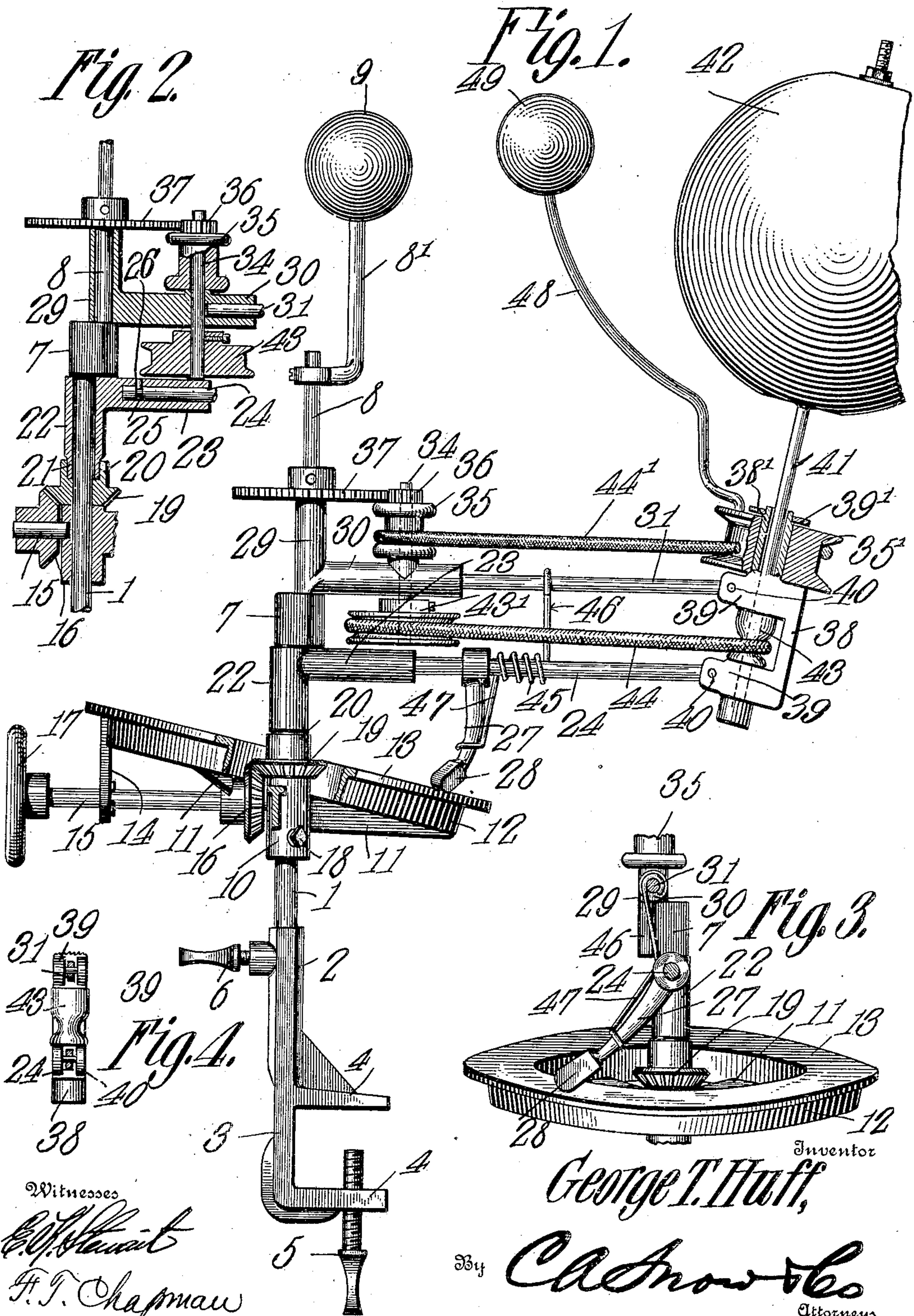


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TELLURIAN.

APPLICATION FILED MAY 20, 1908.

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Patented May 18, 1909.



Witnesses

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To all whom it may concern:

Be it known that I, GEORGE T. HUFF, a citizen of the United States, residing at Street, in the county of Harford and State of Maryland, have invented a new and useful Tellurian, of which the following is a specification.

