E. WOODRUM.

DISPLAY DEVICE.

APPLICATION FILED NOV. 11, 1909.

987,028.

Patented Mar. 14, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

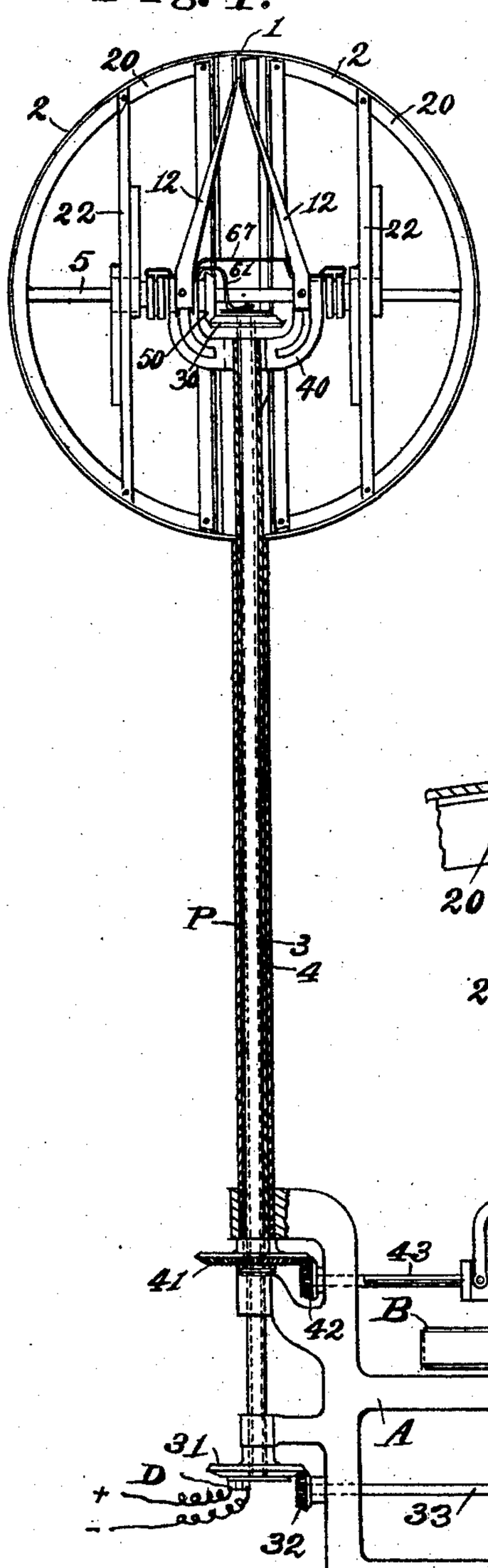



Fig. 2.

