No. 635,175. Patented Oct. 17, 1899.

R. MOWERY.

TELLURIAN.

(Application filed Mar. 10, 1899.)

(No Model.)

2 Sheets—Sheet 1.

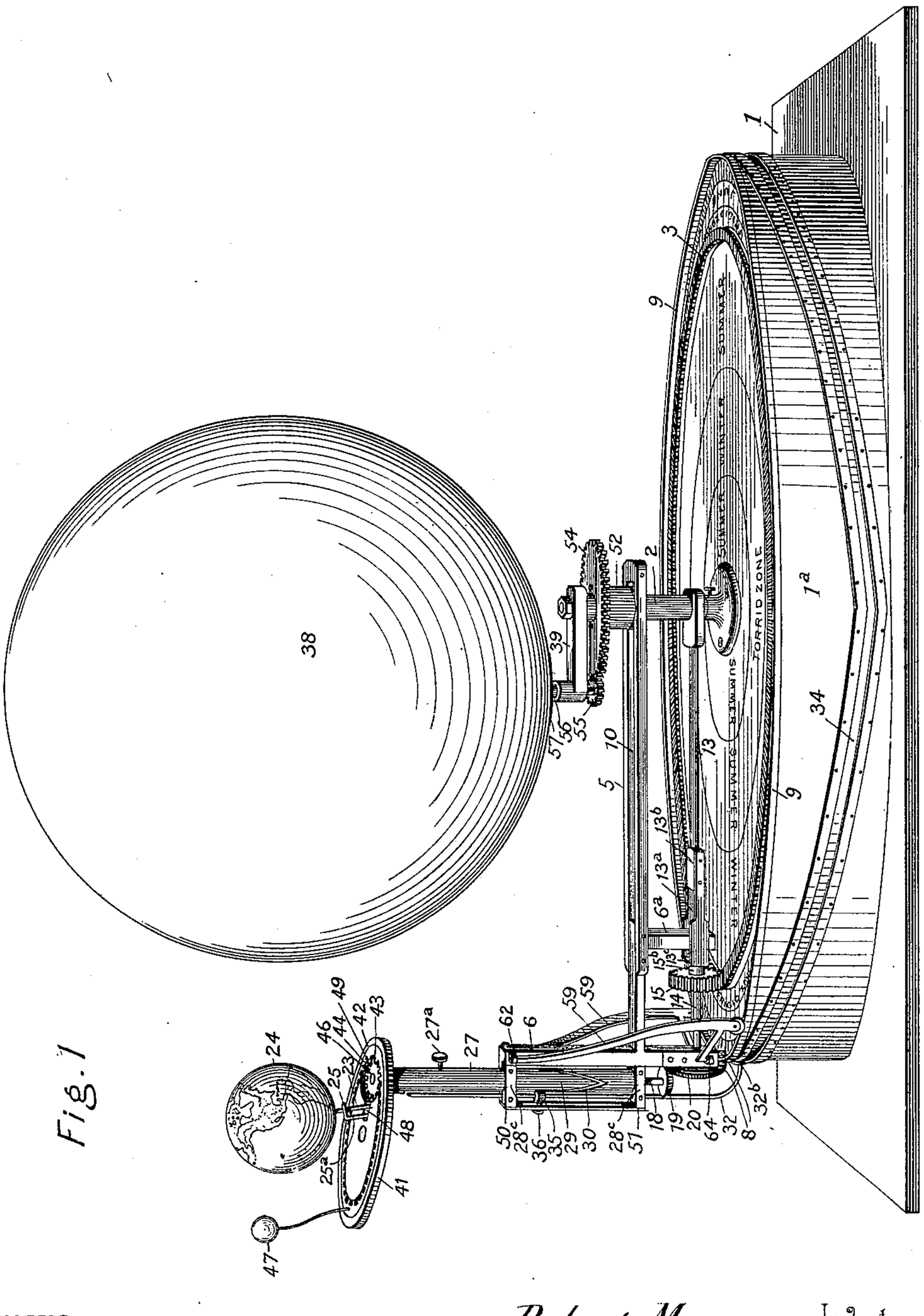

Fig. 1.

Witnesses

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Fig. 3.

