3 Sheets--Sheet 1

G. S. McKENZIE.

Improvement in Telluriums.

No. 122,954.

Patented Jan. 23, 1872.

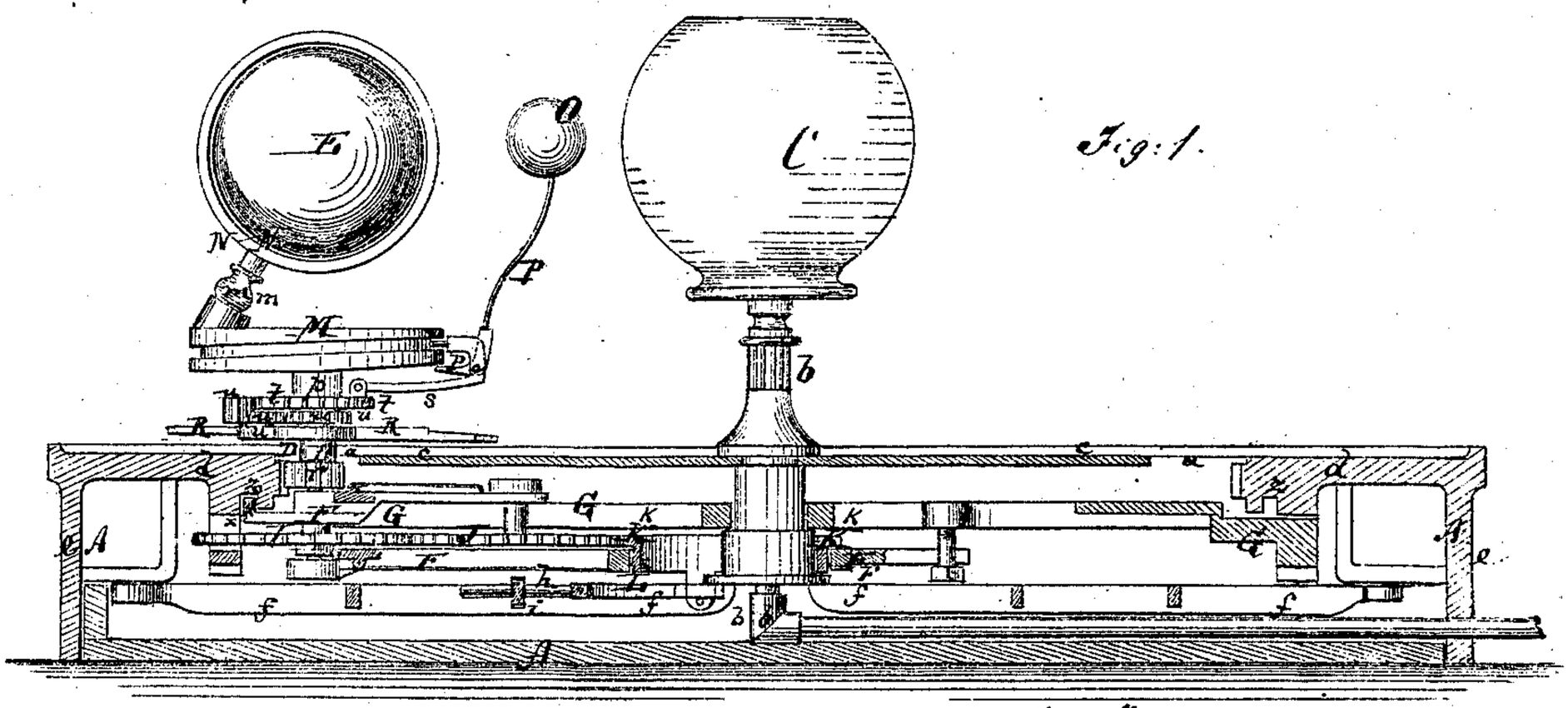

Fig: 1.