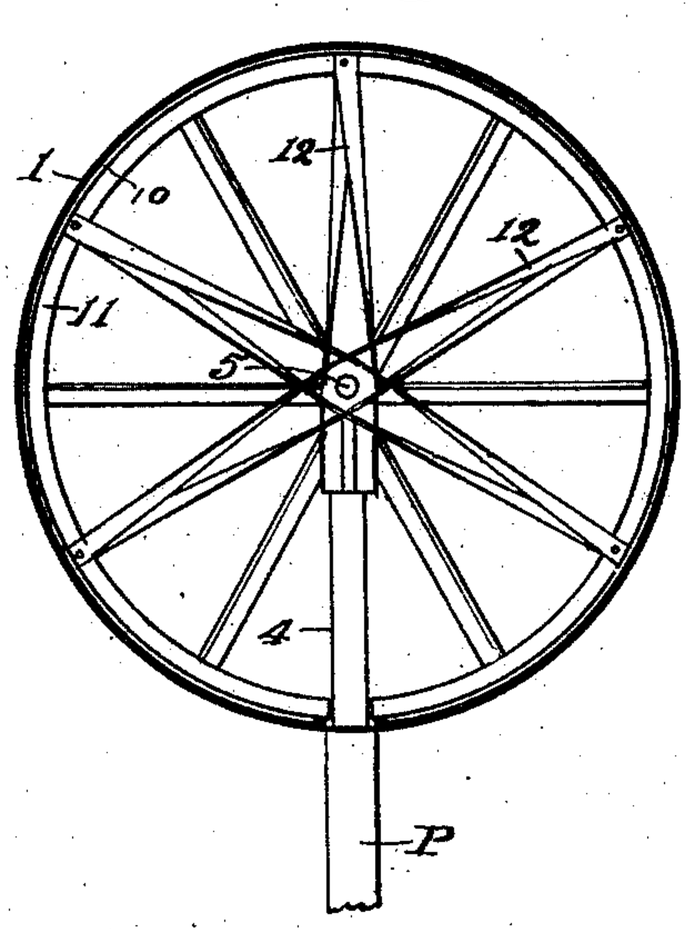
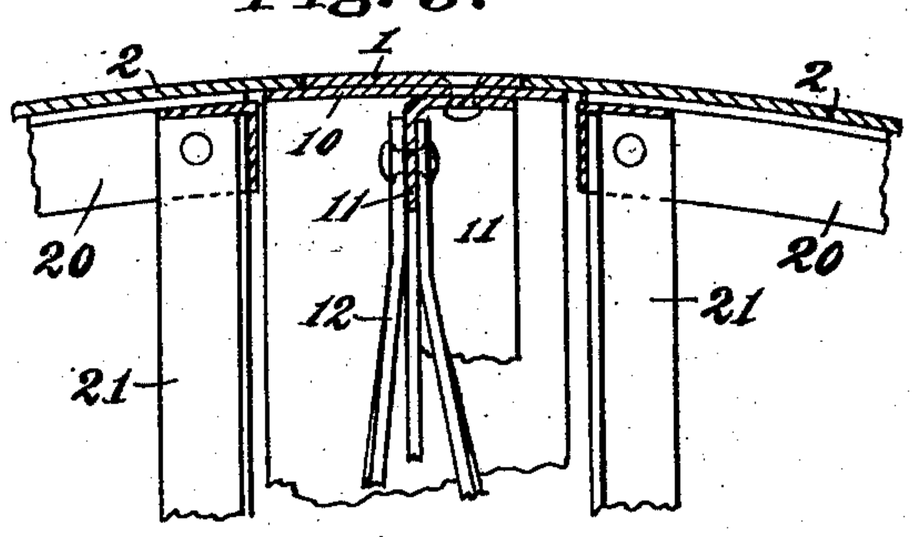



Fig. 3.




WITNESSES.

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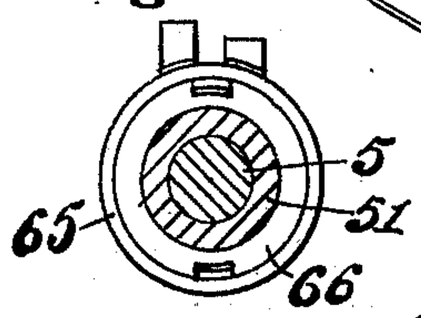
2 SHEETS—SHEET 2.

Fig. 8



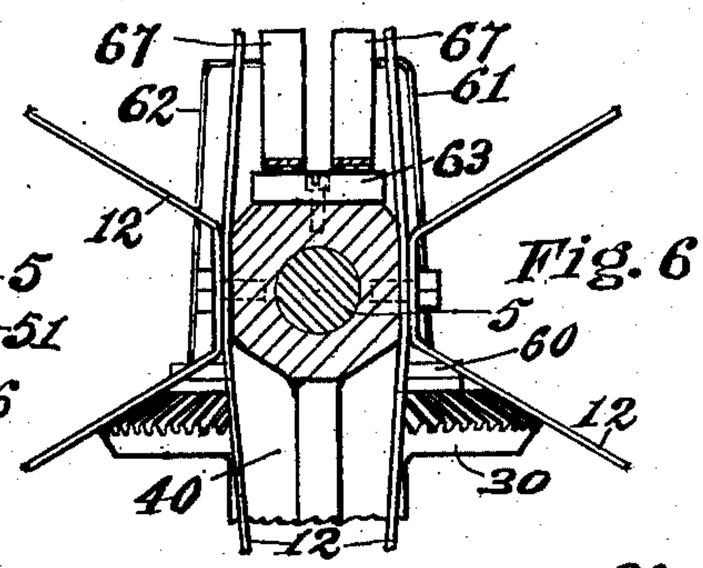




Fig. 6.

