G. McBRIDE.

Tellurian.

No. 198,647. Patented Dec. 25, 1877.

Fig: 1.

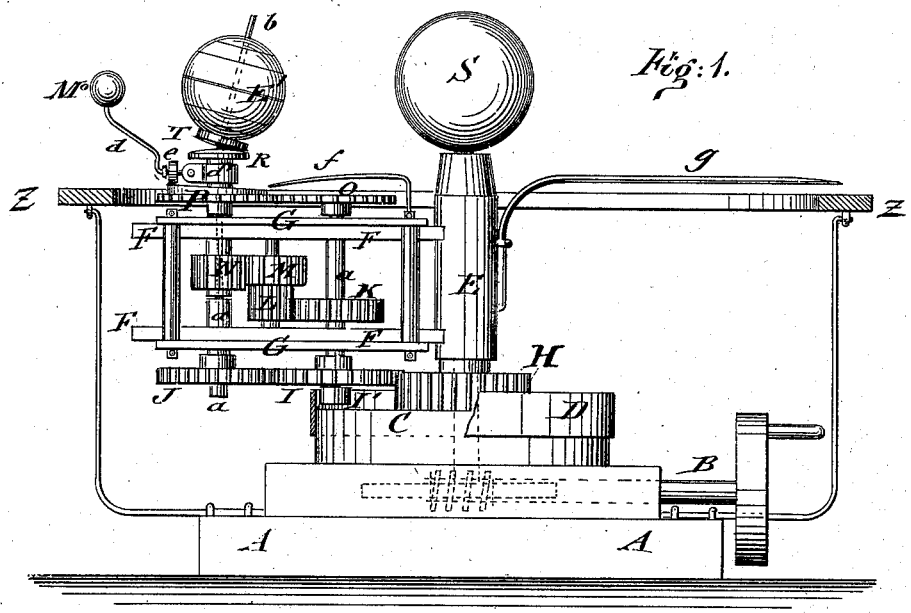


Fig: 3.

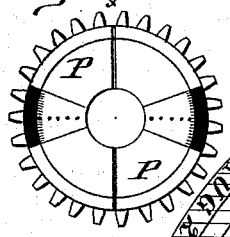


Fig: 2.




Fig: 4.




WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN TELLURIANS.

Specification forming part of Letters Patent No. **198,647**, dated December 25, 1877; application filed October 16, 1877.

*To all whom it may concern:*

Be it known that I, GIDEON McBRIDE, of Dover Hill, in the county of Martin and State of Indiana, have invented a new and Improved Tellurian, of which the following is a specification:

In the accompanying drawings, Figure 1 represents a side elevation of my improved tellurian, partly in section; Fig. 2, a top view of the same; Fig. 3, a detail top view of the inclined surface or dial of the moon-operating cog-wheel; and Fig. 4, a detail vertical central section of the same on line *x x*, Fig. 3.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish for the use of schools, &c., an improved tellurian of simple construction, by which the elliptic orbit of the earth around the sun, and the orbit of the moon around the earth, together with all the phenomena resulting from the relation of sun, earth, and moon to each other, may be fully and lucidly illustrated, embracing, among others, the succession of day and night, the change of seasons, the changes of the moon, solar and lunar eclipses, the entrance and progress of the same into and through the signs of the zodiac, &c.

The invention consists of a revolving center-post, carrying horizontal arms for guiding the mechanism that imparts motion to the earth and moon, and secures also, by connection with a fixed elliptic plane and flange or hoop, and with a fixed elliptic cog-wheel, the regular orbit of the earth.

The axial motion of the earth, and the rotation of the moon around the same, are obtained by friction-wheels, the friction-wheel of the moon-supporting wire traveling over an inclined dial, with suitable subdivisions to illustrate lunar and solar eclipses, as will be more fully explained hereinafter.

Referring to the drawings, A represents the supporting-stand; B, a crank-shaft, which imparts, by a worm-wheel and intermeshing gear-wheel, revolving motion to an upright center-post, E, which supports the sun S.

A fixed elliptic plane, C, is attached to stand A, and provided with an elliptic circumferential hoop or flange, D, and a fixed elliptical cog-wheel, H, the major axis of which is placed in line with the major axis of the elliptic plane C.

Fixed and slotted horizontal arms F extend from the revolving center-post, and serve as guides for the sliding frame G, on which the train of gear-wheels is arranged by which motion is transmitted from the elliptic gear-wheel to the earth and moon.

Two vertical shafts, *a*, turn in bearings of the sliding frame G, and have at their lower ends intermeshing cog-wheels I and J, of which the cog-wheel I is geared into the fixed elliptic cog-wheel H, and serves, in connection with a friction-wheel, I′, that bears against the inner side of hoop D, to govern the orbit of the globe, and give the diurnal motion to the same.

By turning the crank-shaft B, rotary motion is imparted to the center-post E and arms F, and thereby the cog-wheel I caused to revolve at the same time around the elliptic cog-wheel H. The frame G is thereby caused to slide forward or back on the arms F, which brings the earth E′ at the upper end of the shaft of wheel J at the proper times, nearer to or farther from the sun.

The action of the friction-wheel I′ on the elliptic hoop holds the wheel I in gear with the elliptic cog-wheel H, so that a continuous elliptical motion is secured to the frame G, and thereby to the earth E′.

