W. W. ATWOOD.

SIDEREAL SPHERE.

APPLICATION FILED JUNE 21, 1911.

1,019,405. **Patented Mar. 5, 1912.**

Fig. 1.

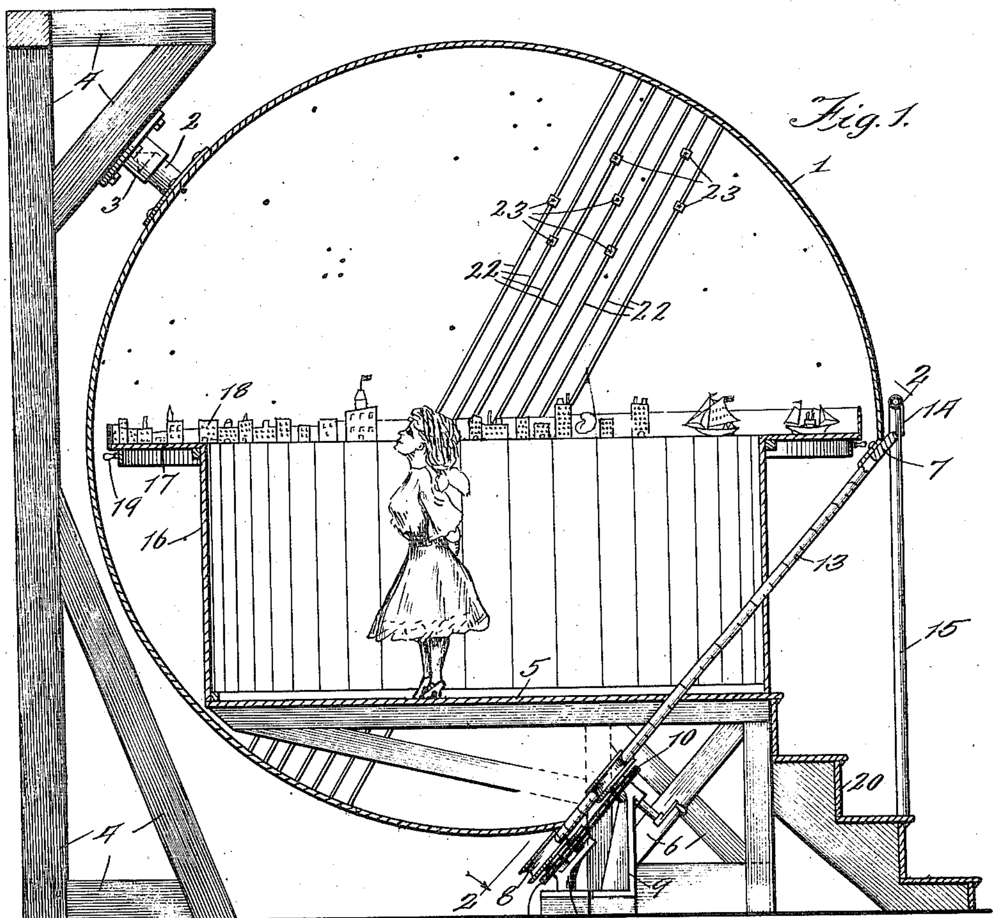


Fig. 2.

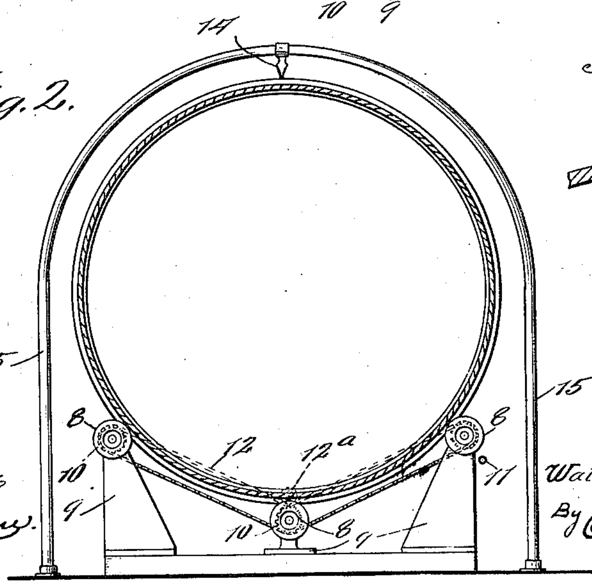
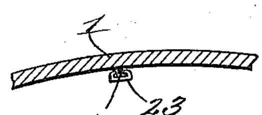


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

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SIDEREAL SPHERE.