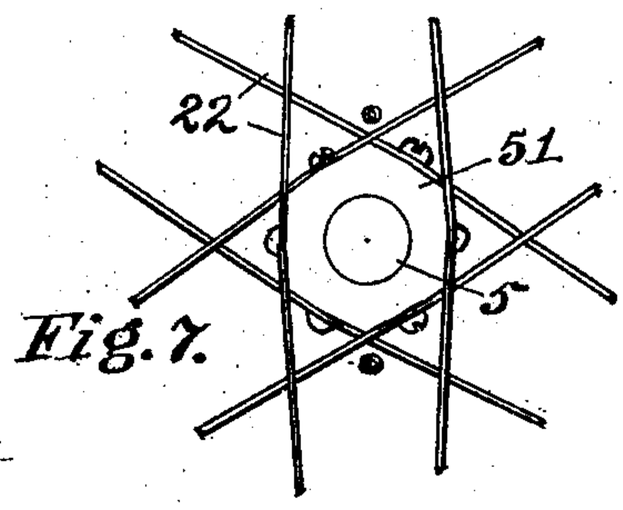



Fig. 7.

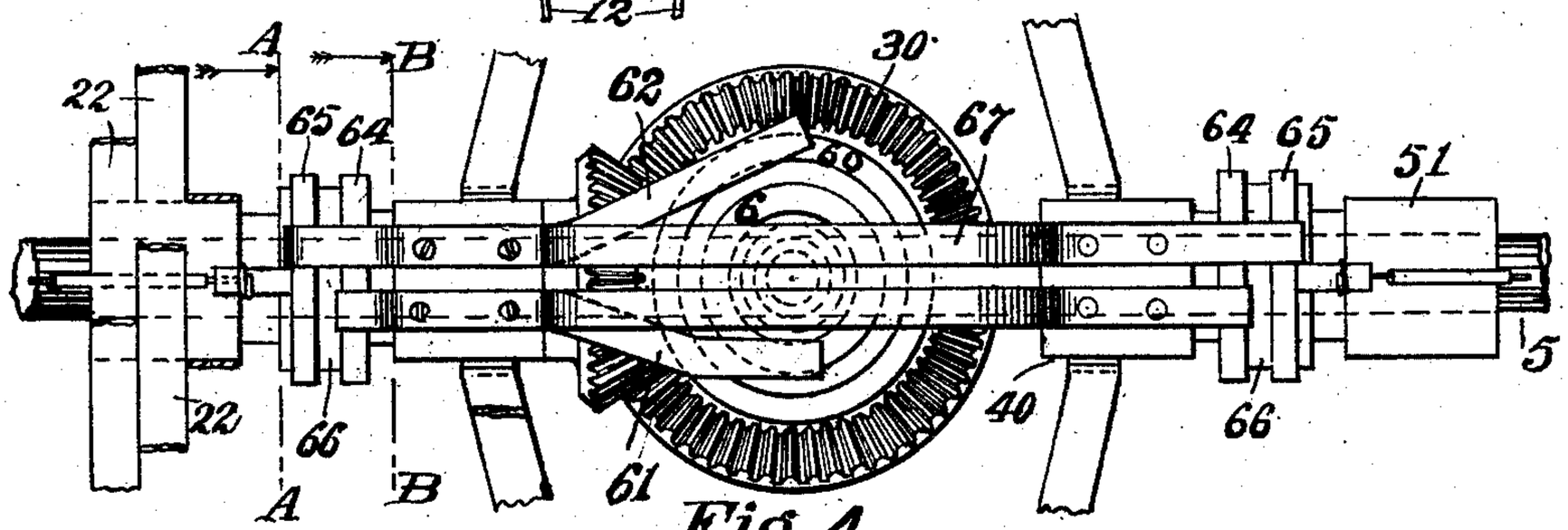



Fig. 4.