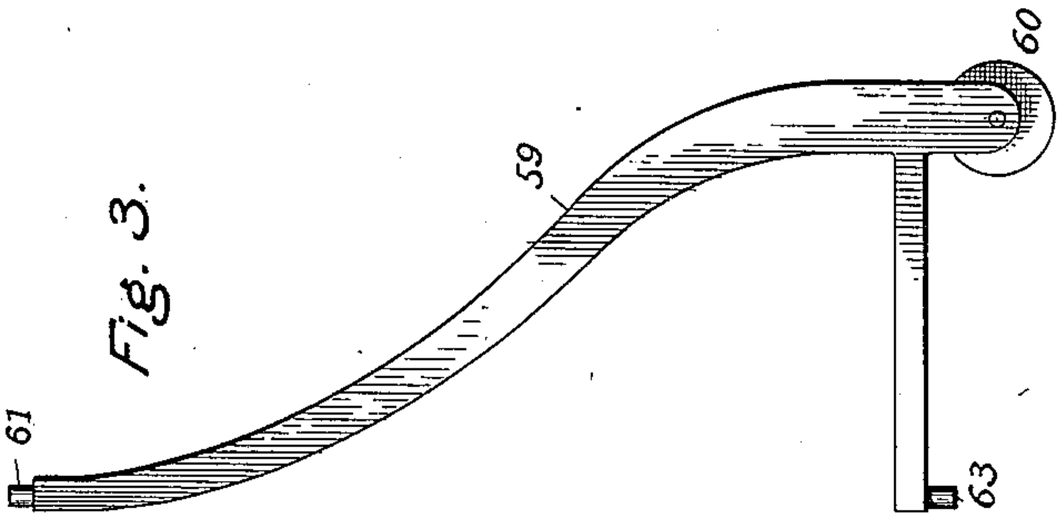
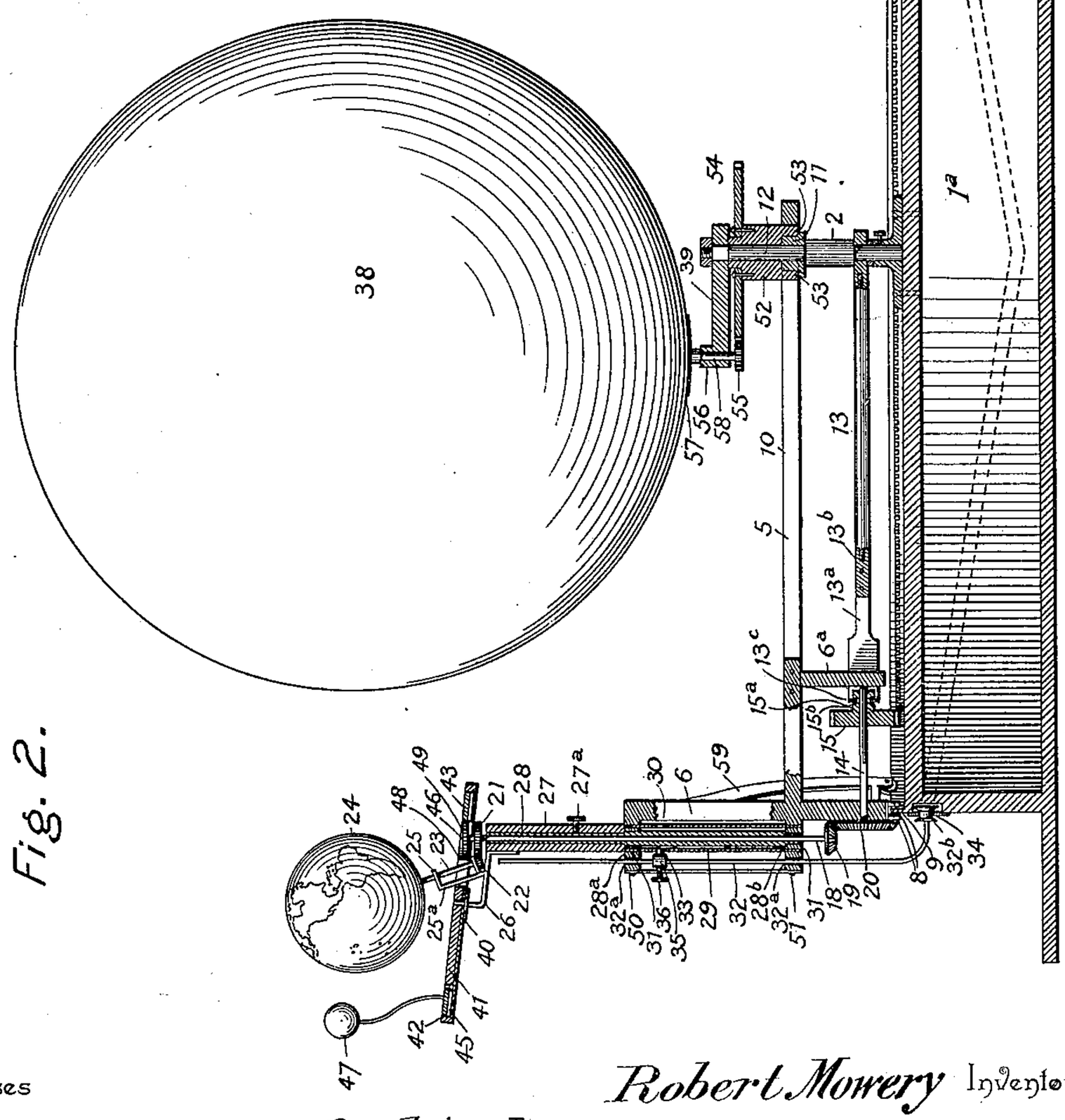


