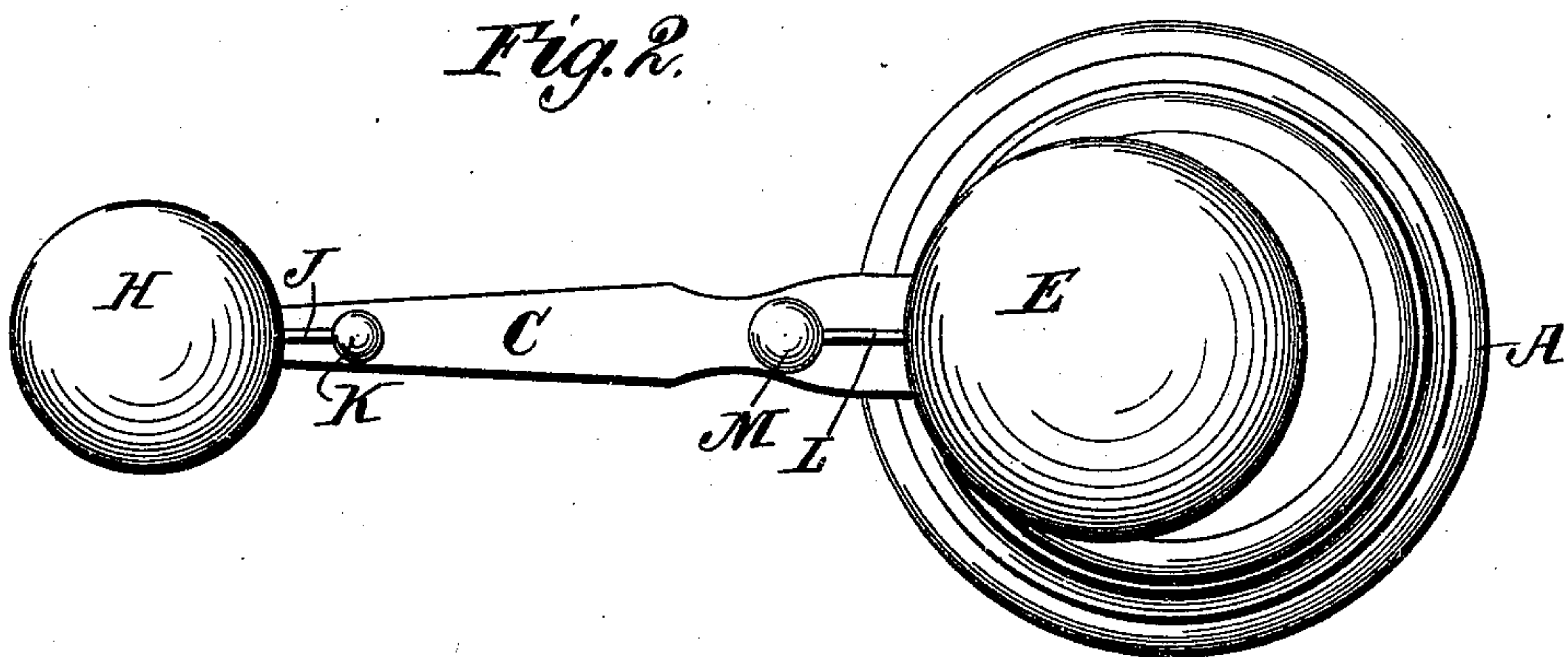
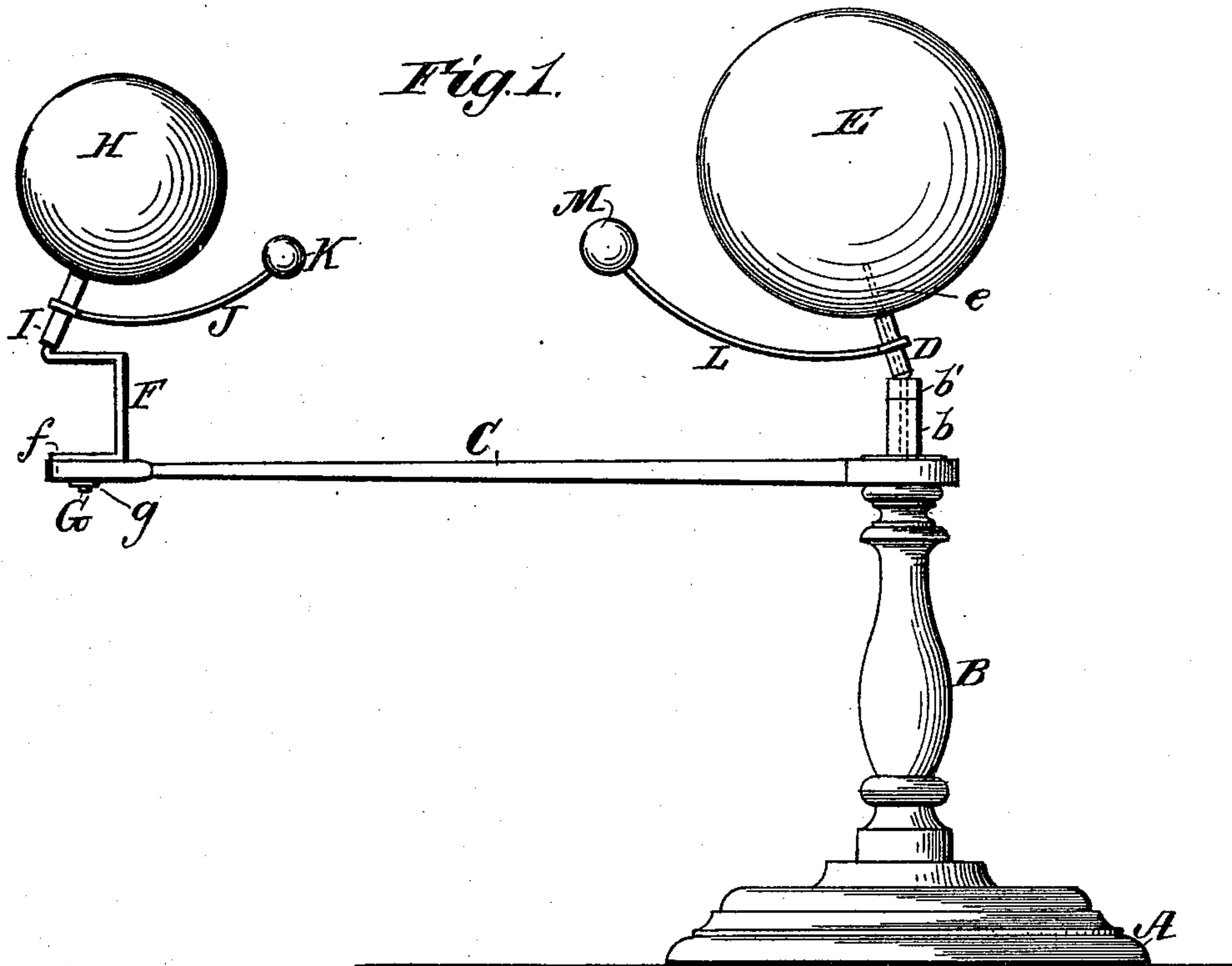