This invention has reference to improvements in tellurians, and its object is to provide a mechanism of very simple construction for illustrating the rotation of the earth on its axis and the orbital movement of the earth around the sun, and also to provide a simple means for maintaining the inclination of the axis of the body representing the earth with respect to the plane of the ecliptic.

The invention comprises a suitable support which may be attached to a table or other object, the said support carrying an arm pivotally mounted thereon and another arm also pivotally mounted thereon but displaced so as to move eccentrically with relation to the first arm, and the two arms carry at the ends remote from their pivots a pivotal support for a rod or shaft representing the earth's axis and carrying a spherical body or globe representing the earth. The main shaft or support has mounted on it a globe representing the sun, and there are connections whereby as the globe representing the earth is rotated around the support for the sun globe, the earth globe is given an axial rotation corresponding to the diurnal rotation of the earth.

It is well known that the axis of the earth points constantly toward Polaris and that the plane of the axis is constant with respect to the plane of the ecliptic. In order that this may be accurately represented in the structure one of the pivoted arms is under the control of a track disposed at a suitable angle to the horizon so that, as will hereinafter appear, the axis of the globe is maintained in constant relation to a fixed point corresponding to the pole star.

The invention will be best understood by a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings—

Figure 1 is a side elevation, partly in section, of an apparatus made in accordance with the present invention. Fig. 2 is a vertical section, with parts in elevation, of a portion of the supporting and operating mechanism. Fig. 3 is a detail view show-

ing the track and arm traveling thereon and a portion of the coacting parts. Fig. 4 is a detail view of a bracket for the axial stem of the earth globe.

Referring to the drawings, there is shown a post or standard 1 mounted on the upper end of a socket member 2 of a clamp 3 having two arms 4—4 adapted to embrace a table top or other suitable fastening means to be removably held by a screw 5. The socket member 2 is also provided with a clamp screw 6 by means of which the post 1 is secured to the socket member 2. The post 1, at its upper end, has formed on it or secured to it a block 7 from which rises another post 8 disposed eccentrically with relation to the post 1. The post 8 has secured to it, so as to be rotated about it and fixed at any desired point, an offset rod 8', and at the upper end of the rod 8' there is secured a globe 9 which is designed to represent the sun without, however, an attempt at proportionate size.

At an appropriate point on the post 1 there is secured a sleeve 10 from which radiate a number of arms 11 carrying a ring 12, the upper surface of which is formed into a lateral annular flange 13. The ring 12 with its flange 13 is disposed at a suitable angle to the horizon. Depending from the ring 12 is a bracket 14 through which there is passed a shaft 15 having a bearing in said bracket and also having a bearing in the sleeve 10. Adjacent to the sleeve the shaft 15 carries a bevel gear 16, while at the outer end the shaft is provided with a hand wheel 17, by means of which it may be rotated. Of course any other means by which rotative movement may be imparted to the shaft may be used. The sleeve 10 is secured to the post 1 by a set screw 18 so that it may be adjusted longitudinally on said post and fixed at the desired adjusted position.

Mounted on the post 1 so as to turn freely thereon is another bevel gear wheel 19 in mesh with the gear wheel 16 and having its hub 20 counterbored to receive the reduced end 21 of a hub 22 also loosely mounted on the post 1 but secured to the gear wheel 19 by a close frictional fit of the reduced end in the counterbore of the hub 20. The adjustment is such that the upper end of the hub 22 is in close relation to the under side of the block or enlargement 7. The hub 22 is formed with a laterally-extending socket 23 into which is fitted a rod 24 having near

its inner end a groove 25 receiving a set screw 26 extending through the walls of the socket. By this means the rod 24 is securely held in an extension 23 but is free to be rotated on a longitudinal axis. Fast on this rod is an arm 27 extending laterally from the rod 24 and formed at its free end with a head 28 disposed at an angle to the length of the rod and in engagement with the face of the flange 13 of the ring 12.

Mounted on the post 8 in close relation to the top of the block 7 is another sleeve 29 provided with a laterally-extending member 30 formed with the socket for the reception of a rod 31 which, however, is fast in the sleeve, or the extension rod 31 may be made in one piece. The extension 30 also carries an upright shaft 34 upon which is mounted a spool or pulley 35 carrying a gear pinion 36 in mesh with a gear wheel 37 fast on the post 8 above the sleeve or hub 29.

