

Aug. 23, 1960

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2,949,682

SATELLITE ORBIT TOYS

Filed May 9, 1958

2 Sheets-Sheet 1

FIG. 1

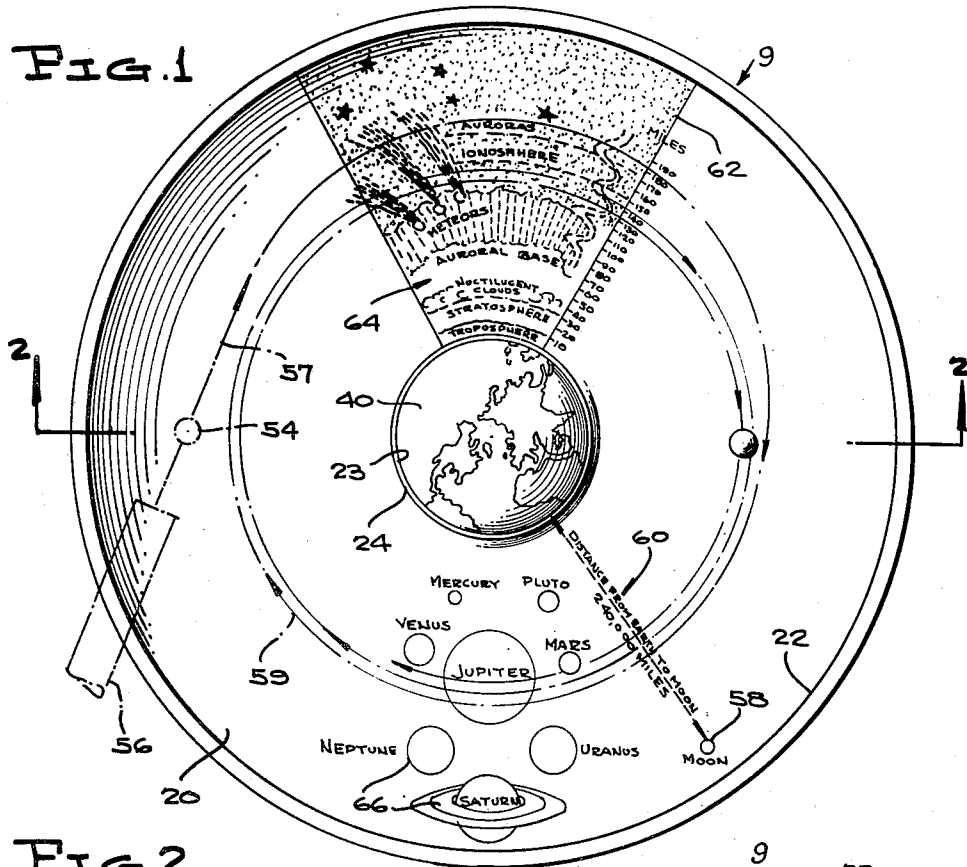
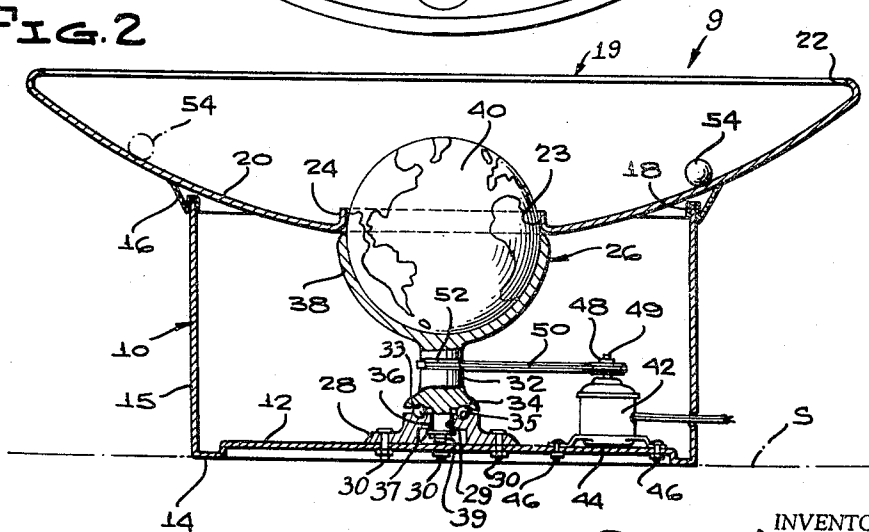