(No Model.)

G. E. HENDERSON.
ASTRONOMICAL APPARATUS.

No. 585,032.

Patented June 22, 1897.



Witnesses.
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UNITED STATES PATENT OFFICE.

GIDEON EUGENE HENDERSON, OF ESSEX, CANADA.

ASTRONOMICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 585,032, dated June 22, 1897.

Application filed October 31, 1895. Serial No. 567,550. (No model.)

To all whom it may concern:

Be it known that I, GIDEON EUGENE HENDERSON, a subject of Victoria, Queen of the United Kingdom of Great Britain and Ireland, &c., residing at the town of Essex, in the Province of Ontario, Canada, have invented a new and useful apparatus which I call the "Helioterra," of which the following is a specification.

10 This invention relates to planetariums, and has for its object to provide an improved, simple, and inexpensive planetarium or orrery by means of which the relative motions of the planets of the solar system may be 15 illustrated and the various phenomena resulting therefrom illustrated, the device being especially designed for illustrating the movements of the planet Mercury about the sun and the movements of the earth and its 20 satellite the moon.

To these ends my invention consists in the features and in the combination or arrangement of parts hereinafter described, and pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this 25 specification, wherein—

Figure 1 is a side elevation of my improved planetarium, and Fig. 2 is a plan view thereof.

30 In order that others may make and use my improved device, I will describe the same in detail, reference being made to said drawings, wherein similar letters of reference refer to like parts.