The intermeshing cog-wheel J causes inclined polar wire *b*, that forms the upper half of the shaft *a*, to point northward, or to maintain its polarity in all parts of its orbit around the sun or center.

A train of gear-wheels, K, L, M, and N, are set in motion by the shaft of wheel I, so as to revolve a convex wheel or plate, R, on the outer rim of which travels a small friction-wheel, T, which is attached to the lower end of the earth E′. The convex wheel R and friction wheel or rim T serve to impart the diurnal motion to the earth from west to east, a sleeve of the convex wheel being set on a sleeve of the gear-wheel N, that turns loosely around the center part of wire *b* of cog-wheel J.

At the upper end of the shaft of cog-wheel T is a cog-wheel, O, that gears with a cog-wheel, P, turning loosely on the sleeve of the convex wheel R. The wheels O and P are arranged at the upper part of frame G, and are intended to govern the orbit of the moon M°; also, to govern the moon in its orbit around the earth E′. The upper face of the wheel P is slightly inclined toward the south, and divided in the nature of a dial, by a line passing from the north to the south, into two equal parts, the line indicating the high and low sides of the dial.

A transverse dotted line, at right angles to the north and south line, is intended to mark the nodes of the moon, or the point where the orbit of the moon crosses the plane of the earth's orbit. At both sides of the transverse dotted line are arranged, along the outer rim of the dial, dark spaces, which are intended to cover a space of thirty-three degrees, sixteen and a half on each side of the nodes, as shown in Fig. 3. The dark spaces are divided into twenty-four equal parts and numbered.

The moon M° is supported at the end of a wire, *d*, that is pivoted to a loose sleeve, *d′*, turning on the sleeve of the convex-wheel R, the wire resting, by a small friction-wheel, *e*, on the outer rim of the dial, so that by the turning of the wheel P the wire-supporting friction-wheel is turned, and thereby the moon caused to revolve around the earth.

When the machinery is set in motion by the hand-crank, the cog-wheel O so acts on the wheel and dial P as to carry the outer rim back through a space equal to its entire circumference, thereby holding the high side of the dial to the north and the lower side to the south in all points of the orbit of the earth as it passes around the sun. At the same time the small friction-wheel traverses the outer rim of the dial, and revolves the moon around the earth, her orbit crossing the plane of the earth's orbit at the nodes.

The moon is, on account of the inclined surface of the dial, one-half of her time elevated five and a half degrees above the plane of the earth's orbit, and the other half depressed five and a half degrees below, ascending northward and descending southward.

A fixed index, *f*, passes radially from the sun and diametrically across wheel O, and serves to explain, in connection with the passage of the nodes past the same by the backward motion of wheel P, the lunar and solar eclipses, the former happening at full moon, when the earth is between sun and moon, while the latter happens at new moon, or when the moon passes between the earth and the sun.

The magnitude of the eclipses, whether total or partial, may be readily explained, in connection with the graduated dark spaces on the dial, by the teacher, so as to bring the entire subject clearly to the mind of the scholar.

A circle, Z, supported on wire arms, surrounds the whole of the revolving mechanism. The circle Z is intended to represent the line of the ecliptic, with the zodiac lying on either side. The inner or middle space is divided into twelve equal parts, intended to represent the twelve signs of the zodiac; the outer space into twelve equal parts, to represent the twelve months of the year.

A radial index-arm, *g*, of the revolving center-post E points, during the revolution of the working mechanism, to each of the twelve signs of the zodiac, and to each of the twelve months of the year.

The earth revolves in an elliptic orbit around the sun, and the moon at the same time around the earth, so that the different phenomena resulting from the relative positions of sun, earth, and moon to each other may be fully illustrated, and the different movements accomplished in a simpler and less costly manner than in the tellurians at present in use.

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

1. In a tellurian, the combination of the elliptic plane C, having hoop or flange D and fixed elliptic cog-wheel H, with the revolving center-post E, having guide-arms F, and with sliding frame G, friction-wheel I′, and cog-wheels I and J, the shaft of cog-wheel J carrying the earth E′, the whole being arranged to impart elliptical motion to the earth, substantially as shown and described.

2. In a tellurian, the combination of elliptic plane C, having hoop or flange D, fixed elliptic cog-wheel H, intermeshing cog-wheel I, friction-wheel I′, and cog-wheel J, having polar-wire extension, that maintains its polarity in all parts of its orbit around the sun S, substantially as set forth.

3. The combination of the elliptic plane C, having hoop or flange D, fixed elliptic cog-wheel H, intermeshing cog-wheel I, friction-wheel I′, gear-wheels K L M N, convex wheel R, and bottom rim T of earth E′, to impart a diurnal motion from west to east, substantially as specified.

4. The combination of the elliptic plane C, having hoop or flange, fixed elliptic cog-wheel H, intermeshing cog-wheel I, cog-wheel O at upper end of shaft of wheel I, upper cog-wheel P, having inclined face-dial, friction-wheel *e*, and moon-supporting wire *d* turning loosely on sleeve of wheel R, to govern orbit of moon M°, substantially as set forth.

5. The combination of a fixed index, *f*, extending radially from the sun and diametrically across upper cog-wheel O, with the intermeshing cog-wheel P, having inclined and subdivided face-dial indicating the nodes of the moon, to illustrate lunar and solar eclipses, substantially as set forth.

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Witnesses:
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