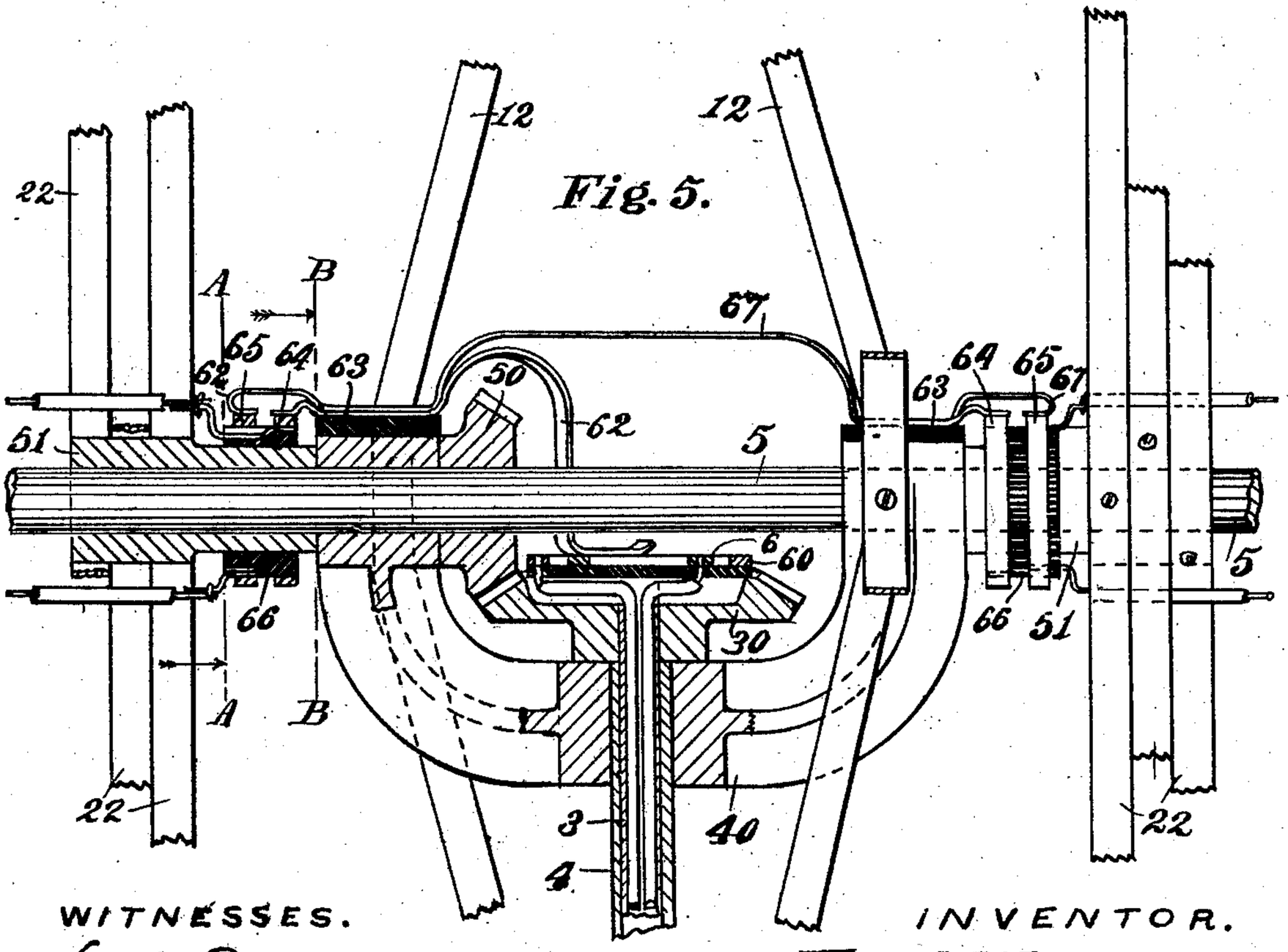



Fig. 5.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

EARL WOODRUM, OF GLENCOVE, WASHINGTON.