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT MOWERY, OF HOT SPRINGS, ARKANSAS, ASSIGNOR OF ONE-HALF TO JOSEPH R. KILGORE AND JOHN H. KILGORE, OF SAME PLACE.

TELLURIAN.

SPECIFICATION forming part of Letters Patent No. 635,175, dated October 17, 1899.

Application filed March 10, 1899. Serial No. 708,559. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MOWERY, a citizen of the United States, residing at Hot Springs, in the county of Garland and State of Arkansas, have invented a new and useful Tellurian, of which the following is a specification.

My invention relates to tellurians, and has for its object to provide a simple and efficient construction and arrangement of parts, consisting in an improvement upon the device shown in a former patent, No. 571,785, granted to me November 24, 1896, whereby the movements of the earth and moon with relation to the sun to cause day and night, the change of seasons, the vernal and autumnal equinoxes, the perihelion and aphelion, the phases of the moon, the ebb and flow of the tide, the eclipses, and other phenomena depending upon the relative positions of the represented bodies are illustrated, means being provided to maintain the axis of the earth at its proper inclination to the plane of the ecliptic.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a tellurian constructed in accordance with my invention. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a detail view of one of the lateral braces of the rotary frame.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

1 designates a base or platform upon which is erected an elliptical support 1^a, and rising from the support is a standard 2, surrounded upon the surface of said support 1^a by a circular rack 3. A sliding frame, consisting, mainly, of a radial bar 5, is slotted at its inner end to receive the standard 2, said bar having attached to it near its outer end an upright or brace 6, which extends downward to the plane of the surface of the support 1^a and is provided with axially-parallel guide-rolls 8, which operate upon opposite sides of a peripheral rim or track 9, said track consisting of a flat band secured to the edge of the support and extending upward from the plane of the surface thereof to allow contact of the guide-rolls with opposite sides of the same. The bar 5 is slotted longitudinally, as shown at 10, to receive a journal-block 11, which is fitted for rotary movement upon the reduced spindle portion 12 of the standard, whereby the frame is free to rotate around the standard as a center and at the same time is capable of longitudinal movement caused by the guide-rolls 8 traversing the track 9, the distance of the track from the standard varying to accord with the elliptical shape of the support 1^a. Depending from the bar 5 is a bracket 6^a, which slidingly engages a brace-rod 13, fulcrumed upon a second spindle portion of the standard 2 and provided at its outer end with a longitudinal guide or way 13^a, formed by parallel plates suitably folded at their inner ends to a block 13^b, which is threaded upon the outer end of the body portion of the rod. The extremities of these plates are turned inward and cut away to form a bearing 13^c, in which is mounted the reduced journal portion 15^a of the hub 15^b of a pinion 15, which traverses the rack 3. Mounted in a suitable bearing in the upright 6 is a horizontal shaft 14, upon which the said pinion 15 is feathered, the hub of the pinion being hollow to allow the shaft to extend therethrough and into the guide or way 13^a at the outer end of the brace-rod 13.