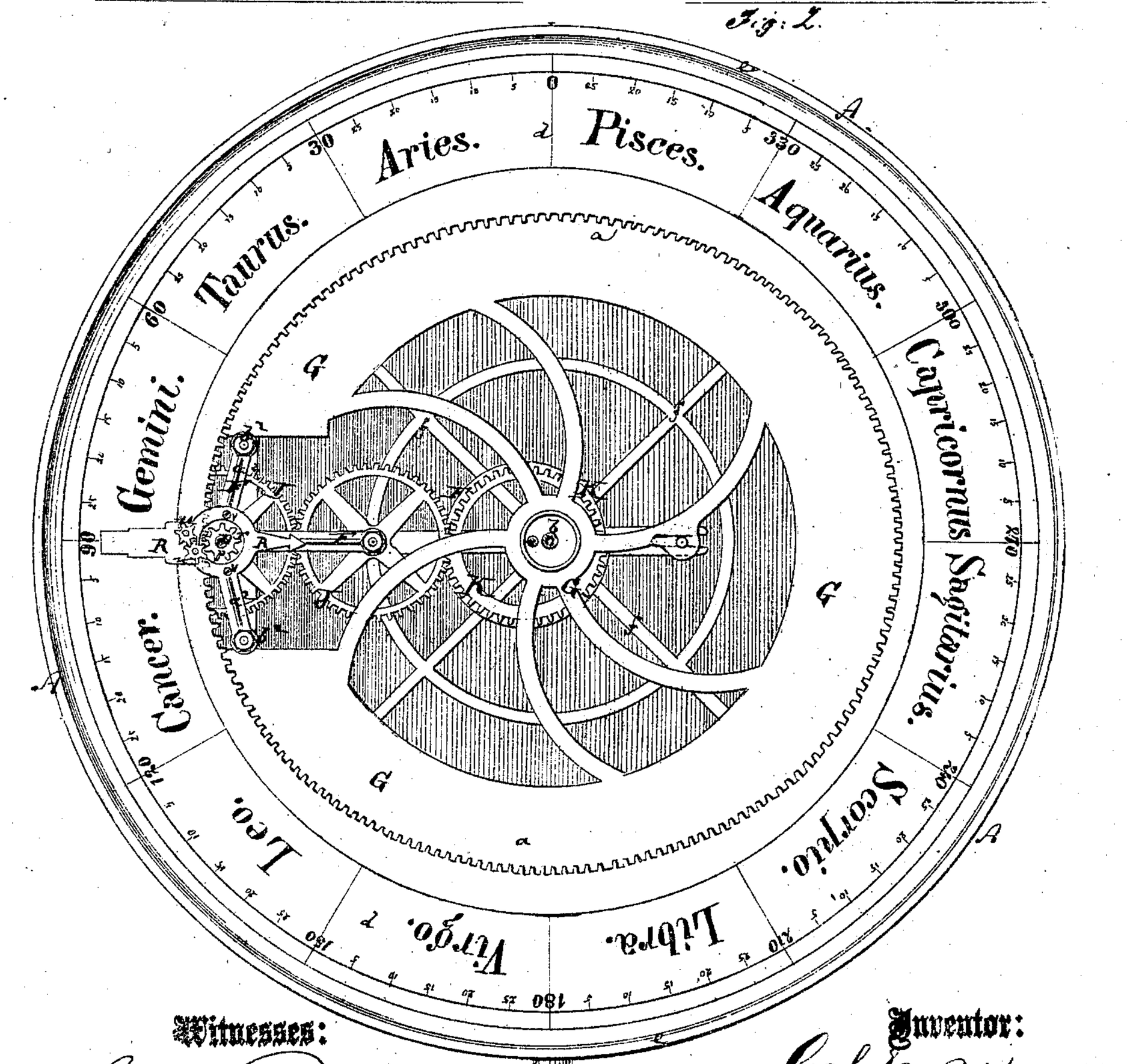

Fig: 2.

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3 Sheets--Sheet 2.

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Fig: 3.