## DISPLAY DEVICE.

987,028. Specification of Letters Patent. **Patented Mar. 14, 1911.**

Application filed November 11, 1909. Serial No. 527,550.

*To all whom it may concern:*

Be it known that I, EARL WOODRUM, a citizen of the United States, and a resident of Glencove, Pierce county, Washington, have invented certain new and useful Improvements in Display Devices, of which the following is a specification.

My invention relates to an improvement in display devices, or devices of such character as are likely to attract attention when shown, either by their novel construction, the novel or puzzling results secured, or by the attractive character of either the device or its work.

The object of my invention is to produce a device which will be interesting and attractive in operation in the ways above named, particularly by reason of certain illusions created by its operation and by the mystifying character of the same.

My invention comprises the novel parts and combinations of parts which will be hereinafter described and particularly pointed out in the claims.

In the drawings accompanying herewith I have shown my invention embodied in the form which is now preferred by me.

Figure 1 is an elevation of my device, much thereof being in section. Fig. 2 is a sectional elevation of the globular body taken on a plane at right angles to that of Fig. 1. Fig. 3 is a section showing in detail and a larger scale the construction of the outer shell where the equatorial and polar zones meet. Fig. 4, shows in plan the mechanism within the globe whereby it is turned. Fig. 5 shows the same mechanism in elevation, one side of the center being in section and the other side in elevation. Fig. 6 is a section and elevation taken upon the line B, B, of Figs. 4 and 5. Fig. 7 is an elevation showing an end view of the collar and spokes whereby the polar sections of the globe are carried. Fig. 8 is a section and elevation upon the line A, A of Figs. 4 and 5.

My invention in its visible parts appears to consist of a globular body which is capable of revolving in a multitude of planes, this body being supported upon the end of a post or rod, yet not to be fixedly attached thereto but free to turn with a sliding effect thereon. This appearance is illusionary, as will be seen from the following.

The surface of the globe in reality consists of an equatorial zone and polar zones at each side thereof. The term polar zone as used herein is intended to mean a zone which does not include the equator and lying between the equatorial zone and the pole. Reference to Figs. 1, 2 and 3 will show what is meant by these terms. The equatorial zone 1 is only a narrow one extending about the globe and including therein the area of the supporting post P and the operating shafts contained therein. Preferably this zone is made as narrow as possible, the polar zones 2, each approximating an area of half the globe. This globe is preferably made of thin sheet metal, polished or nickel plated so as to be reflective. The edges of the zones where they abut should be as close and invisible a fit as feasible. As shown in detail in Fig. 3 the zone 1 comprises two strips, the inner 10 overlapping the edges of the sheets forming the polar zones 2, so that there will be no visible crack into the interior. To give stiffness to this equatorial zone I have shown it as provided with a web 11 of angle iron to which spokes 12 are attached. The polar zones 2 are also provided with stiffening, angle shaped webs 20 and 21 and provided with spokes 22, which are secured to a collar 51 mounted on and turning with the polar axis 5.

The spokes 12 which carry the equatorial zone 1, are mounted upon a yoke 40 which is carried upon and turns with the outer of two concentric shafts which are included within the supporting column or post P. By revolving the outer shaft 4 the shaft 5 which constitutes what I have called the polar axis, together with the entire body of the globe, is caused to turn about the axis of the shaft 4.

The inner shaft 3 has a bevel gear 30 secured to its inner end, this meshing with a bevel gear 50 secured upon the shaft 5. By varying the turning of the two shafts 3 and 4 the parts of the globe which I have

called the polar zones, being everything outside of the narrow zone 1, will also be given a revolution about the shaft 5. The direction of this revolution relative to the shaft will change as the speed of rotation of the shafts vary. With a slight difference in their speed of rotation there will be but a slow rotation of the shaft 5 and with considerable difference in the speed of rotation of the shafts there will be a rapid rotation of the shaft 5 and of the globe.