FIG. 2



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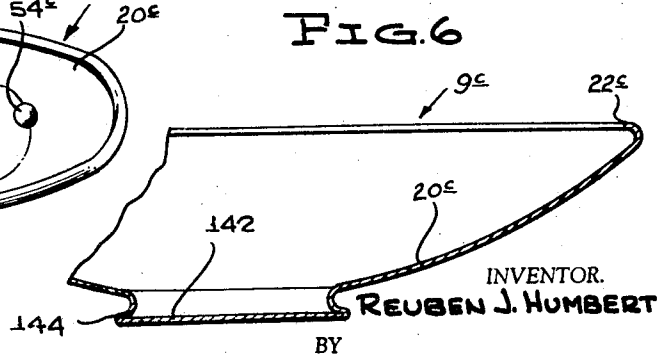
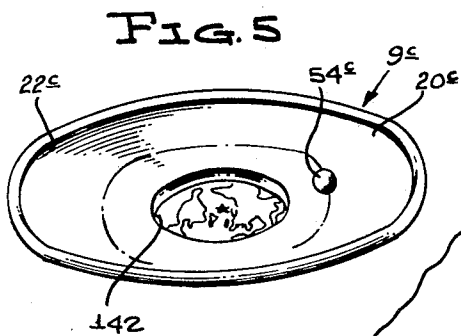
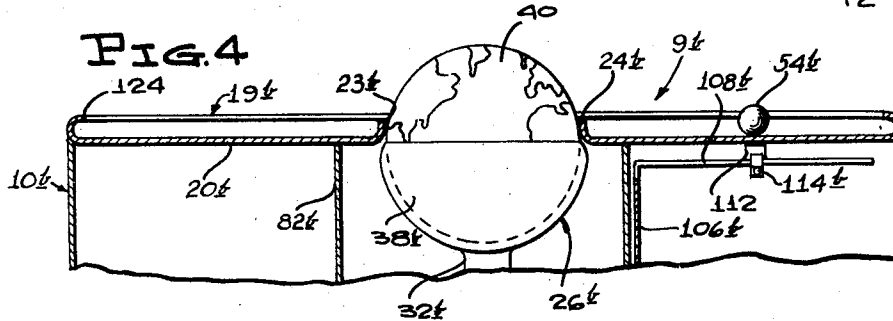
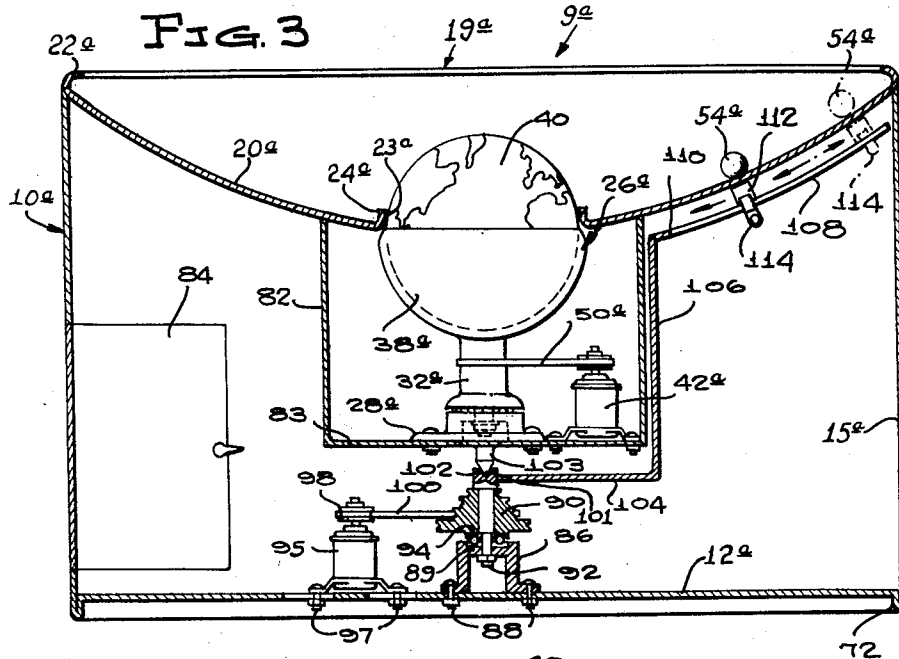
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2 Sheets-Sheet 2