1,019,405. Specification of Letters Patent. Patented Mar. 5, 1912.

Application filed June 21, 1911. Serial No. 634,497.

To all whom it may concern:

Be it known that I, WALLACE W. ATWOOD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Sidereal Spheres, of which the following is a specification.

My invention relates to sidereal spheres, and the object of the invention is to provide apparatus of this character which will present to an observer within the sphere the appearance of the heavens at the particular place on the earth where the apparatus is located. Contributory to this general object it is my purpose to provide a sphere whose axis of rotation is inclined to correspond with the latitude of the place, for example at Chicago where the latitude is about forty-two degrees the inclination of the axis will be about forty-two degrees from the vertical; and to provide a stationary platform within the sphere upon which the observer may stand.

Another object is to provide means whereby the observer may learn the positions of the stars and constellations by comparison with objects in the landscape with which he is familiar.

Another object is to provide means for obtaining the effect of perspective or distance between the objects in the landscape and the spherical shell which represents the heavens.

Another object is to provide means whereby the sphere may be rotated and set so that it may correspond in position not only with the latitude, but also with the date and hour of observation.

I accomplish my objects by the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of the complete apparatus. Fig. 2 is a sectional view taken on the line 2—2, Fig. 1. Fig. 3 is a fragmentary detail showing a suitable construction for the planet tracks.

Similar numerals refer to similar parts throughout the several views.

The sphere 1 has upon its inner surface a representation of the stars and various constellations. Said sphere is constructed to rotate upon an inclined axis having an angle of inclination corresponding with the latitude of the place where the apparatus is to be used. According to the present design a trunnion 2 is secured to the outside of the sphere over the point where the North Star is represented on the inside of the sphere. This trunnion is supported in a bearing 3 fastened to any suitable supporting structure 4.

At a point opposite to the trunnion 2, the sphere is cut away along a plane perpendicular to the axis of rotation, the opening thus made being large enough to receive a portion of the stationary platform 5 and its supporting structure 6. Said opening is made large enough to also permit the entrance and exit of the observer. In the preferred form of support herein shown, a ring 7 is rigidly fastened to the sphere at the opening therein and forms a track which runs upon sheaves 8. According to the present design, these sheaves are three in number, one of them being located at the lowermost point of the ring and the others equidistantly on either side thereof. These sheaves are supported upon bearings 9 here shown to be inclined so that the axis of rotation of the sheaves will be parallel to the axis of rotation of the sphere. A sprocket 10 is secured to each of said sheaves and one of them is driven by a crank 11 or any other suitable power device. Said sprockets are connected together by means of a chain 12 and thus the rotation of one is imparted to all. This rotates the sheaves 8 and causes the sphere to rotate about its axis. An idler drum or wheel 12^a holds said chain in engagement with the central sprocket. It will be understood that the rotation of the sphere need never be rapid and that only a small amount of rotation will ordinarily be required at any one time, for the only rotation needed is that which is necessary to produce the same relative amount of rotation between the sphere and the platform as there is between the earth and any particular point in the heavens.

It is desirable that a scale 13 be marked upon the edge of the ring 7 or some other suitable part of the sphere, said scale cooperating with a stationary pointer 14 and thus enabling the sphere to be set at the proper position to correspond with the date and hour of observation. Said pointer may be supported in any suitable manner, for example, in the present design it is fastened to an arch 15 made of piping or other suitable material.

The platform 5 is circular in outline except for the portion adjacent to the opening

therein, and is approached by steps 20. A circular wall 16 rises from the edge of the platform to about the elevation of the eyes of the average observer. Extending outwardly from the top thereof is an annular platform 17 which is provided at its periphery with a horizon circle 18 which forms a silhouette conforming to the objects which would actually be visible at the horizon of the place. Platform 17 may be scenically painted canvas or may otherwise portray the supposed immediate surroundings of the hypothetical point of view.

In the preferred construction the horizon circle 18 is somewhat smaller in diameter than the sphere 10, a space being thereby afforded between said circle and said sphere. A row of electric lights 19 or other means of illumination is located in such position beneath the horizon circle as to light the space between said circle and the sphere, and to light the sphere itself for some distance above the circle. These lights may be colored and controlled in a manner well known to theater-lighting men and others to produce sunset and sunrise effects and also the representation of storms or other natural phenomena.