As the end or polar sections comprise almost all of the surface of the globe, and as the whole is rotating about an equatorial diameter while these polar sections or zones are rotating about the polar axis, there will be an optical illusion, any point upon the surface of the polar zones appearing to move in a path which is a compound of these two rotations, and this point will appear to follow a path which will constantly vary if one or other of these rotations be caused to vary. An infinite variety of movements of any point upon the surface may be caused by merely varying the relative speeds of the two shafts 3 and 4.

The shafts 3 and 4 at their lower ends extend beyond the post P and are journaled in a frame A. Their ends carry bevel gears 31 and 41 which mesh with their respective companion bevel gears 32 and 42 secured to shafts 33 and 43. The shaft 43 has a friction wheel 44 secured to turn therewith but capable of sliding along the shaft. This shaft is also preferably concentric with and telescopes within a shaft 38, which latter has a friction wheel 34 secured thereto. Shaft 33 is turned through belt wheels 36 and 37, and belt 35 from shaft 38. These shafts are all driven through friction wheels 34 and 44 from a face-friction wheel B, which may be turned by a belt *b* which engages its periphery. The friction wheel 34 may also be made to slide upon its shaft, or, the shaft may be made to slide within the belt pulley 36, whereby the friction wheel 34 may be made to turn at variable speeds, similarly to wheel 44. It is however, not necessary to have more than one of these movable upon the face of the friction disk B, and which this is, is immaterial.

I have shown the wheel 44 as arranged to slide along its shaft, this action being secured by a rod $C^6$ which is actuated by an arm $C^5$ carried by a shaft $C^4$, this being actuated through an arm $C^3$, link $C^2$ and crank arm $C^1$ carried by the shaft which carries the friction wheel C, the latter engaging the under surface of the friction disk B. This friction wheel C may also be made movable inward and outward upon the face of the disk B if the rate of shifting of the wheel 44 is desired. There are many other mechanisms which may be used for turning the shafts 3 and 4. I have described the above mechanisms as illustrative of one form which is now preferred by me.

It will often be desirable to illuminate the globe, either from the inside or by placing electric bulbs upon its surface. I have therefore shown means whereby an electric current may be introduced within the globe for such use. Through the central shaft 3, which is hollow, I pass two conductors, insulated, and connected at the lower ends with two concentric rings carried by the face of the bevel gear 31, one conductor being connected with each ring. Fixed brushes D, engage these rings and are connected with line conductors. At the upper end of shaft 3 these conductors connect respectively with rings 6 and 60 carried upon the face of the bevel gear 30 and insulated therefrom. Contact springs or brushes 61 and 62 carried by the yoke 40 and insulated therefrom by plate 63, rub upon the rings 6 and 60 and at their opposite ends are extended to engage rings 64 and 65 carried by the cylinder 51 which is secured to turn with the shaft and which carries the spokes 22 of the polar zones or sections 2. The rings 64 and 65 are insulated from this cylinder by an insulating collar 66. The opposite side of the globe may be similarly supplied by duplication of parts, or conductors 67 may be used to span over the yoke, rings 64 and 65 being used in duplicate at each side. In this manner the current may be conveyed to the surface of the globe and there used in any manner desired. This may be by electric light bulbs upon the outer surface, or by lights within and windows in the globe surface. The manner of using the current is immaterial.

In the driving mechanism shown in Fig. 1, the belt 35 connecting the two shafts 33 and 43 may be a straight or a crossed belt as will best serve the purpose. This will be determined by the direction of rotation wanted. The driving mechanism connected with the lower ends of the shafts 3 and 4 may be simplified by mounting the wheels 34 and 44 directly upon the shafts 3 and 4 so as to slide just as they are shown as doing upon the shafts 43 and 38, using a single friction driving disk or two connected to turn together. This variation will increase the vertical height of the driving mechanism over that shown and sometimes may not be as desirable because of this increase.

What I claim as my invention and desire to secure by Letters Patent is:

1. A display device comprising a globular body having its surface divided into a plurality of zones and means for turning all of said zones about one axis and certain of these zones about another axis.

2. A display device comprising a globular body having its surface divided into a plurality of zones, and means for giving certain of said zones a movement of translation about one axis and of rotation about another axis.