The frame also supports at its outer end a vertical spindle 18, provided at its lower end with a bevel-gear 19, which meshes with a similar gear 20 on the outer extremity of the shaft 14, and is provided at its upper end with a gear 21 to mesh with a pinion 22 on the spindle 23 of the earth-globe 24. This spindle of the earth-globe is mounted in bearings 25, arranged in alinement and supported by a bracket 26, and the bracket is carried by a collar 27, which is fitted upon and secured by a set-screw 27^a to the upper reduced end of a tubular bearing-shaft 28, whereby said bracket and shaft are adapted for simultaneous rotation. This bearing-shaft is fitted at its upper and lower extremities in bearings 28^a and 28^b, formed in upper and lower brackets 50 and 51, supported by the frame, said bearings being closed by suitable cap-plates

28ᶜ. Also permanently fixed to said bearing-shaft and disposed concentric with the spindle 18 is a cylindrical drum or shell 29, provided with a cam-slot 30, said drum or shell being spaced from the shaft 28 by means of upper and lower collars 31, which are rigidly secured in place.

Mounted upon the frame for vertical movement and preferably extending through guide openings or bearings 32ᵃ, also formed in said brackets 50 and 51, is an operating-rod 32, arranged at its lower end in operative relation with a cam groove or way 34, formed in the side surface of the support 1ᵃ and preferably bearing an antifriction-roll 32ᵇ, which operates in said groove or way. Carried by the operating-rod is a pin 33, which extends from a collar 35, fitted upon the rod and held in place by a set-screw 36, said pin being arranged to engage the cam-slot 30, and as said operating-rod reciprocates vertically during the movement of the frame around the standard 2 as a center the pin 33 reciprocates in the slot 30, and thus turns the spindle 28 of the bracket 26 to maintain the axis of the earth-globe at an inclination in a uniform direction in all positions of the parts. This operation is necessary in order to illustrate the change of seasons and the vernal and autumnal equinoxes, as will be seen by those familiar with this art. In other words, the operating-rod 32, in combination with the drum having a cam-groove, maintains the axis of the earth-globe at an inclination which is permanent with respect to a fixed object outside of the orbit of the earth-globe.

Supported by a disk 40 at the extremity of the bracket 26 is a table 41, arranged at a slight inclination downward in the direction of inclination of the axis of the earth-globe, and this table is provided with a circumferential seat 42, in which is mounted an annular carrier 43, provided with internal gear-teeth 44. Said carrier preferably has an antifriction-bearing in the seat 42, and the teeth thereof mesh with a pinion 46, secured to the upper extremity of the spindle 18 above the plane of the gear 21. This carrier supports a moon-globe 47, and during the rotation of the frame around the central standard 2 the moon-globe is caused to rotate in an approximately horizontal plane around the earth-globe, the plane of the orbit being, however, at an inclination to the axis of the earth-globe. The arm 25ᵃ, which supports the bearings for the earth-globe spindle, extends upward through an opening or slot 48 in the table, and the pinion 46 operates in a circular opening 49.

Mounted upon the standard 2 above the plane of the supporting-bar 5 and resting thereon is a collar 52, provided with depending lugs 53, which extend downward into the slot 10 of said bar 5, whereby the collar receives rotary motion from the supporting-frame, while it maintains a fixed position axially with relation to the standard 2. Said collar carries a gear 54, meshing with a pinion 55 on the spindle 58 of the sun-globe 38, said spindle being secured to the sun-globe in the construction illustrated by means of a suitable plate 57. Said spindle 58 is mounted in a bearing 56 at the extremity of a sun-globe-supporting arm 39, which is fixed to the standard 2 above the plane of the gear 54. By the means including the rotary gear 54, pinion 55, and fixed supporting-arm 39 the sun-globe receives rotary motion, which represents the axial rotation of the sun.