In the preferred form of the apparatus I provide tracks 22, one for each of the planets, these tracks being located on the inner surface of the sphere and being arranged in accordance with the position of the orbits of the planets in the heavens. These tracks may assume any suitable form, for example, the one shown in detail in Fig. 3, in which the tracks 22 are beaded along their lateral edges and are engaged by sliding members 23 which may carry small electric lights, or otherwise be made to represent the planets themselves. These members 23 are slidable upon the tracks and may be set by hand or otherwise to the proper position to represent the location of the planets in the heavens at the hour of observation.

In operation, the sphere will first be set to the date and hour at which the observation is to be made. The observer then enters and stands near the center of the platform. As he looks around him he will see on the artificial horizon 18 objects with which he is familiar, and will thus be able to "get his bearings" as it were, and fix in his mind the quarters of the heavens where the various constellations are located. By thus being able to see them in their true position with reference to the landscape, the locations of the various stars, planets and constellations will be impressed upon him, a thing which is very desirable in a study of astronomy and also a very difficult thing for a teacher, text book writer or map maker to accomplish. As the time passes the operator will rotate the sphere at the same rate that the earth rotates, or for illustration he may rotate faster to thus show how the stars apparently move in the heavens. This apparatus is not only of great assistance in conveying to the student the position of and apparent movement of the stars in the sky but has the added advantage of making the study both easy, impressive and attractive. Furthermore the apparatus is comparatively inexpensive to build, and its cost of maintenance is negligible. Also the operating mechanism is very simple and cannot well get out of order.

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

1. Apparatus of the class described comprising a rotatable sphere having its axis inclined to correspond with the latitude of the place, and a stationary platform within said sphere for supporting an observer.

2. Apparatus of the class described comprising a hollow sphere rotatable about an inclined axis, said sphere having an opening concentric with its axis at the lower pole, and a platform projecting through said opening into the sphere and adapted to support an observer.

3. Apparatus of the class described comprising a rotatable hollow sphere having an opening concentric with its axis at the lower pole, a journal bearing for said sphere at the upper pole thereof, a track secured to the sphere adjacent to the periphery of said opening and wheels for supporting said track.

4. Apparatus of the class described comprising a hollow sphere rotatable about an inclined axis, said sphere having an opening concentric with its axis at the lower pole, a journal bearing for said sphere at the upper pole thereof, a track upon said sphere near the lower pole thereof concentric with the axis of rotation, wheels for supporting said track, and means for rotating said wheels to thereby rotate said sphere.

5. In combination, a hollow rotatable sphere, a platform therein below the center thereof, and a stationary horizon circle arranged horizontally at approximately the level of the center of the sphere, said horizon circle being formed to represent a landscape.

6. In combination, a hollow sphere adapted to rotate about an inclined axis, an opening in said sphere concentric with the axis thereof near the lower pole, a platform within the sphere supported from the outside thereof and located below the center of the sphere, and a horizon circle approximately upon a level with the center of the sphere.

7. In combination, a hollow sphere, a platform therein below the center thereof, annular walls rising from the periphery of said platform, an annular platform extending horizontally outward from the upper end of said walls and being located approxi-

mately on a level with the center of the sphere, and means representing a landscape horizon rising from the outer circumference of the last mentioned platform.

8. In combination, a hollow sphere rotatable about an inclined axis, a platform within said sphere, a stationary horizon circle within said sphere concentric therewith, and having a diameter somewhat smaller than the diameter of the sphere, and means for lighting the space between the horizon circle and the sphere.

9. A hollow sidereal sphere rotatable about an inclined axis, a stationary platform within said sphere supported from the outside thereof, said platform being below the center of the sphere, and a stationary horizon circle approximately upon a level with the center of the sphere.

10. A sidereal sphere rotatable about an inclined axis, an opening in said sphere concentric with the axis thereof near the lower pole, means at the periphery of said opening for rotatably supporting said sphere, means at the upper pole for rotatably supporting said sphere, a platform within the sphere below the center thereof and supported from the outside through said opening, a horizon circle above said platform of a diameter smaller than the sphere, and lighting means located beneath and near to said horizon circle for the purpose described.

11. In a sidereal sphere, the combination of a sphere rotatable about a fixed axis and tracks arranged upon the inner surface of the sphere in position to correspond with the orbits of the planets, and members slidable upon said tracks for representing the planets.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

WALLACE W. ATWOOD.

Witnesses:
HOWARD M. COX,
MARGARET D. ROBB.