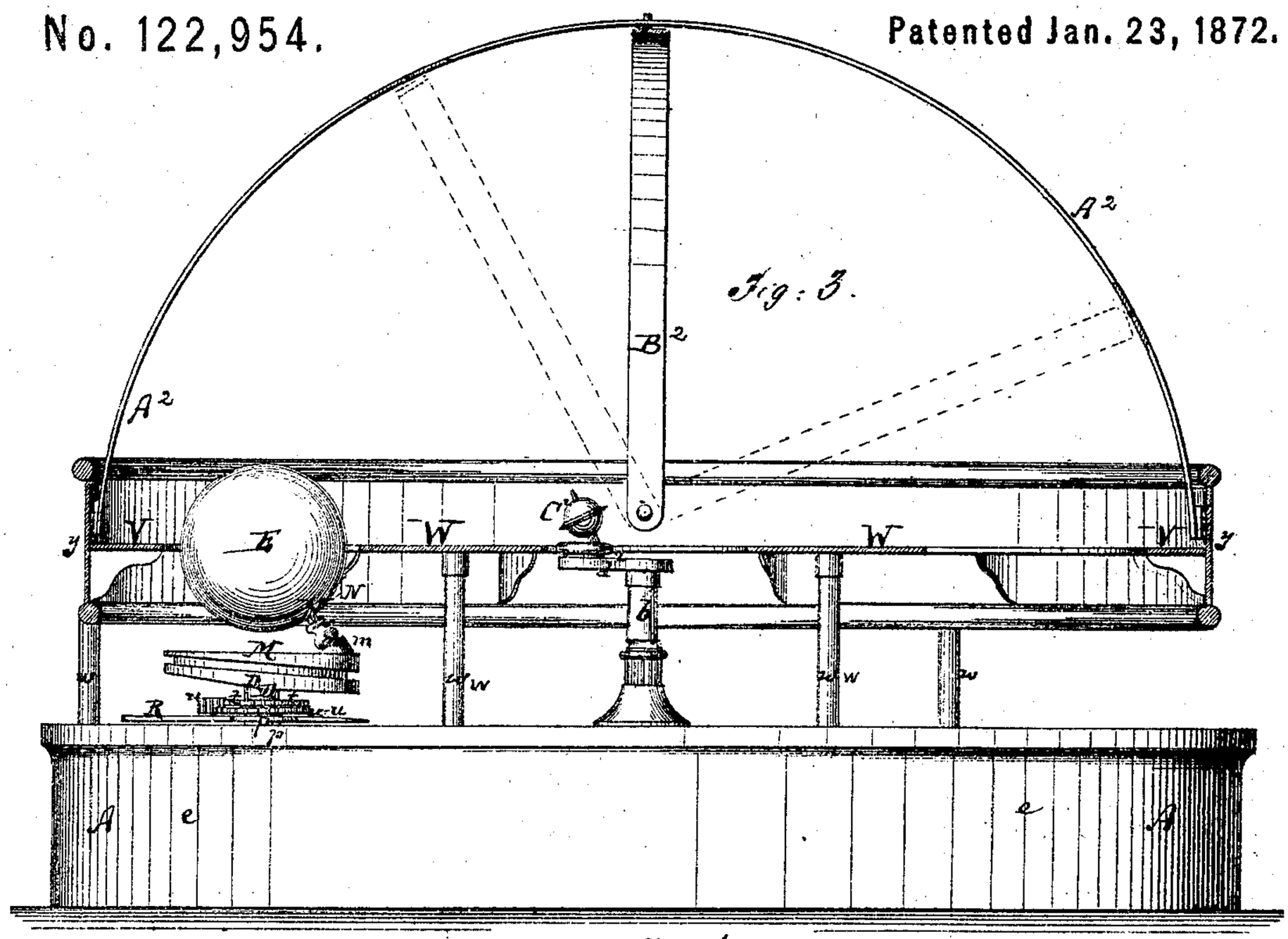

Fig: 4.

