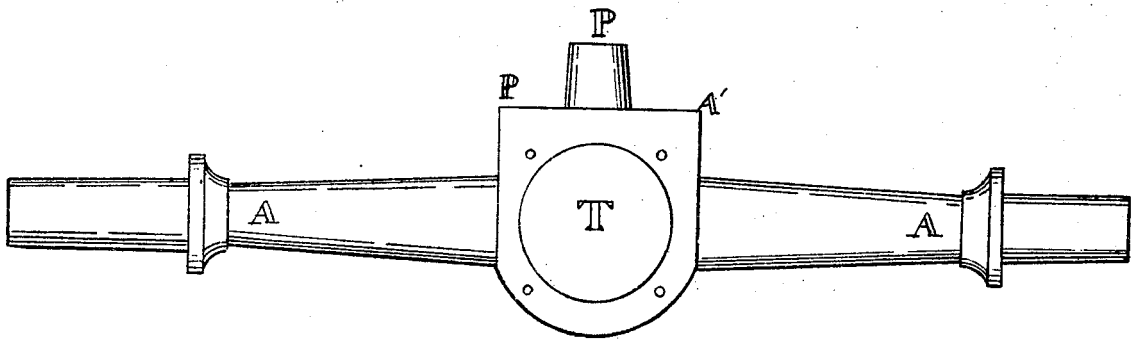
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N<sup>o</sup> 72687

Patented Dec. 24, 1867.

Fig. 3.



Witnesses.  
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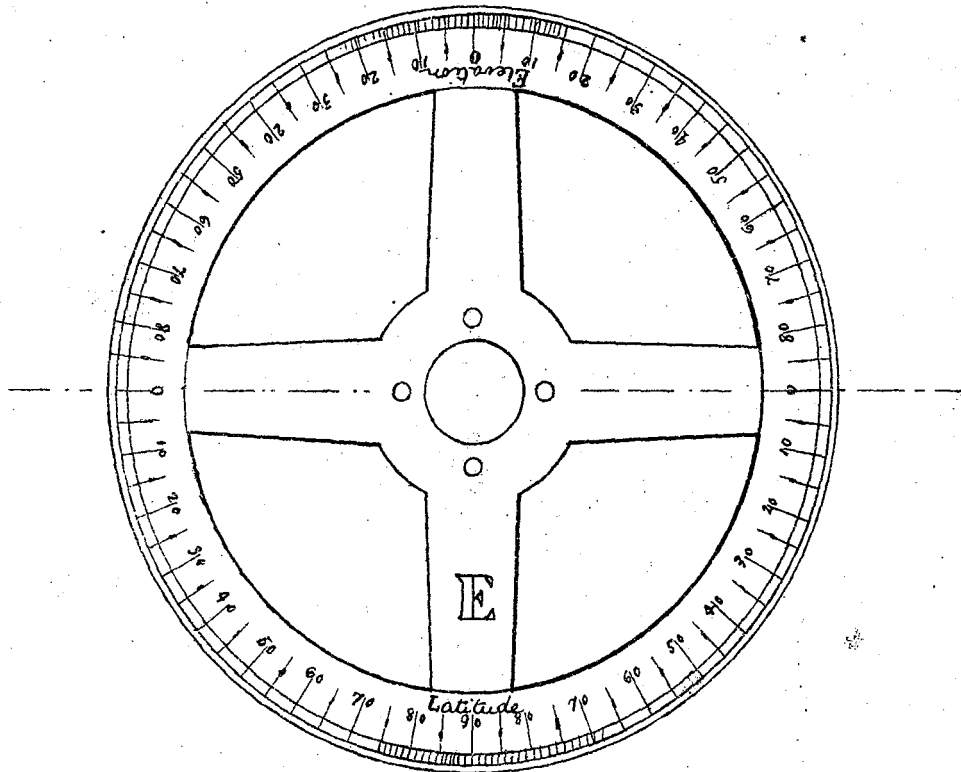
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Fig. 4.