In addition to the above-described means for maintaining the supporting-frame in its operative position, said means including the antifriction guide-rolls at the lower end of the upright 6, which coöperate with the peripheral flange or rim 9, and the pinion 15, which traverses the rack 3, I have found in practice that it is desirable to employ braces 59, extending in opposite directions from the radial plane of the supporting-frame and provided with grooved pulleys 60 to traverse the rim 9. Each of these braces is provided at its upper end with a trunnion 61, fitted in a bearing in a lateral ear 62, extending from the upper bracket 50, and also with a lower trunnion 63, mounted in a similar bearing in a lateral ear 64, projecting from the upright near its lower end. It is obvious that these braces serve to strengthen and steady the supporting-frame laterally or in the direction of movement thereof, and the pivotal mounting thereof adapts them to follow accurately the rim traversed by their rollers 60. It will be seen, further, from the foregoing description that the function of the retaining-rod 13 is to maintain the pinion 15 at a fixed distance from the axis of movement formed by the standard 2 without causing undue frictional resistance and also without preventing the free radial reciprocation of the frame with relation thereto, such reciprocation being due to the guide-rolls 8 traversing the elliptical rim 9. Power may be applied to any desired point of the swinging frame or its attachments to operate the device. The means for conveying motion to the earth-globe spindle and consisting of the gear 15, spindles 14 and 18, and operating parts are simple and their operation is direct and efficient.

As a means of indicating the seasons in the different zones at corresponding periods of the year I preferably provide the upper surface of the support 1ᵃ with a series of belts marked to represent the different seasons and zones and surround these belts with a calendar, including the months of the year. As the position of the earth-globe with relation to the sun-globe controls the seasons a comparison of the rotary frame with the chart formed by the upper surface of the support will indicate at any given period of the year the seasons which will be found in the different zones. Furthermore, in practice various changes in the form, proportion, and the minor details of construction within the

scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. In a tellurian, the combination with a sun-globe, of a rotary frame, a bracket swiveled upon the frame, an inclined earth-globe axis mounted upon the bracket, to describe an orbit around the sun-globe, a fixed cam-guide, and an operating-rod having an adjustable device thereon to engage the cam-guide and move said rod vertically, whereby rotary motion may be imparted to the bracket in accordance with the movement of the frame around its axis and preserve a uniform direction of inclination of the earth-globe axis.

2. In a tellurian, the combination with a sun-globe, of a rotary frame, a bracket swiveled upon the frame, an inclined earth-globe axis mounted upon the bracket to describe an orbit around the sun-globe, a fixed cam-guide, an operating-rod actuated by said cam-guide, a drum operatively connected with said bracket and having a cam, and means carried by said operating-rod for traversing the cam, and adapted to impart rotary movement to said bracket to preserve a uniform direction of inclination of the earth-globe axis, substantially as specified.

3. In a tellurian, the combination with a sun-globe, of a rotary frame, a bracket swiveled upon the frame, an inclined earth-globe axis mounted upon the bracket to describe an orbit around the sun-globe, a fixed cam-guide, an operating-rod actuated by said cam-guide, a drum operatively connected with said bracket and having a cam-slot, and a guide-pin carried by said operating-rod to traverse the cam-slot, whereby rotary movement is imparted to the bracket to preserve the direction of inclination of the earth-globe axis, substantially as specified.

4. In a tellurian, the combination with a sun-globe, of a rotary frame, a bracket swiveled upon the frame, an inclined earth-globe axis mounted upon the bracket to describe an orbit around the sun-globe, a fixed cam-guide, a reciprocatory operating-rod actuated by said cam-guide, a drum operatively connected with said bracket and having a cam-slot, a pin adjustably mounted upon the operating-rod to traverse said cam-slot, and means for securing said pin in its adjusted positions upon the rod, substantially as specified.

5. In a tellurian, the combination with a sun-globe, of a rotary frame, a bracket swiveled upon the frame, an inclined earth-globe axis mounted upon the bracket to describe an orbit around the sun-globe, a fixed cam-guide, a reciprocatory operating-rod actuated by said guide, a drum operatively connected with said bracket and having a cam-slot, a collar adjustably fitted upon the operating-rod and provided with a pin to traverse said cam-slot, and a set-screw for securing the collar in an adjusted position upon the rod, substantially as specified.

6. In a tellurian, the combination with a sun-globe, of an elliptical track, a rotary frame arranged in a radial position with relation to the track, mounted at its outer end upon and adapted to traverse the track, and slidingly mounted at its inner end, a bracket swiveled upon the frame, an inclined earth-globe axis mounted upon the bracket, a fixed cam-guide, an operating-rod mounted for vertical reciprocation upon the rotary frame and provided at its lower end with a guide-roll operating in said cam-guide, a drum operatively connected with said bracket and having a cam-slot, and a guide-pin carried by the operating-rod to traverse said cam-slot, substantially as specified.