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2,949,682

SATELLITE ORBIT TOYS

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3 Claims. (Cl. 35—46)

This invention relates to improvements in educational toys, and more particularly to improved educational toys providing simulations of earth satellites orbiting around the earth.

The main object of the invention is to provide simple, inexpensive, interesting and highly educational toys of the character indicated, which are attractive to persons of all ages, and which involve a bowl surrounding an earth globe, and a satellite ball to be rolled in the bowl around the earth globe in simulation of the movements of an earth satellite moving in orbit around the earth.

Another object of the invention is to provide, in toys of the character indicated above, magnetic means which serves to retain and move a satellite ball in a selected orbit around the earth globe.

Other objects of the invention will appear from the following description, and the annexed drawings in which like and related numerals designate like parts throughout the several views, and wherein:

Figure 1 is a top plan view of a toy according to the present invention;

Figure 2 is a vertical transverse sectional view taken on line 2—2 of Figure 1;

Figure 3 is a view like Figure 2 of a modified form of the invention;

Figure 4 is a fragmentary view, like Figure 3, of yet another form of the invention;

Figure 5 is a perspective view of a further form of the invention; and

Figure 6 is an enlarged vertical transverse fragmentary sectional view taken diametrically through Figure 5.

Referring to the drawings in detail, and first to Figures 1 and 2, the device shown and generally designated 9, comprises a hollow upright cylindrical base 10 having a flat bottom wall 12 which is spaced upwardly from the lower end of the base by an upwardly offset peripheral flange 14, and a side wall 15. Removably resting upon the upper end of the side wall 15 is a downwardly tapering annular flange 16 formed at its lower edge with a downwardly opening channel 18 receiving the upper end of the side wall 15.

Soldered or otherwise fixedly secured to the top edge of the flange 16 is a circular bowl 19 having a concavo-convex bottom wall 20, concentric with the base 10 and having a diameter substantially greater than the diameter of the base. On the peripheral edge of the bottom wall 20 is an integral and upwardly and laterally inwardly directed concave ball retaining lip 22. The bottom wall 20 is provided with a central opening 23, surrounded by a low upstanding earth globe protecting flange 24. The bowl 19 can be lifted off the base 10 to provide access to the interior of the base.

Generally indicated at 26 is a centrally disposed earth globe supporting and rotating assembly comprising a circular, peripheral flange disc 28 which is secured to the base bottom wall 12 by bolts 30. A short vertical stand-

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ard 32 has in its lower end a ball race 33, facing a ball race 35 in the upper end of the disc 28, in which ball bearings 34 are confined, so as to mount the standard rotatably upon the disc 28. The disc 28 has a central vertical opening 29 in which is journaled a reduced, depending extension 36 of the standard 32, and a washer 37 on the extension bears against the underside of the disc 28 and is held in place, as by a cotter pin 39, so as to assemble the standard 32 to the disc 28.

The standard 32 has fixed on its upper end an enlarged diameter hemispherical cup 38 in which is frictionally but rotatably seated an earth globe 40, which is covered, marked, or otherwise formed to simulate the earth, and whose upper half projects through the opening 23 and above the bottom wall 20 and the flange 24 of the bowl 19. In any position to which the earth globe is manually rotated relative to the cup 38, it will be frictionally retained in such position, so as to thereafter rotate with the cup 38 whenever the cup is rotated.

A small electric motor 42 has a motor base 44 secured by screws 46 to the base bottom plate 12 at one side of the disc 28, and has a drive pulley 48 on its shaft 49, and trained around the pulley 48 is a belt 50 which is trained around the standard 32 in a circumferential groove 52 therein.