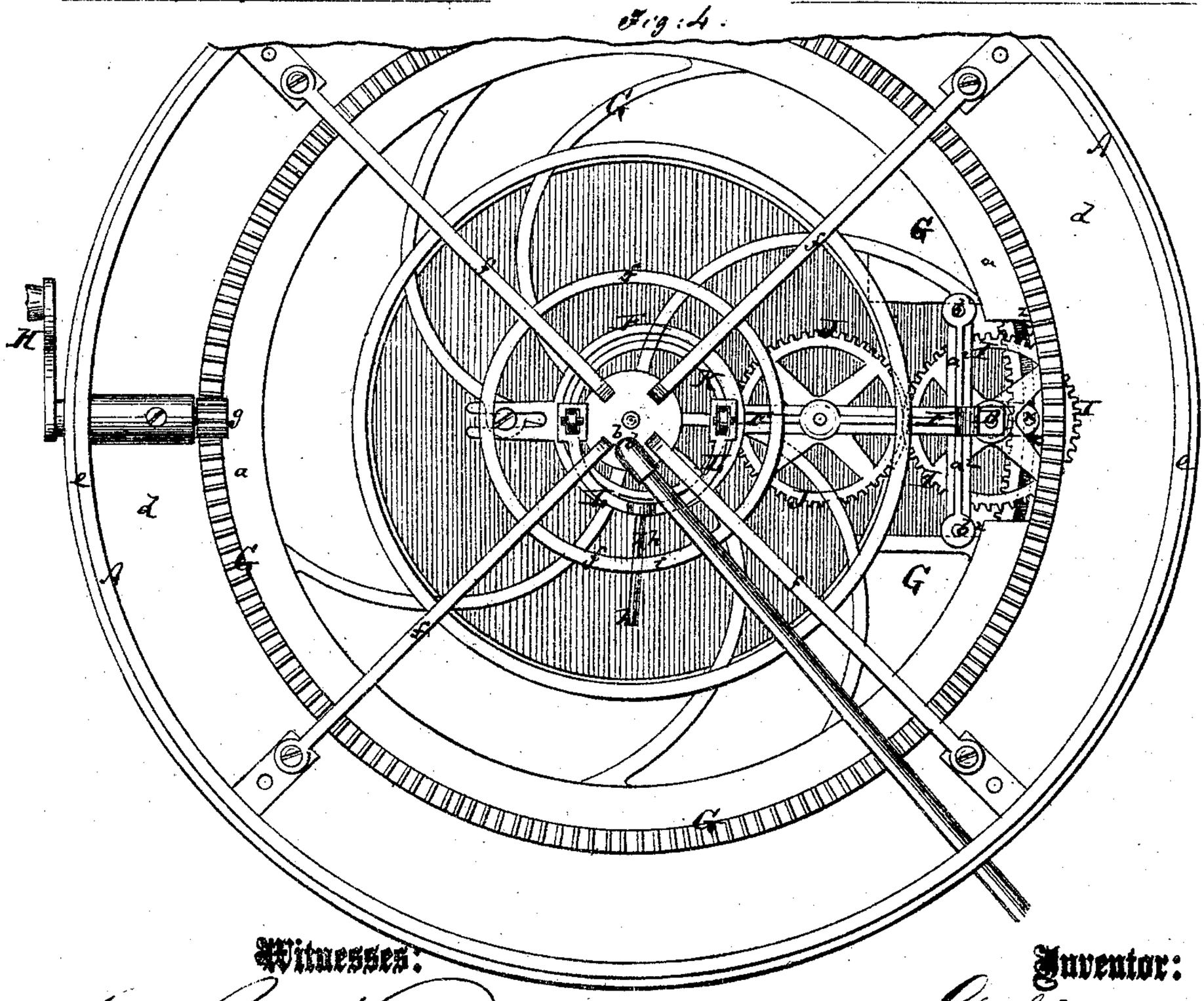

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Fig: 6.