At the outer ends of the two rods 24 and 31 is a socket member 38 secured by ears 39 formed at spaced points on said socket member and receiving between them the outer ends of the said rods, which latter are secured to the ears by means of pins 40. Mounted in the socket member 38 is a shaft 41 free to rotate in said socket member and carrying at its upper end a globe 42 representing the earth. The shaft 41 has fast to it a pulley or spool 43 in line with a pulley 43'. Mounted on the shaft 34 between the extensions 23 and 30, the said shaft passes through the extension 30 but not engaging the extension 23. These two pulleys 43 and 43' are connected by a belt 14. In order to accommodate the pulley 43 on the shaft 41 the socket member 38 is diverted to one side between the bearings of the shaft 41, as shown in Fig. 1.

Above the body of the socket member 38 there is a sleeve-like extension 38' surrounding the shaft 41, and receiving and constituting a bearing for a pulley 35' in line with the pulley 35 before referred to. The pulleys 35 and 35' are connected by a belt 44' and the pulley 35' may be held on the sleeve bearing 38' by a washer 39' frictionally applied to the outer end of the sleeve 38' or otherwise.

The arm 27, before referred to, is under the control of a helical spring 45 on the rod 24, and end extensions 46 and 47 of this spring engage the rod 31 and arm 27, respectively, the arrangement being such that the arm 27 has a tendency under the action of the spring to remain in engagement with the flange 13 under all circumstances. Suppose, now, that the hand wheel 17 is rotated, there is transmitted to the arm 24 a rotative movement about a vertical axis represented by the post 1, and this will cause the earth globe 42 to participate in this rotative movement. Assuming that the parts are in the position

shown in Fig. 1, it will be seen that the displacement of the post 8 with relation to the post 1 is sufficient to cause an inclination of the socket 38 and shaft 41 representing the axis of the earth to an extent of twenty-three and one-half degrees, which represents the inclination of the earth's axis to the plane of the ecliptic. As the rotation of the earth globe about the sun continues the head 28 of the arm 27 will ride along the inclined path formed by the flange 13 and the rod 24 will be twisted on its longitudinal axis, causing a corresponding inclination of the socket 38 with relation to a vertical plane cutting the rod 31, and the vertical planes cutting the rods 24 and 31 will be correspondingly displaced. The proportion of the parts is such that the shaft 41 on revolving around the sun globe will be inclined always in the same direction so as to be constantly directed toward a fixed point which may be taken as representative of the pole star. The earth globe travels in an elliptical path around the sun, the ellipse being caused by the resultant action of the eccentric displacement of the two posts 1 and 8 and the inclined track formed by the flange 13 acting through the arm 27 upon the rod 24. This will also tilt the plane of the axis of the earth globe with respect to the plane of the ecliptic so that the change of seasons effected by the apparent passage of the sun across the equatorial line of the earth may be observed. There is thus provided a simple apparatus by means of which the somewhat complex relative movements of the earth to the sun are caused to be represented without the necessity of gearing or other such mechanism.

The pulley 35' carries a supporting rod 48 on the end of which is a ball 49 representing the moon. The pulleys 35 and 43' and also the pulleys 35' and 43 are so proportioned that the moon's rotation about the earth is proportional to the earth's rotation about the sun.

In order that the belts 44 and 44' may remain in proper operative relation to their pulleys they may be made of elastic material so as to be in tight enough relation to these pulleys when they are in closest relation and stretch sufficiently to permit the movement of the pulleys apart when their relation changes.

What is claimed is:—

1. In a tellurian, a stationary upright post or support composed of two members in eccentric relation, rotatable sleeves one on each supporting member, rods each carried by a respective one of said sleeves, a socketed member carried by the ends of the rods remote from the sleeves, means for imparting a rotative movement to one of the rods on its longitudinal axis, a shaft carried by the said socketed member, and globes, one representing the earth and carried by the shaft

and the other representing the sun and carried by the upper one of the supporting members.