A satellite simulating ball 54 is provided to roll freely upon the bottom wall 20 of the bowl 19. Any suitable ball projecting means, indicated generally at 56, such as a "pop gun," can be employed to project the satellite ball 54 onto the bowl bottom wall 20 in a path tangential to the earth globe 40, as in a path indicated at 57 in Figure 1.

In use of the device, the earth globe 40 is rotated to simulate rotation of the earth by energizing the motor 42, and the satellite ball 54 is then projected tangentially onto the bowl bottom wall 20, at a distance from the globe 40, with sufficient force to roll around the bowl several times, in an orbit around the earth globe 40 in a path such as indicated at 59 in Figure 1.

The slant of the bowl bottom wall 20 inwardly and downwardly toward the earth globe 40 then causes the satellite ball 54 to move gradually toward the earth globe 40, as the ball rolls around the bowl, in simulation of the gravitational pull of the earth. The ball continues to roll around the bowl 19 in a spiral path, which is continuously reduced in diameter, until its loss of momentum lets the ball come into contact with the globe protecting flange 24 and comes to rest, in simulation of the orbit of and the return to earth of a real earth satellite.

The form of the invention shown in Figure 3, and generally designated 9a, comprises a base 10a similar to but relatively larger in diameter than the base 10 of Figures 1 and 2, having a bottom wall 12a and a side wall 15a. A bowl 19a, generally similar to the bowl 19, is engaged in the upper end of the base 10a and has its peripheral edge secured to the upper end of the base side wall 15a. The concave bottom wall 20a of the bowl has therein a central opening 23a, surrounded by an upstanding flange 24a.

A hollow cylindrical housing 82 is secured to and depends from the bowl bottom wall 20a and contains an earth globe supporting assembly 26a similar to that of the first described form of the invention, and includes a motor 42a, a standard 32a, rotatably supported upon a disc 28a. The disc 28a is secured upon the flat bottom wall 83 of the housing 82, which is spaced above the bottom wall 12a.

A pedestal 86 of inverted cup shape has a peripheral flange secured by bolts 88 upon the base bottom wall 12a. A stepped pulley 90 is secured on a shaft 92, which is journaled at its lower end in the top 89 of the pedestal

86, and a ball bearing 94 is interposed between the pedestal 96 and the pulley 90. A driving motor 95 is secured at 97 upon the base bottom wall 12a, and on its shaft is a drive pulley around which is trained a drive belt 100 which is also trained around the pulley 90 in a selected groove thereof. The pulley 90 acts as a change speed pulley and can be rotated at different desired speeds, according to the groove thereof in which the belt is engaged.

A head 102 on the upper end of the shaft 92 has a conical recess 101 in its upper end receiving the point of a conical pintle 103 which is fixedly secured to and extends downwardly from the bottom wall 83 of the housing 82.

The base side wall 15a is provided with an access door 84 giving access to the interior of the base 10a for maintenance, repair, replacement, or adjustment of the mechanism therein.

A horizontal radial arm 104 is fixedly secured to the head 102 and has on its outer end an upwardly projecting extension 106 which has on its upper end an upwardly and laterally outwardly curved radial arm 108 having a longitudinal slot 110 therein. The curvature of the arm 108 follows that of the bowl bottom wall 20a and the arm 108 is uniformly spaced therebelow.

Designated at 112 is a permanent magnet which is located in the space between the arm 108 and the bowl bottom wall 20a, and is mounted on a clamp 114 extending through the slot 110 in the radial arm 108. The clamp can be adjusted to any desired positions along the arm 108, and secured in such positions by means of the clamp 114. The magnet 112 is closed to the underside of the bowl bottom wall 20a which is made of non-magnetic material, such as plastic or cardboard. The satellite ball 54a is of magnetic material.

In using the device of Figure 3, the satellite ball 54a is merely thrown freely onto the bowl bottom wall 20a, with the motor 95 in operation so that the magnet 112 is swept around the bowl 19a, so that, as the ball 54a comes near the magnet it will be held by the magnet and caused to travel around the bowl in an orbit corresponding to the adjusted position of the magnet, as long as the motor 95 is in operation.