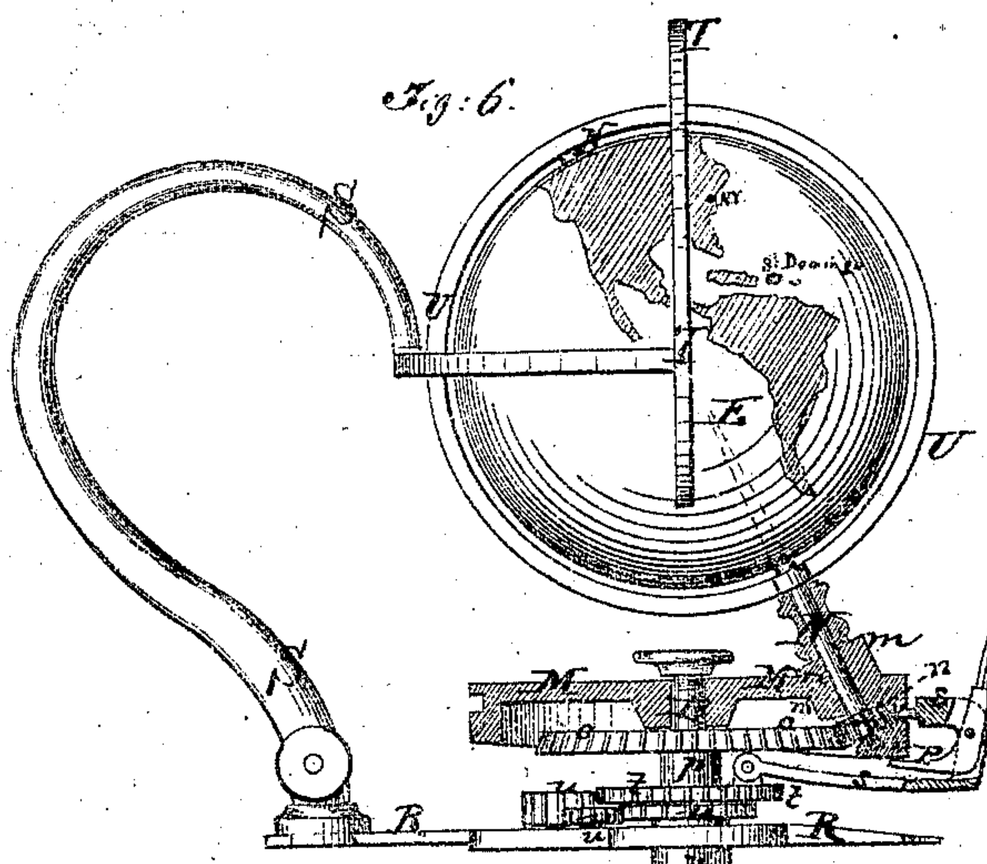


Fig: 7.