35 Referring to said drawings, the reference-letter A indicates a base with which is formed or to which is attached a vertical pedestal B, terminating at its upper end in a pintle *b*, which is capped with a ferrule *b'*. Firmly 40 affixed in said pintle and pedestal is a rod or wire *e*, (see dotted lines in Fig. 1,) which is bent or deflected at a slight angle from the vertical, as best shown in Fig. 1, and at its upper end is inserted and firmly secured in a 45 globe E, which is intended to represent the sun. Loosely journaled on the rod or wire *e* is a sleeve D, midway between the ends of which is soldered one end of an arm L, the other end of which is inserted in a small globe 50 M, representing the planet Mercury.

Journaled on the pintle *b* is a horizontal arm C, which is free to be revolved about

said pintle as a center. The outer end of said arm is suitably apertured, through which aperture passes the lower end of a bent rod or 55 wire F, a washer *g* being placed over the lower end of said rod or wire beneath the arm C and said end then upset or headed down beneath the washer. The rod or wire F immediately above the arm C is bent horizontally, as at *f*, 60 to prevent the rod or wire from slipping down through the aperture in the arm, and is then bent vertically for a suitable distance, thence horizontally, and is finally bent at a slight inclination to the vertical and is inserted in a 65 suitable aperture in a globe H, intended to represent the earth. Loosely journaled on the inclined portion of the rod or wire F is a sleeve I, midway between the ends of which is soldered one end of an arm J, the other end of 70 which is inserted in a small globe K, which represents the moon.

The operation of my device will be readily understood. By revolving the arm C about the pintle *b* as a center the globe H, representing the earth, is caused to move in a circular path, illustrating the revolution of the earth in its orbit around the sun, and by turning the wire F about G as a center the operator is enabled to keep the inclined axis of 80 the globe H, representing the earth as it is rotated about the sun, pointing in the same direction, thus illustrating the manner in which the north pole of the earth always points toward the pole star. The inclination 85 of the wire F enables the globe to be rotated so as to constantly alter its horizontal plane of rotation, thus illustrating that in addition to the rotation of the earth about its own axis its center of axial rotation also has an oscillatory or gyrating movement, exhibiting the 90 manner in which the change of seasons is caused and showing the manner in which the poles of the earth are inclined to the ecliptic. By rotating the globe H upon the wire F the 95 diurnal motion of the earth is illustrated. The globe K, representing the moon, may, by means of the arm J, be revolved about the globe H, thus illustrating the movement of the moon in its orbit about the earth and the 100 moon's phases, and in a manner that will be readily understood may also be exhibited the eclipses of the sun and moon. In like manner the globe M, representing Mercury, may be

revolved around the globe E, representing the sun, and as it is so revolved it gradually approaches the globe E, owing to the fact that the wire *e* is inserted in the globe E eccentrically instead of radially until it reaches a point directly opposite the point shown in the drawings, when the globe M will have reached its nearest point to the globe E, thus illustrating the fact that the orbits of the planets are not true circles concentric with the sun.

The plane of the circle described by the globe M inclines toward the plane of the circle described by the globe H as they are revolved around the globe E, owing to the inclination of the sleeve D, illustrating that the plane of the orbit of Mercury inclines to the ecliptic, and in like manner is shown that the plane of the moon's orbit is also inclined to the ecliptic.

It will be evident that many different astronomical phenomena may be illustrated by means of my improved planetarium and which it is not necessary to here describe.

I am aware that planetariums, orreries, or tellurians have been devised prior to my invention for illustrating the relative movements of the planets relative to each other and to the sun, and do not claim such, broadly; but,

Having described my invention, what I claim is—

1. In a planetarium, the combination with the pedestal B having secured to its upper end a fixed inclined rod *e*, of a globe E eccentrically mounted on said rod, a sleeve D journaled on the inclined portion of said rod, and an arm L affixed at one end to said sleeve and supporting at its other end a globe M, whereby when the arm L is rotated about the inclined rod *e* as a center the globe M is caused to approach and recede from the globe E, substantially as described.

2. In a planetarium, the combination with the pedestal B having secured to its upper end an inclined rod *e*, of a globe E eccentrically mounted on said rod, a sleeve D journaled on the inclined portion of said rod, an arm L affixed at one end to said sleeve and supporting at its other end a globe M, a horizontal arm C journaled at one end on said pedestal, a rod F rotatably mounted in the free end of said arm and inclined at its upper end, a sleeve I journaled on said inclined portion and having attached thereto an arm J carrying a globe K, and a globe H rotatably supported on the upper inclined end of the rod F, substantially as described.

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Witnesses:

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