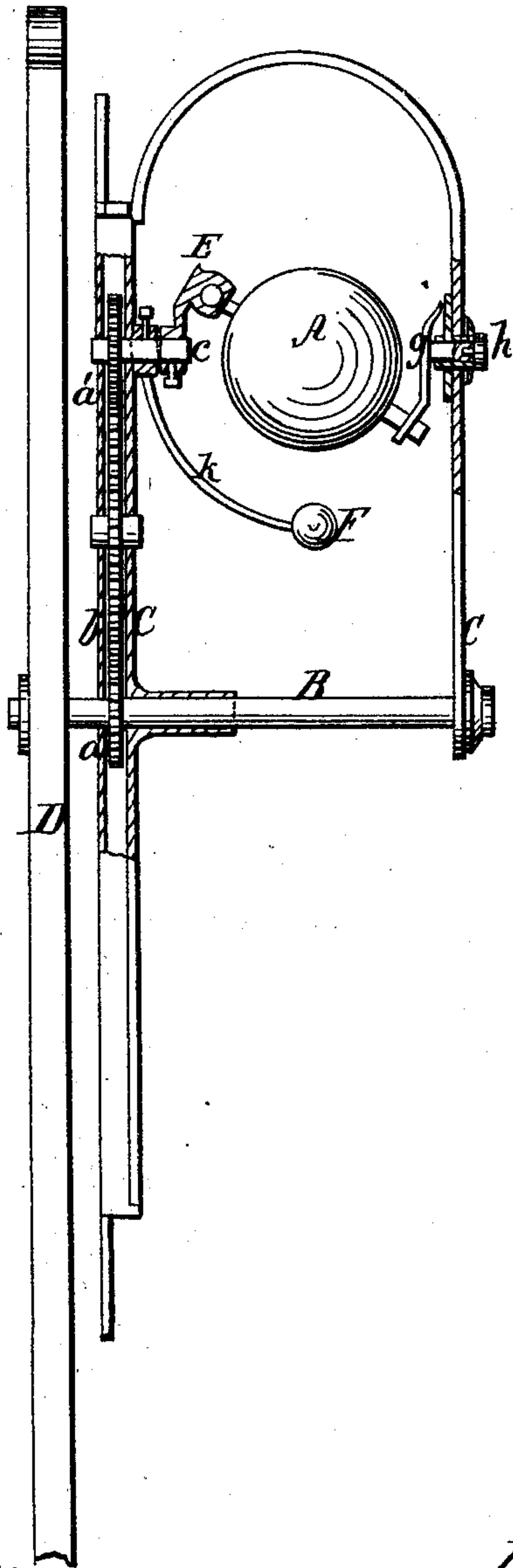


*E. Root,*

*Astronomical Instrument.*

*N<sup>o</sup> 69842.*

*Patented Oct. 15, 1867.*



*Witnesses;  
Thos. Crocker  
Wm. Freun*

*Inventor;  
E. Root  
Per *[Signature]*  
Attorney*

# United States Patent Office.

ELEAZER ROOT, OF TERRE HAUTE, INDIANA.

*Letters Patent No. 69,842, dated October 15, 1867.*

## IMPROVEMENT IN TERRASPHERES.

*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, ELEAZER ROOT, of Terre Haute, in the county of Vigo, and State of Indiana, have invented new and useful Improvements in Terraspheres; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The drawing represents parts of a terrasphere in which my improvements are exhibited.

This invention relates to improvements in the terrasphere, for which Letters Patent were granted to me on the 18th day of December, 1866, which consists in hanging the axis of the earth at the north pole in a bearing at the end of an arm so constructed and connected with gearing as to preserve its vertical position while the earth rotates on its own axis, and also while it makes its revolution around the sun in the plane of ecliptic. Also in attaching the moon to the axis which carries the said vertical arm that bears the northern end of the earth's axis, instead of connecting it directly with the axis of the earth in the manner provided by the Letters Patent aforesaid. Also in hanging the axis of the index at the south pole of the earth in a tubular bearing, instead of suspending it on a pivot as previously arranged.

The globe A represents the earth, and B the axis, on which is placed the sun in a complete terrasphere, but not represented in the drawing. The axis B passes through a supporting frame, C, which revolves on it to carry the earth in her orbit around the sun, and one end of the axis B is made fast to the supporting standard D. A small pinion, *a*, is made fast on the axis B, at one side of the revolving frame C, which pinion gears into an intermediate spur-wheel, *b*, gearing into another pinion, *a'*, on the opposite side, and of the same size as pinion *a*. The wheels *b* and *a'* are hung in the side of the revolving frame C. The axis *c* of the pinion *a'* projects through into the inside of the frame C, and upon the axis is secured by a set-screw the arm E that carries the north end of the axis of the earth, and preserves its vertical position while the earth revolves in its orbit and on its own axis, so that it retains always the same angle of inclination to the plane of the ecliptic. The axis of the earth has a ball on its end to hang in a socket in the arm E, or it may be suspended to it in a tubular bearing with shoulders. The southern end of the earth's axis is suspended in the small index *g*, which has an axis supported in a tubular bearing, *h*, instead of being hung on a pivot, as provided in the arrangement described in my Letters Patent aforesaid. On the axis *c* of the pinion *a'* is hung the arm *k* that supports the moon F, moving loosely around it to allow the moon to be placed in position by hand, as desired with relation to the earth. It will be observed that when the frame C revolves upon the axis B, to carry the earth in its orbit around the sun, the gear-wheels connecting the axis B with the axis *c* will move in concert with each other and thus keep the arm E in a vertical position, to preserve the same angle of inclination of the earth's axis to the plane of the ecliptic throughout her orbit.

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

1. The arm E, sustaining the north end of the axis of the earth A, combined with the axis *c*, and the gear-connection with the axis B, so as to preserve its vertical position throughout the revolution of the earth in her orbit, substantially as described.

2. Hanging the index *g*, at the south pole of the earth, in a tubular bearing, substantially as described.

ELEAZER ROOT.

Witnesses:

HENRY F. INGRAHAM,  
JOHN AUSTEN MERRICK.