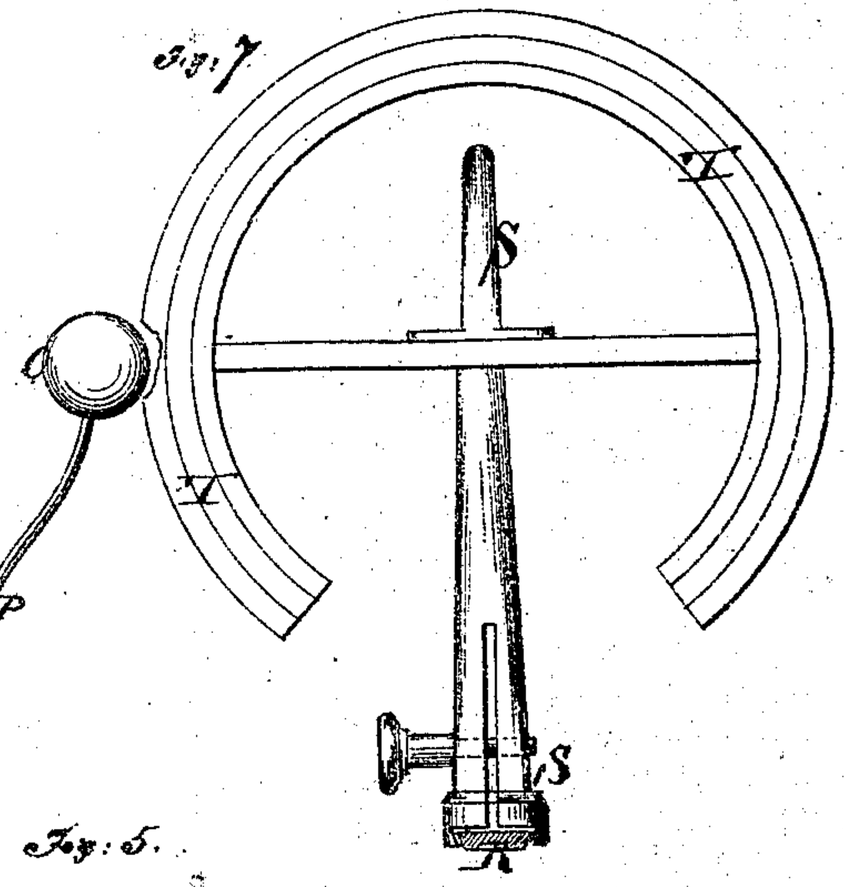
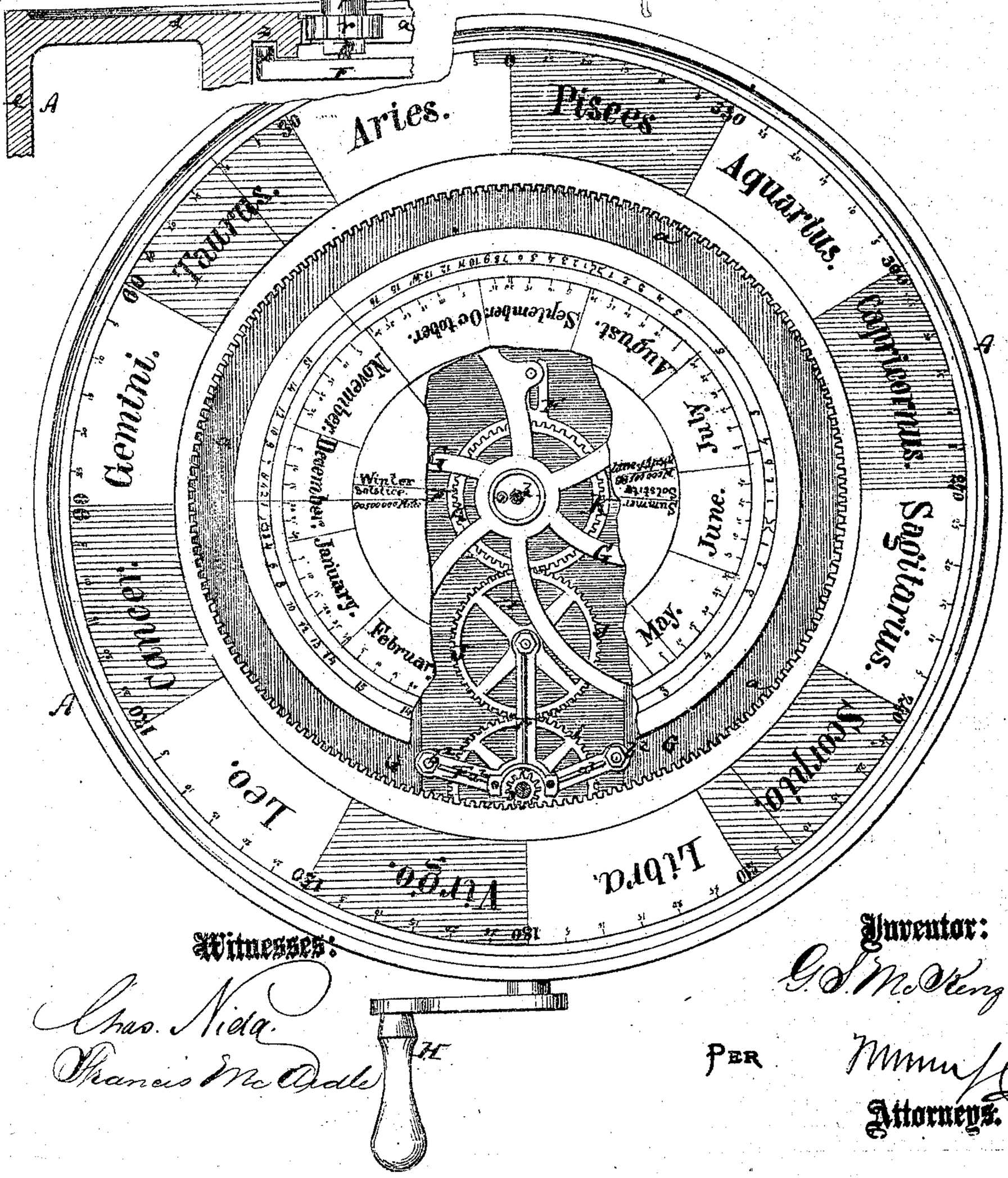


Fig: 5.