2. In a tellurian, a stationary support
5 formed of two posts eccentrically disposed one to the other, sleeves, one on each post, arms extending from said sleeves in parallel planes, an earth globe, an axial support for the same, a member carried by the ends of
10 the arms remote from the sleeves and receiving an earth axis, connections between the stationary support and the axial support of the earth globe for imparting rotative movement of the earth globe about
15 its own axis, means for imparting rotative movement of the earth about the fixed support, a circular inclined track, and an arm on one of the rods connected to the socket member supporting the axial support for
20 the earth globe, in operative relation to the track.

3. In a tellurian, a fixed support consisting of two posts one eccentric to the other, a globe representing the sun carried by one
25 of the posts, a sleeve on each post, a rod extending from each sleeve, the rods being in parallel planes, a socket member carried by the ends of the rods remote from the sleeves, a shaft mounted in the socket member, a
30 globe representing the earth and carried by said shaft, an inclined track on the fixed support, an arm carried by one of the rods, and in operative relation to the track, intermeshing gearing carried by the post supporting the sun globe and by the sleeve
35 mounted thereon, respectively, and elastic power transmitting connections between the gearing and the shaft carrying the earth globe.

4. In a tellurian, a fixed support composed of two posts in eccentric relation, a sleeve on each post, rods carried by the sleeves in parallel planes, a socket member carried by the ends of the rods remote from the sleeves,
45 a shaft carried by said socket member, a globe representing the earth carried by said shaft, an arm fixed on one of the rods, an inclined track carried by the support and engaged by the end of the said arm on one of
50 the rods, a spring engaging the arm and also engaging the other rod, and means for imparting rotative movement to the sleeves and the rods carried thereby about the fixed support.

5. A tellurian comprising a fixed support composed of a post, an inclined track secured thereto, a sleeve on said post, means for imparting rotative movement to said sleeve, a rod carried by said sleeve, an arm
60 carried by said rod and in operative relation to the track, another post above the first post and in eccentric relation thereto, a sleeve on the second post, a rod carried by the sleeve in parallel relation to the first-named rod, a
65 spring engaging the arm on the first-named

rod and also engaging the second-named rod, a socket member carried by the free ends of both rods, a shaft seated in said socket member, a globe representing the earth on said shaft, another globe representing the sun
70 and mounted on the second post, a fixed gear on the second post, another gear on the sleeve mounted on the second post, pulleys one fast to the second-named gear and the other to the shaft supporting the earth globe, and
75 elastic connections between the two pulleys.

6. A tellurian comprising a fixed support composed of a post, an inclined track secured thereto, a sleeve on said post, means for imparting rotative movement to said sleeve, a
80 rod carried by said sleeve, an arm carried by said rod and in operative relation to the track, another post above the first post and in eccentric relation thereto, a sleeve on the second post, a rod carried by the sleeve in
85 parallel relation to the first-named rod, a spring engaging the arm on the first-named rod and also engaging the second-named rod, a socket member carried by the free ends of both rods, a shaft seated in said socket member, a globe representing the earth on said
90 shaft, another globe representing the sun and mounted on the second post, a fixed gear on the second post, another gear on the sleeve mounted on the second post, pulleys
95 one fast to the second-named gear and the other to the shaft supporting the earth globe, elastic connections between the two pulleys, a second pulley fast on the second named gear, a pulley loose on the socket member
100 carrying the earth-globe, shaft connections between the two last-named pulleys, and a moon globe carried by the last loose pulley.

7. In a tellurian, a stationary upright post or support composed of two members in eccentric relation, rotatable sleeves, one on
105 each supporting member, rods carried by said sleeves, a socket member carried by the ends of the rods remote from the sleeves, a shaft carried by the socket member, a shaft
110 carried by one of the rod supporting members, gear connections between the last-named shaft and the upright post or support, pulleys on the said last-named shaft, pulleys axial to the first-named shaft, one
115 pulley being fast thereon and the other pulley loose thereon, connections between the two sets of pulleys and globes, one representing the sun, on the fixed support, one representing the earth on the first-named
120 shaft, and one representing the moon carried by the pulley loose on the first-named shaft.

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

GEORGE T. HUFF.

Witnesses:

PURNELL F. SAPPINGTON,
GEORGE BUCKMAN.