The form of the invention shown in Figure 4, and generally designated 9b, is substantially the same in construction and operation as that of Figure 3, except that the bowl 19b has a flat horizontal bottom wall 20b.

In Figures 5 and 6 is shown yet another form of the invention, generally designated 9c, which is a low cost device particularly suited for use by smaller children. This form comprises a bowl 19c having a concave bottom wall 20c having a concave peripheral ball retaining lip 22c. The bottom wall 20c has a central opening 23c which is surrounded by a downwardly directed flange 144 to whose lower end is secured a flat plate 142. On the upper surface of the plate 142 can be a representation of the earth, so that the plate 142 constitutes the earth globe in this form of the invention. The satellite ball 54c can be merely placed in the bowl 19c and caused to go into orbit by an initial circular movement of the device. Alternately, the ball 54c can be propelled onto the bowl bottom wall 20c by the means 56.

In all forms of the invention, the surface of the device can be attractively colored and various markings can be placed thereon to more faithfully provide a simulation of the atmosphere, earth, etc. Thus, a plurality of simulations of planets 66 can be provided in the first form of the invention on the bottom wall 20 of the bowl 19 and also on the bowls of the second, third and fourth, as well as the moon, indicated at 58, and the distance of the moon from the earth, as indicated at 60. Further, a radial line 62 can be provided marking one side of an area 64, and calibrations of the line 62 can indicate the radial distance from the earth of atmosphere layers depicted in the area 64, as for example the troposphere,

stratosphere, etc. The area 64 can be extended over the full circumference of the plate, if desired.

The locations of the planets, stars, and other celestial bodies shown at 66 need not necessarily indicate their respective radial distances from the earth and they may be depicted upon the plate 20 merely to provide attractive ornamentation.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may fall within the scope of the appended claims.

What is claimed is:

1. A satellite orbit toy comprising a base, a bowl stationarily mounted upon said base, said bowl having a bottom wall and having a central opening therein, an earth simulating element positioned in said opening, a satellite ball rollable upon said bottom wall around the earth element in simulation of an earth satellite in orbit around the earth element, and a radial line extending on the surface of the bowl bottom wall from said opening, said line having graduations indicating planetary distances from the earth element with reference to the paths of the satellite ball around the bowl, said earth element being an earth globe having an upper portion rising above the bottom wall in the region of said opening and a lower portion extending below said bottom wall, said base having an earth globe supporting and rotating assembly comprising a cup into which said lower part of the globe is frictionally and rotatably seated, a pedestal fixed to and depending from said cup, means mounting said pedestal on the base for rotation on a vertical axis, and mechanical rotating means operatively connected to said pedestal.

2. A satellite orbit toy comprising a base, a bowl stationarily mounted upon said base, said bowl having a bottom wall and having a central opening therein, an earth simulating element positioned in said opening, a satellite ball rollable upon said bottom wall around the earth element in simulation of an earth satellite in orbit around the earth element, and a radial line extending on the surface of the bowl bottom wall from said opening, said line having graduations indicating planetary distances from the earth element with reference to the paths of the satellite ball around the bowl, said satellite ball being magnetic, a radial arm extending radially outwardly from the central vertical axis of said bottom wall and positioned beneath and spaced below the underside of said bottom wall, said arm having an inner end, a magnet mounted upon said arm and positioned close to the underside of the bottom wall, support means aligned with the vertical axis of said bowl bottom wall and positioned therebelow on which said inner end of said arm is journaled, and mechanical rotating means on said base for rotating said arm so as to sweep the arm and the magnet around the bowl bottom wall for holding and moving the satellite ball in an orbit around the bowl.

3. A satellite orbit toy comprising a base, a bowl fixedly mounted on said base, said bowl having a bottom wall which is continuous and unindented and has a central opening therein, an earth globe positioned in said opening and having an upper portion extending above said bottom wall in the region of said opening, first means mounted on said base and connected to the earth globe for rotating the globe relative to the bowl, said bottom wall having an upper surface, a radial line on said upper surface extending outwardly from said opening, said line having graduations indicating planetary distances from

the earth globe, a free ball rollable upon and around
the bowl surface, and second means for propelling the
ball around the bowl.

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