J. F. O'BYRNE.

GYROSCOPE AND SPHERE.

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975,988. **Patented Nov. 15, 1910.**

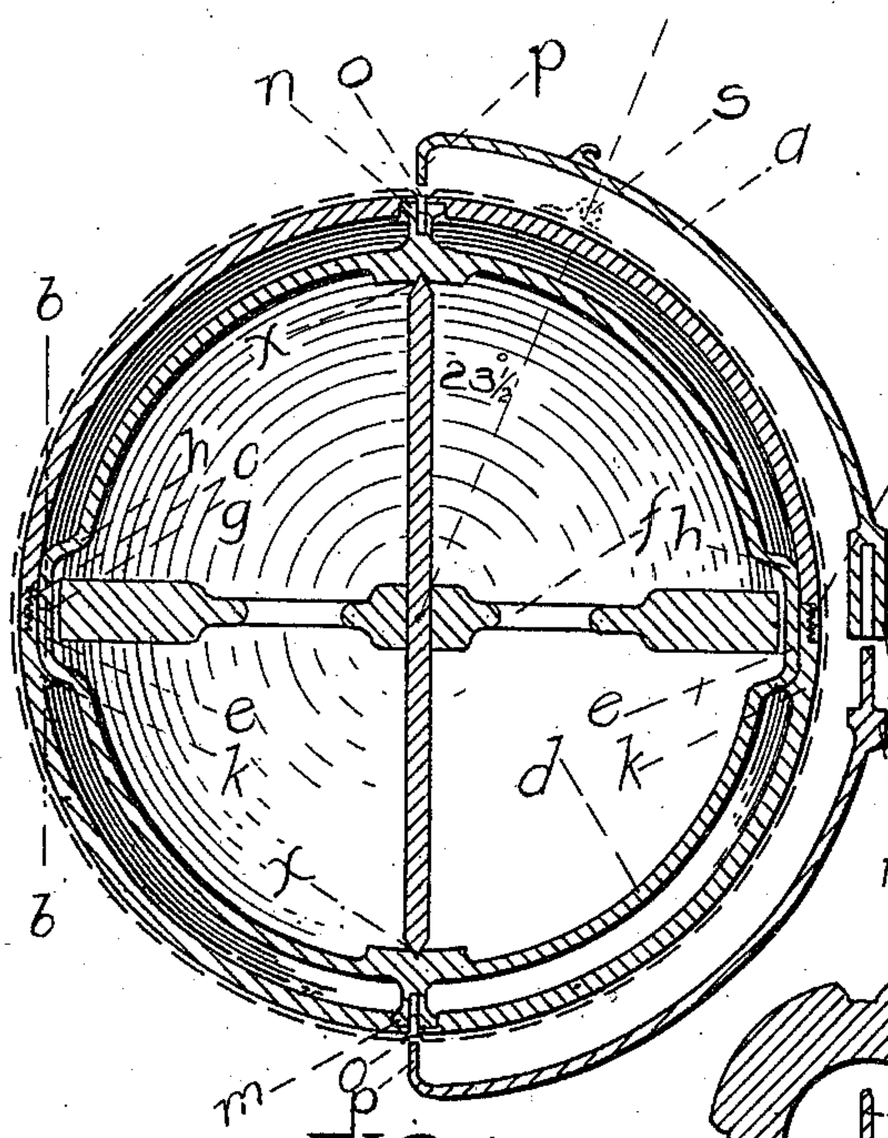

FIG. 1

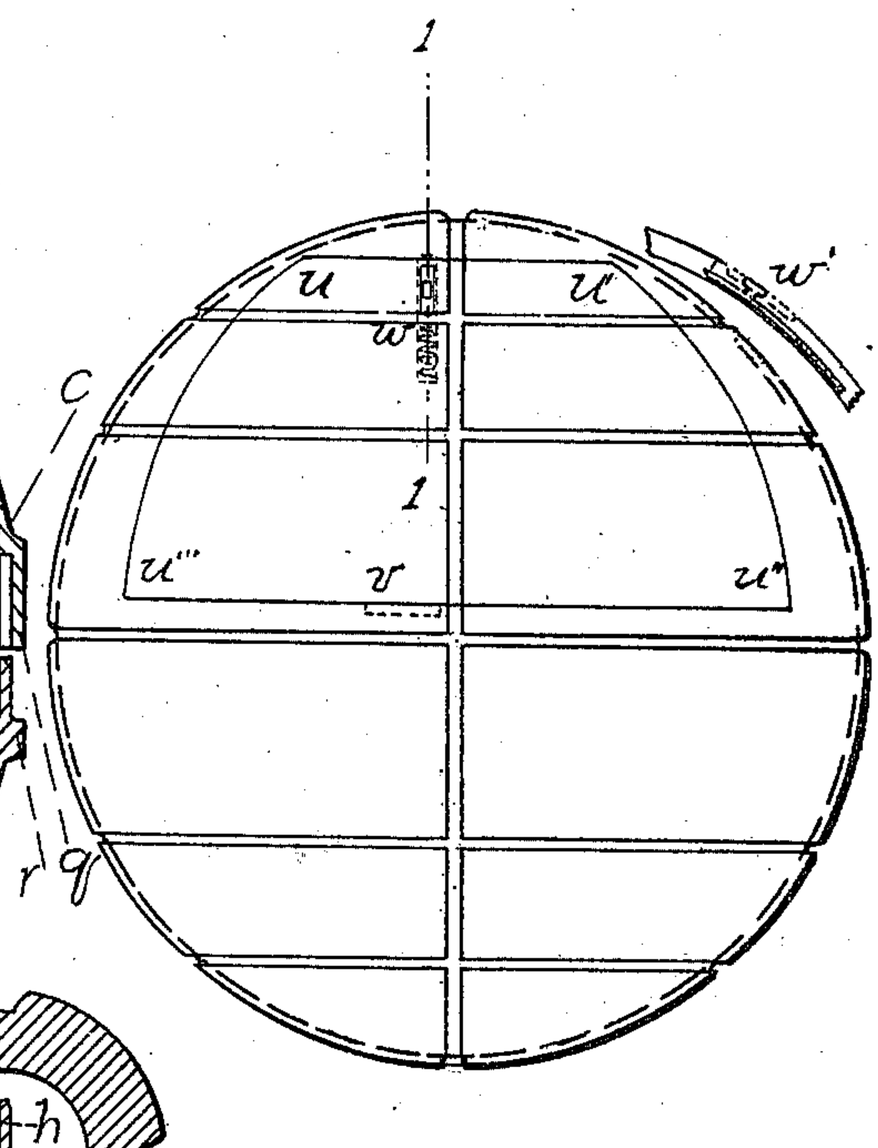

FIG. 2

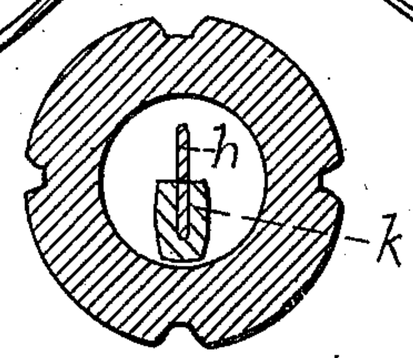

FIG 5

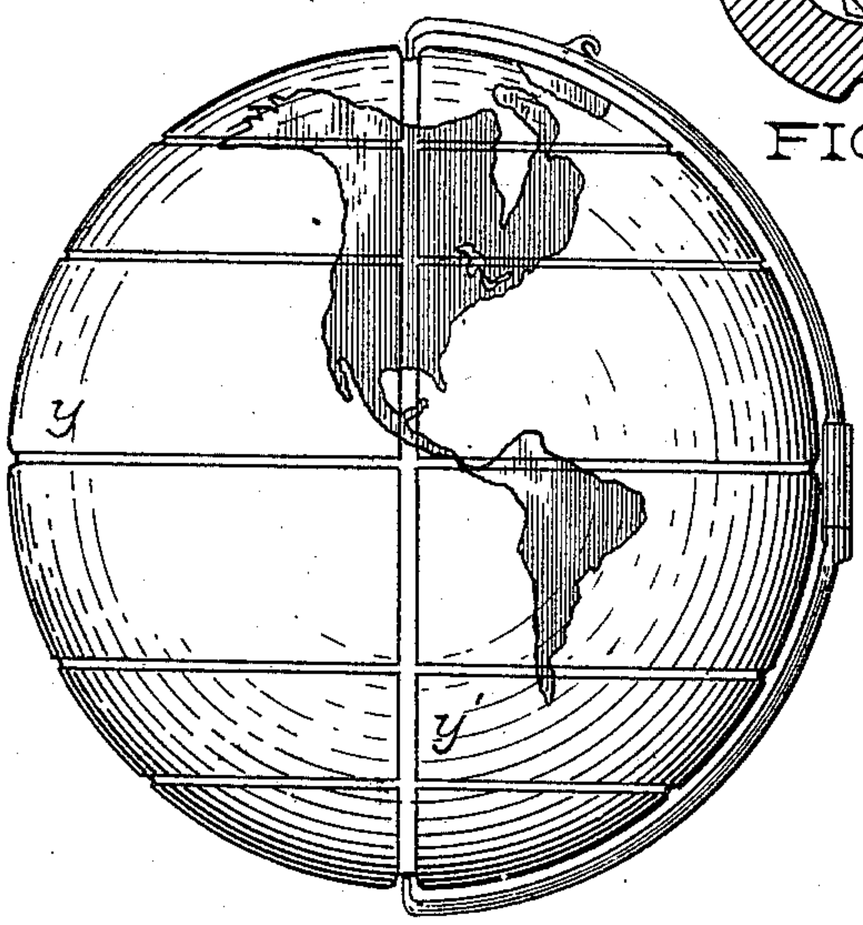

FIG. 3

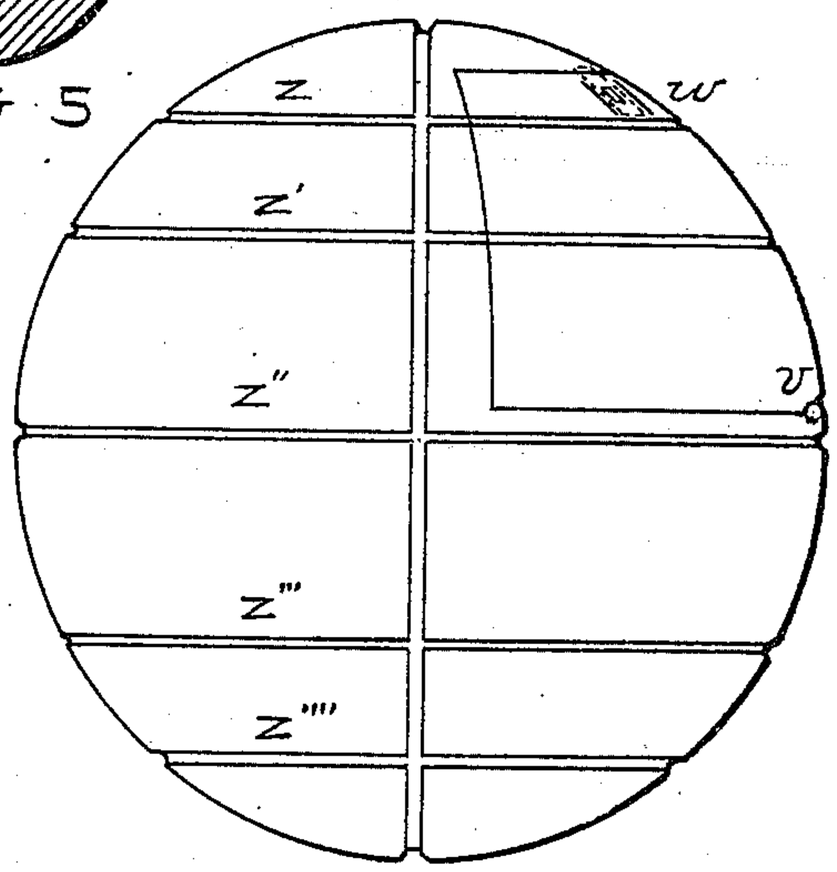

FIG. 4

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GYROSCOPE AND SPHERE.

975,988. Specification of Letters Patent. **Patented Nov. 15, 1910.**

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To all whom it may concern:

Be it known that I, JOSEPH F. O'BYRNE, a citizen of the United States, and a resident of Contact city, county of Elko, and State of Nevada, have invented certain new and useful Improvements in Instructive Toys, as set forth in the following specification.

This invention relates to tops and more particularly to the gyroscope top and is a combination of this well known toy and an ordinary hollow sphere which in my invention I have regarded as the earth.