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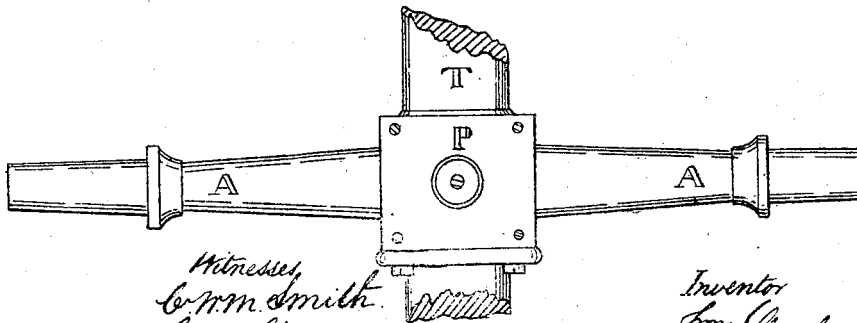
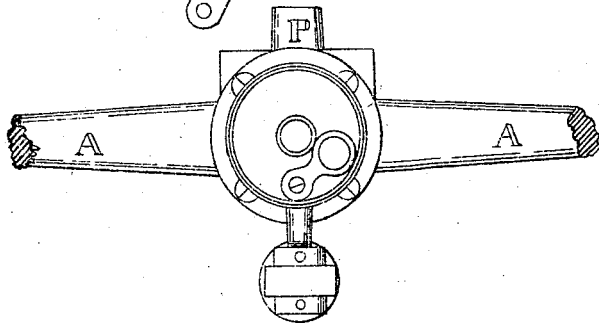
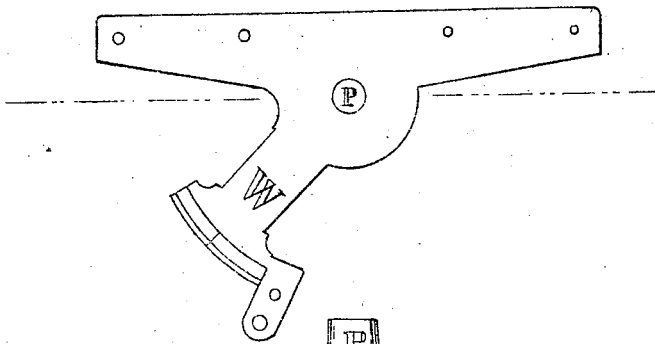
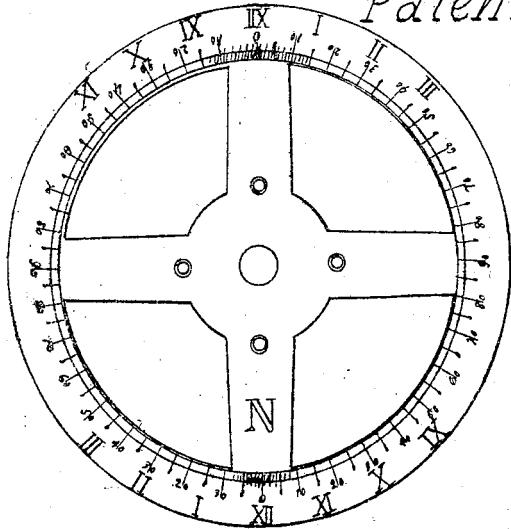
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Solar & Transit-Instrument.

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Patented Dec. 24, 1867.