7. In a tellurian, the combination with a sun-globe, of a rotary frame, an elliptical support provided upon its side surface with a cam-guide, an elliptical track, a rotary frame arranged in a radial position with relation to the track and mounted at its inner end for sliding movement upon a central standard, guide-rolls mounted upon the frame to traverse said track, an operating-rod reciprocably mounted upon the frame and provided at its lower end with a guide-roll to operate in said cam-guide, a bracket swiveled upon the frame and carrying an inclined earth-globe axis, a drum operatively connected with said bracket and having a cam-slot, and a guide-pin carried by the operating-rod to traverse said cam-slot, substantially as specified.

8. In a tellurian, the combination with a sun-globe, of an elliptical track, a rotary frame arranged in a radial position with relation to the track, mounted at its outer end upon and adapted to traverse the track, and slidably mounted at its inner end upon a central standard, a rack concentric with the rotary frame, a pinion mounted upon the rotary frame to traverse said rack, a retaining-rod mounted coaxially with the rotary frame and having a swivel connection with the hub of said pinion, an earth-globe spindle mounted upon the frame, a shaft mounted upon the frame and having a feathered connection with said pinion, and operating connections between said shaft and the earth-globe spindle, substantially as specified.

9. In a tellurian, the combination with a sun-globe, of an elliptical track, a rotary frame mounted at its outer end to traverse said track, an earth-globe spindle mounted upon the frame, a radial shaft mounted upon the frame and operatively connected with said spindle, a circular rack concentric with the axis of movement of the rotary frame, a pinion traversing said rack and feathered upon said radial shaft, said pinion having its hub provided with a reduced spindle portion, and a retaining-rod mounted concentric with the axis of movement of the rotary frame and provided at its outer end with a bearing, in which said journal portion of the pinion is

mounted, and a communicating longitudinal slot for the reception of the inwardly-projecting portion of said radial shaft, substantially as specified.

10. In a tellurian, the combination with a sun-globe, of an elliptical track, a rotary frame mounted at its outer end to traverse said track, an earth-globe spindle mounted upon the frame, a radial shaft mounted upon the frame and operatively connected with said spindle, a circular rack concentric with the axis of movement of the rotary frame, a pinion traversing said rack and feathered upon said radial shaft, said pinion having its hub provided with a reduced spindle portion, and a retaining-rod mounted concentric with the axis of movement of the rotary frame and provided at its outer end with a bearing, in which said journal portion of the pinion is mounted, a communicating longitudinal slot for the reception of the inwardly-projecting portion of said radial shaft, and a bracket-arm carried by the rotary frame and slidingly engaging said slot of the retaining-rod, substantially as specified.

11. In a tellurian, the combination with a base and central standard, of a rotary frame including a radial bar provided with a longitudinal slot, a bearing-sleeve mounted upon the journal portion of the standard and operating in said slot of the radial bar, an elliptical track traversed by the outer end of the rotary frame, an earth-globe having its spindle mounted upon the rotary frame, means for communicating motion to the earth-globe spindle, a collar seated upon said radial bar and having lugs fitted in the slot thereof, a gear carried by said collar, a fixed sun-globe-supporting arm, and a sun-globe having its spindle mounted in a bearing upon said arm and provided with a pinion meshing with said gear, substantially as specified.

12. In a tellurian, the combination with a sun-globe, of a rotary frame mounted for radial sliding movement, an elliptical track traversed at its outer end by said frame, an earth-globe spindle mounted upon the frame, means for communicating motion to the earth-globe spindle, and braces pivotally mounted upon the frame, at opposite sides of the plane thereof, and provided with guide-rolls traversing said track, substantially as specified.

13. In a tellurian, the combination with a base, a central standard, a rotary earth-globe-carrying frame having a longitudinally-slotted bar disposed radially with relation to said standard, and means for imparting radial reciprocatory movement to the frame, of a journal-block 11 mounted upon said standard, and having a parallel-sided portion fitted in the slot of said frame-bar, a collar seated upon said journal-block and having projections extending into the slot of the frame-bar, a sun-globe having its spindle mounted in a bracket-arm supported by the standard, said spindle having a pinion, and a gear carried by said collar and meshing with the pinion, to impart rotary motion to the sun-globe spindle, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT MOWERY.

Witnesses:
J. W. HALEY,
H. E. GREENE.