3. A display device comprising a globular body having its surface divided into zones, a single tubular support for said body, means for turning said body as a whole about one axis, means for turning certain of said zones about another axis, and means for actuating said turning means through said tubular support.

4. A display device comprising a globular body having its surface divided into an equatorial zone and polar zones, means for turning the equatorial zone upon an equatorial axis, means for turning the polar zones upon a polar axis, and means for carrying said polar axis by and to turn with the said equatorial axis.

5. A display device comprising a globular body having its surface divided into an equatorial zone and polar zones, said equatorial zone being mounted to turn upon an equatorial axis, a polar axis upon which said polar zones turn, means for giving said polar axis a motion of translation about the equatorial axis, and means for turning the polar zones about their axis.

6. A display device comprising a globular body having an equatorial zone mounted to turn upon an equatorial axis, a polar axis supported from the equatorial axis and having a motion of translation about the equatorial axis, and polar zones mounted to turn upon said polar axis.

7. A display device comprising a globular body having an equatorial zone mounted to turn upon an equatorial axis, a polar axis supported from the equatorial axis and having a motion of translation about the equatorial axis, polar zones carried by said polar axis, and means for turning said parts upon their axes of rotation in directions and at rates which are variably different as between equatorial and polar zones.

8. A display device comprising a globular body having an equatorial zone mounted to turn upon an axis which constitutes an equatorial diameter, a polar axis supported from the equatorial axis and having a motion of translation about the same, polar zones carried by and turning upon said polar axis, and means for rotating the polar and equatorial zones upon their respective rotative axes in directions and at rates which are variably different as between the equatorial and the polar zones.

9. A display device comprising a globular body having its surface divided into zones, concentric shafts entering the equatorial zone, and means within the globe connecting said shafts each with its particular zones to rotate them upon their respective axes.

10. A display device comprising a globular body having its surface divided into an equatorial and polar zones, two concentric shafts, one secured to the equatorial zone to turn it, a polar axis carrying the polar zones and carried by the equatorial zone, and means for turning the polar zones upon said polar axis by the other of said concentric shafts.

11. A display device comprising a globular body having separate equatorial and polar zones, two concentric shafts, one secured to the equatorial zone and carrying a yoke within said globe, a shaft constituting a polar axis journaled in said yoke, said polar zones being mounted to turn upon said polar axis, and means for turning said polar zones from the other of said concentric shafts.

12. A display device comprising a globular body having separate equatorial and polar zones, two concentric shafts, one secured to the equatorial zone and carrying a yoke within said globe, a shaft constituting a polar axis journaled in said yoke, said polar zones being mounted to turn upon said polar axis, intermeshing gears carried by the other of said concentric shafts and by the polar axis.

13. A display device comprising a globular body having separate equatorial and polar zones, two concentric shafts one secured to the equatorial zone to turn it and carrying a yoke within said globe, a polar axis mounted to turn in said yoke, said polar zones being mounted to turn with said polar axis, means for turning said polar axis from the other of said concentric shafts, and means for turning said concentric shafts at variable and differing rates.

14. A display device comprising a globular body having its surface divided into an equatorial and polar zones, a single post-like support for said globe, means for turning the equatorial and polar zones each about its respective axes, and means for conveying electric current to the interior of said globe.

15. A display device comprising a globular body having its surface divided into an equatorial and polar zones, two concentric shafts, one secured to the equatorial zone to support and turn it, a polar-axis shaft carrying the polar zones and supported with the equatorial zone, means for turning the polar zones by the other of said concentric shafts, and means for conducting electricity to the interior of the globe through the axis of said shafts.

16. A display device comprising a globular body having its surface divided into zones, concentric shafts entering the equa-

torial zone, rotative connection from each shaft to its respective zone, driving means for said shafts comprising friction wheels connected with the shafts to turn them, a face-friction disk engaging the peripheries of said friction wheels, and means for shifting the said wheels upon the face of the friction disk.

In testimony whereof I have hereunto affixed my signature at Seattle, Washington, this 2nd day of November 1909.

EARL WOODRUM.

Witnesses:
H. L. REYNOLDS,
E. BRYAN.