The object of the invention, besides providing an amusing toy, is to explain and illustrate to the child the motion of the earth around the sun, giving the seasons, and its rotation on its own axis, giving the days and nights.

In the accompanying drawing Figure 1 is a vertical meridian section through the gyroscope, sphere, and yoke *a;* Fig. 2 is an elevation of the toy as shown in Fig. 1 with the yoke left off; Fig. 3 is a picture of the toy ready for market, showing the western hemisphere; Fig. 4 shows Fig. 2 rotated around the axis of the top ninety degrees to the right; Fig. 5 is a section taken through *b*—*b* of Fig. 1; and *w'* of Fig. 2 is a section taken through 1—1 of Fig. 2. This section has not been cross-hatched as this would render the section obscure.

In Fig. 1, *c* is a threaded portion at, or around, the equatorial line of the sphere and serves to screw together the two hollow hemispheres of which the hollow sphere is made up. The gyroscope is composed of the central fly-wheel or spinning part *f*, and the single yoke *d*, which is split at *g*, as is common in the manufacture of these toys. For my purpose I form the yoke of my gyroscope with the bend shown at *h*, which gives a larger radius for the wheel and provides a means for guiding the gyroscope to its proper place in the lower hemisphere and a means of holding the yoke and therefore the gyroscope steady and secure. On the inside of the lower hemisphere, Fig. 1, and near the equatorial line, is a projection *k*, containing grooves into which slip the bends *h*, as the gyroscope is slipped into the lower hemisphere. A section through *b*—*b*, Fig. 1, and Fig. 5, shows the bend *h*, of the gyroscope yoke *d*, held securely by the lug *k*. It will be noted that the lug with the grooves does not extend up beyond the equatorial line of the sphere. When the toy is assembled the projection *m*, Fig. 1, is placed above the hole in the inside of the sphere at *m*, and slips into the hole as *h* is brought around so as to slip into the grooves in *k*. When the upper hemisphere is screwed on to the lower hemisphere the projection *n* engages the corresponding hole in the upper hemisphere and the gyroscope is held securely within the hollow sphere. The holes for *m* and *n* are bored from the inside and are very large as compared with the holes *o*, which extend quite through the sphere so that the auxiliary yoke *a*, can be placed around the sphere by shoving the points *p* into the holes *o*, where they reach into the projections *m* and *n*, of the yoke *d*, in holes of the same size as *o*, placed in the projections *m* and *n* for that purpose. As the points *p* are slightly smaller than the holes *o*, the sphere is free to rotate in the yoke *a*. As the points *p* are shoved into the holes *o*, the pin *r*, which fits into *q* very snugly, engages *q* making the yoke *a*, rigid enough for the purpose of suspending the sphere by the hook *s*, which is placed $23\frac{1}{2}$ degrees from the pole *o*.