Witnesses  
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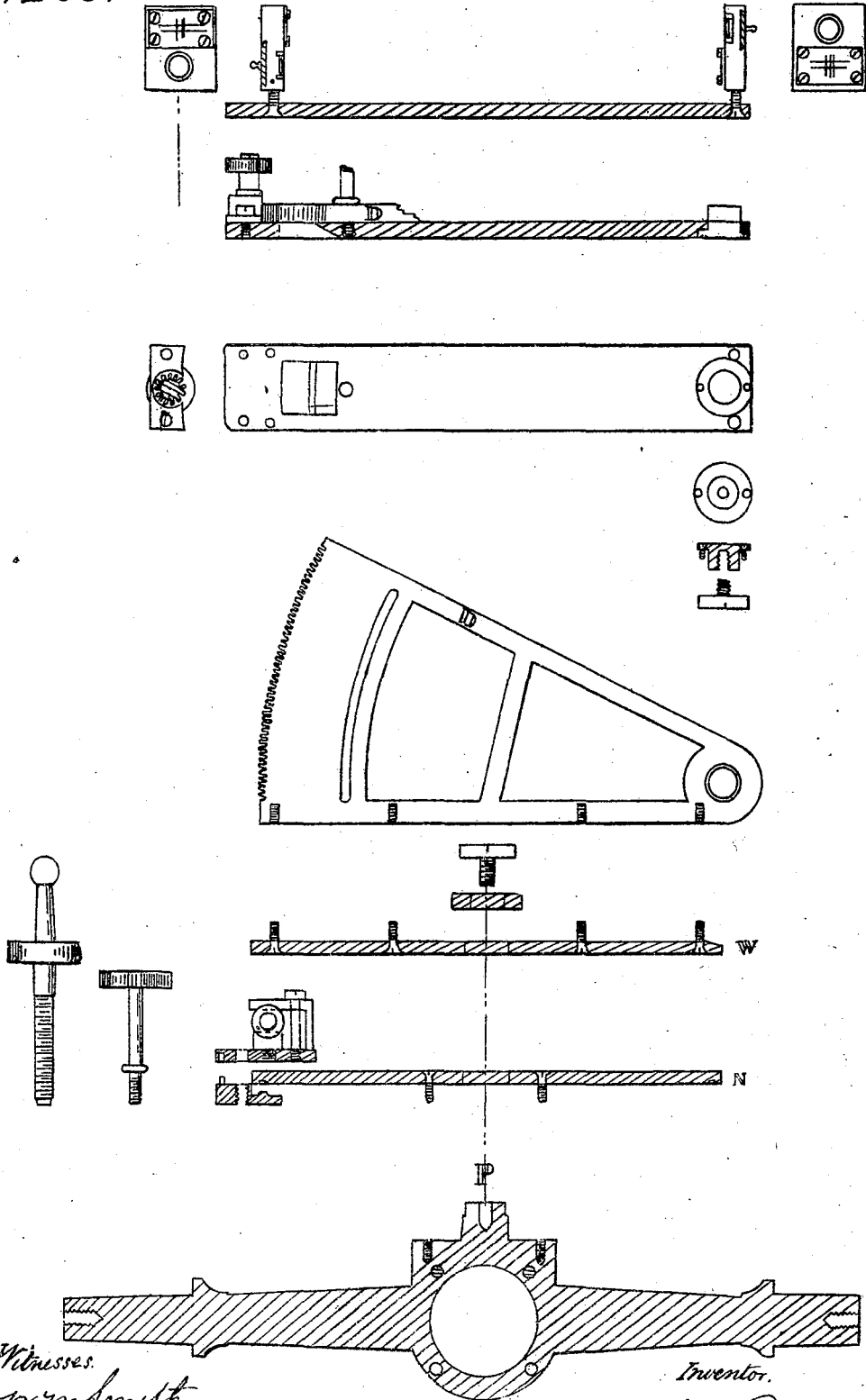
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Solar & Transit-Instrument.

N<sup>o</sup> 72687

Patented Dec. 24, 1867.



Witnesses.  
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# United States Patent Office.

WILLIAM SCHMOLZ, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 72,687, dated December 24, 1867.

## IMPROVEMENT IN SOLAR AND TRANSIT-INSTRUMENTS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM SCHMOLZ, of San Francisco, county of San Francisco, State of California, have invented an Improved Surveyor's Solar Transit; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without further invention or experiment.

The nature of my invention is to provide surveyors' transit-instruments with a solar attachment, the two being combined, so that the operator is enabled to find the longitude, latitude, true meridian, hour of the day, the sun's declination, and the variation of the magnetic needle, the whole forming a part of and attached to one and the same instrument.

Proceeding therefore upon the hypothesis that the solar instrument and the surveyor's transit combined, have never been employed in the manner above named, and that their uses are familiar to all who are acquainted with the proper workings of the said instruments, I will describe my invention, by referring to the drawings forming a part of this specification, of which—

Figure 1 is a side elevation.

Figure 2 is an end view with telescope perpendicular.

Figure 3 is a view of the two axes.

Figure 4 is a view of the elevation-arc.

Figures 5 and 6 are details of the instrument.

A A represent the axis of the telescope, which is furnished with a base, P' A', parallel to the said axis, and from the centre of which a centre-spindle or axis, P, rests perpendicularly thereto. On the base-plate is placed an hour-circle, N, to indicate the time, which is permanently attached to the base-plate with reference to the axis A A, and beneath which is placed the telescope T. The solar apparatus S D W is attached to the axis P, revolving over the hour-circle N. To one end of the axis A A is attached the ordinary vertical or elevation-arc E, one-half of which is numbered and lettered from 0 to 90, from right to left, to set off the latitude from the equator to the pole.

In its operation, for example, to find the true meridian, first level the instrument, as an ordinary transit, then place it approximately north and south; next, in the Nautical Almanac, find the sun's declination for the day and hour, which is set by the vernier S on the declination-arc D; set the latitude-arc E for the latitude of the place of observation. The time being known, set the vernier W on the hour-arc, and clamp it. The ordinary transit, to which this apparatus is now attached, is revolved on its lower axis until the sun imprints its image through the lens on the opposite silver graduated plate. In this position the telescope is in its true meridian, and the needle indicates the magnetic variation.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The hour-circle N, fastened upon the base P' A', with a solar apparatus attached upon the axis P, in combination with a surveyor's transit, substantially as described and for the purposes set forth.

In witness whereof, I have hereunto set my hand and seal.

WM. SCHMOLZ. [L. s.]

Witnesses:

C. W. M. SMITH,

J. L. BOONE.