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122,954

UNITED STATES PATENT OFFICE.

GEORGE SHOTTER McKENZIE, OF NEW YORK, N. Y., ASSIGNOR TO WILLIAM J. GORDON, OF CLEVELAND, OHIO.

IMPROVEMENT IN TELLURIANS.

Specification forming part of Letters Patent No. 122,954, dated January 23, 1872.

To all whom it may concern:

Be it known that I, GEORGE SHOTTER McKENZIE, of the city, county, and State of New York, have invented a new and Improved Tellurian; 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 drawing forming part of this specification, in which—

Figure 1 represents a vertical central section of my improved tellurian. Fig. 2 is a plan or top view, partly in section, of the same. Fig. 3 is a side elevation, partly in section, of the same. Fig. 4 is an inverted plan view of the operating mechanism. Fig. 5 is a plan view, partly in section, of the same, showing the supporting axis of the globe in a different position from that shown in Fig. 2. Fig. 6 is an enlarged side view, partly in section, of the globe and mechanism for moving the same. Fig. 7 is a detail face view on an enlarged scale of the meridian ring and support.

Similar letters of reference indicate corresponding parts.

My invention consists in the improvement of the tellurian patented to S. P. Campbell, July 16, 1867, as hereinafter fully described, and subsequently pointed out in the claim.

In the accompanying drawing, A represents the low cylindrical case in which the machinery for operating the apparatus is set up. The top plate of the case A has an elliptic slot, which serves as the guide for the movement of the earth. From the center of the case A projects a burner, *b*, which holds a glass globe, C, that represents the stationary sun. The elliptic guide or track is so formed as to present the true course of the earth. Thus when the lines of the apsides are drawn together with those of the autumnal equinoxes it will appear that the perihelion is the nearest to the sun and the aphelion furthest away from the same, while the equinoxes are longer than the former and shorter than the latter. The ellipse is thus entirely irregular as should be. By the slot *a* the top plate of the case A is divided into two plates, *c* and *d*. The inner plate *c* is, at or near its rim, divided into twelve parts for the months, and each month divided into spaces representing the course of the earth during each day and month of a year. Besides this, there may be a table at the edge of the plate *c* to show the difference between clock and sun time, as is clearly indicated in Fig. 5. The outer annular plate *d* is divided into three hundred and sixty degrees, and has the signs of the zodiac marked on it. The outer plate *d* is supported by the rim *e* of the case A, while the inner plate is held to a central projection of a strong frame, *f*, which is arranged within the case, as shown in Fig. 1. A pin, D, projects from within the case A through the slot *a*, and serves as the support for the globe E representing the earth. This pin is to be carried along in the slot *a* without revolving on its own axis, so as to illustrate the constancy of the earth's axis and poles. The pin D projects from the outer end of a frame, F, that is connected with a large toothed wheel, G, hung in the case A. The wheel G receives rotary motion by means of a pinion, *g*, and crank H, and as it revolves it carries the frame F and pin D along with it. If the pin D would, however, be merely fixed to the rotating frame F it would not retain the constancy of its poles, for the side facing north would, after half a revolution of F, face south, while it is necessary that it should never change from its original direction. For producing the motion necessary for this constancy of position I have arranged three toothed wheels, I, J, and K, of equal diameter, within the case. One wheel, I, is mounted upon the pin D, and gears into the intermediate wheel, J, which is hung to the frame F. The innermost wheel, K, however, is loosely fitted around the arbor or shaft of the large wheel G, but not rigidly connected with the same. The wheel K is made without spokes—entirely annular—and is hung in the annular inner end of the frame F. It is connected with a semicircular or forked frame, L, which has a pin, *h*, projecting through a ring, *i*, of the fixed frame *f*, as shown in Figs. 1 and 4. The wheel K is, by means of the frame L, prevented from revolving, but can freely swing around the center of the wheel G. The outer end of the frame F has projecting arms a^2, which carry upright pins b^2, that fit a parallel-edged recess in the body of the wheel G, as is clearly shown in Fig. 2. This,

together with the ring-shaped inner end of the frame F, shows that it can slide on the wheel G.