The door *u u' u'' u'''*, Fig. 2, is hinged at *v* which hinge is hidden and better shown in Fig. 4, and has a spring latch *w* a section of which is shown at *w'*.

To spin the wheel the door is opened and the fingers inserted and a string wound around the axis of the gyroscope by turning the same in the opposite direction to the rotation of the earth. A strong pull at the string, the door snapped shut, and we have an ordinary globe with a map of the earth. If now the sphere be suspended by a string attached to the hook *s*, it will begin to turn slowly due to the rapid rotation of the top inside. Care is taken in the factory to have the bearings at the poles of the sphere of a size that will give just enough friction to cause a slow instead of rapid rotation of the sphere. By selecting a strong light to represent the sun, the string may be moved around and around the light and the seasons and days and nights represented exactly. The child will note that the axis of the earth always remains pointing in the same direction, because the gyroscopic action of the top will cause this in the toy. The child may also place its hands on the sphere and see how difficult it is to twist the axis out of its original direction.

A meridian line or groove forming a depression all around the sphere is cut at y' and an equatorial groove at y, Fig. 3. If the sphere, with the top spinning, be placed on a tight string along the groove y', one's first impression is that the sphere should slide up and down the string as one end is elevated or depressed; with no tendency to fall off; but this is not so, as the sphere will roll off of the string in a direction perpendicular to the axis of the top. The meridian grooves have been cut on the sphere to satisfy inquisitive minds. If the sphere be placed on a string along the equatorial groove it will run up and down the string when the same is elevated or depressed at one end, as though it were on the ground, rotating in this position at will.

The sphere placed on an inclined plane with the axis of the gyroscope more nearly parallel than perpendicular to the plane, will roll off of the plane in a strange direction, that is, will roll in a line nearly perpendicular to the axis of the gyroscope, instead of taking the direction of an ordinary sphere.

Grooves are cut along many meridian lines and along the parallels of latitude as shown in Fig. 4 at z, z', z'', z''', and z''''. The sphere acts the same if placed on a string along any meridian line; but when placed on curves along the latitude grooves the sphere will roll along the curves as they are elevated or depressed.

The composition of the sphere may be of cast aluminum for lightness.

It is of course, to be understood that what has been shown and described is merely for the purposes of illustration and that all modifications within the scope of the accompanying claims are contemplated. For example, the yoke a might be made to spring into place instead of engaging in the middle; or the door of the sphere might be dispensed with and the top set in motion after unscrewing the upper hemisphere.

What is claimed and what is desired to be secured by United States Letters Patent is:—

1. A gyroscopic toy comprising, a hollow sphere made up of two hemispheres having threads around their common equatorial line for screwing the two hemispheres together; a gyroscope top with a meridian yoke bent above and below the plane of the fly-wheel of the gyroscope so as to form two short straight pieces of the meridian yoke perpendicular to the plane of the fly-wheel of the gyroscope; grooved lugs placed diametrically opposite each other on one of the hemispheres, slightly below its equatorial line, for the purpose of engaging the straight parts of the meridian yoke and holding the same securely within the sphere when the two hemispheres are screwed together.

2. The combination of a hollow sphere and a gyroscope within the hollow sphere as described comprising the hollow sphere having holes at its poles; a yoke extending one-half around the sphere on the outside and having a hook placed at 23½ degrees from the upper pole, the said yoke being formed of two pieces and engaging for strength at the equatorial line of the sphere, when its ends are pressed into the holes at the poles of the sphere.

3. The combination of a hollow sphere and a gyroscope within the hollow sphere and the sphere having grooves cut along meridian lines and parallels of latitude on the exterior of the sphere as shown.

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Witnesses:
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