When the said wheel G is revolved the pin D will be carried along in the slot *a*, owing to the sliding motion of the frame F and the simultaneous rotation of the same. By revolving the slide F around the stationary wheel K the wheel J receives a double rotation during every rotation of G once around its own axis and once around that of G, or rather K. This motion tends to impart rotation in a reverse order to the wheel I and pin D; but by revolving with the wheel G the wheel I is made to make one revolution in a direction opposite to that imparted to it by J, and the effect of the latter will, therefore, be only to revolve the wheel I and pin D once, so that any one side of the same will always point in the same direction.

To the upper end of the pin D above the case A is rigidly secured an inverted cup or shoulder M, from which projects the hollow bearing *m* for the shaft N that represents the earth's axis. The bearing *m* and shaft N are inclined at an angle of twenty-three and a half degrees, to illustrate the inclination of the earth's axis to its orbit. By being secured to the pin D the bearing *m* will always, during the operation of the apparatus, point in the same direction, showing thereby the constancy of the poles. The shaft N carries at its lower end—*i. e.*, below the cup M—a pinion, *n*, meshing into a toothed wheel, *o*, that is mounted upon a sleeve, *p*. The sleeve *p* is fitted loose around the pin D, so that it can revolve on the same. It carries a pinion, *r*, which is in constant contact with the toothed outer edge of the slot *a*. The meshing of said pinion *r* into the toothed edge of the slot *a* causes the pinion and sleeve to revolve and to impart rotary motion to the wheel *o*. Axial rotation is thereby imparted to the shaft N and globe E. O represents the globe of the moon fixed to a shank or holder, P, which is pivoted at its lower end to an arm, *s*, hinged to a toothed wheel, *t*, that is fitted loose around the sleeve *p*. By means of intermediate toothed wheels *u u* the wheel *t* receives rotary motion from the sleeve *p*. The wheels *u* are hung upon a frame, R, which is above the case A, fastened to the frame F by screws or pins *v*, shown in Fig. 2. The lower edge of the cup M is made cam-shaped, and against it the inward-bent lower end *j* of the shank D is held by the weight of the moon O. The cam serves to move the moon nearer to or further away from the globe E during the rotation of the moon around the globe of the earth. The combined attraction of earth and sun upon the moon is thus fully illustrated. From the frame R projects a post, S, which holds, by means of a horizontal semicircle, the meridian ring T, that shows the line of separation between day and night, and also the holding-ring U of the globe E, as shown. This post S is goose-neck-shaped, as in Fig. 6, to let the moon pass under it. If straight it would not allow the use of the moon together with the rings. V is a ring similar to the plate *d;* and W, a plate similar to the plate *c*, and nearly of the same size. These parts V and W can be placed upon the case A, as in Fig. 3, to be supported thereon by means of the posts *w w* in line with the middle of the sun, and serve to embody the plane of the ellipse, for illustrating on the inclined globe E the variations of the seasons. The moon may have or consist of a reflector, so that the phases may be fully illustrated by its motion around the earth without providing for axial rotation of the moon. The extreme outer end of the frame F carries a projecting pin, *x*, which enters an elliptic groove in the under side of the plate *d*. Thereby the longitudinal displacement of the said frame F is obtained during its rotation with the wheel G. To the ring *y* of the plate V are pivoted a pair of hoops, A^2 B^2, shown in Fig. 3, which can be locked together at their crossing and inclined, as shown by dotted lines. I have provided a miniature earth, C^2, which is swiveled to a plate, d^2, that is put upon the burner *b*, as in Fig. 3. The pole of this globe C^2 will point to the proper spot of the ellipse.

This instrument will be of great value in schools, colleges, and private libraries, as it clearly illustrates all the important changes and phenomena produced by the motion of the earth and moon.

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

The wheel I and pin D, the intermediate wheel J hung to frame F, and the loose and spokeless wheel K combined with the forked frame L *h* and driving-wheel G, as and for the purpose specified.

GEO. SHOTTER McKENZIE.

Witnesses:
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