Aug. 23, 1960 G. LICITIS ET AL 2,949,697

TOY

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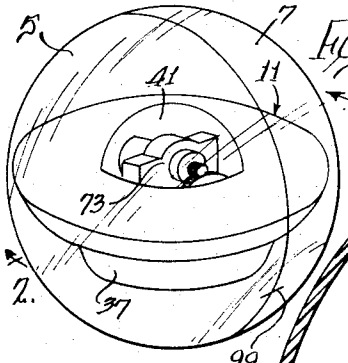

FIG. 1.

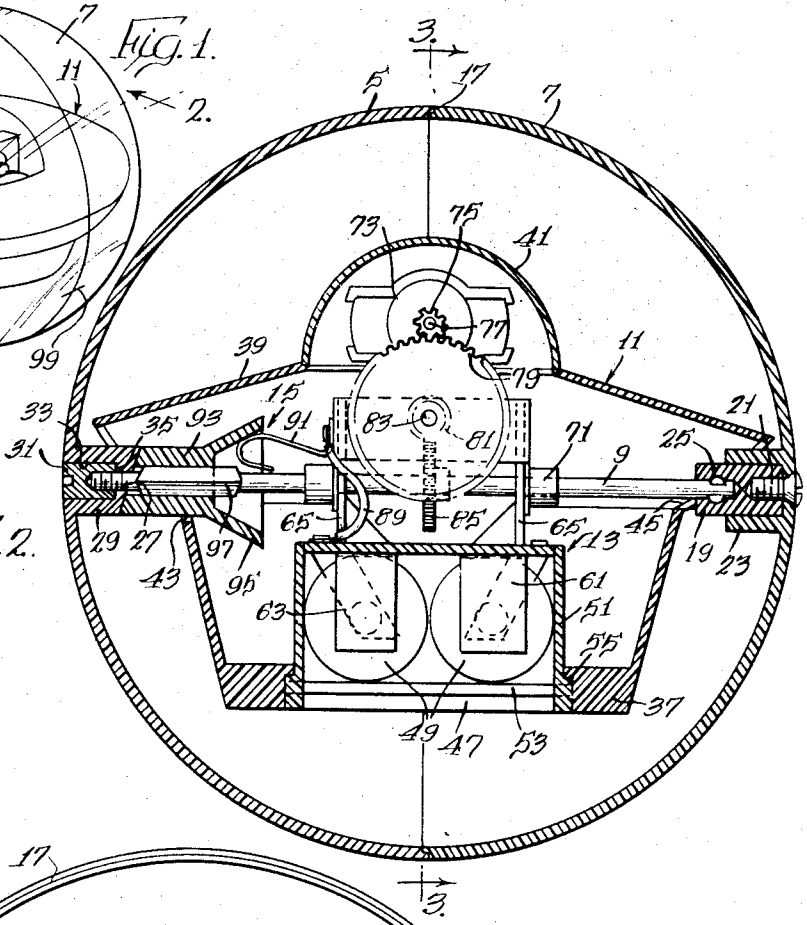

FIG. 2.

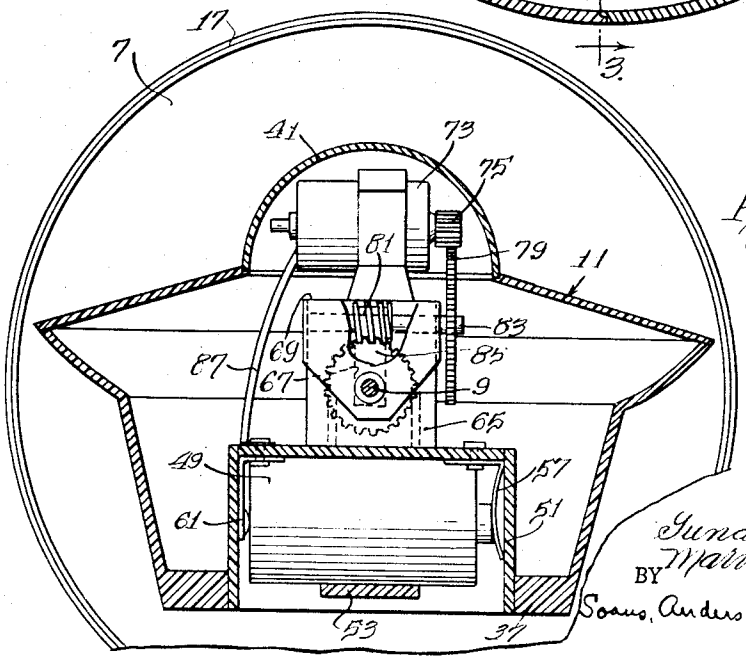

FIG. 3.

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2 Claims. (Cl. 46—243)

The present invention relates generally to a self-propelled toy and more particularly to a battery-propelled motorized ball which will propel itself and which will change directions when it comes into glancing contact with an obstruction.

One object of the present invention is to provide a ball or spherical toy having propelling means including a motor and batteries eccentrically mounted about a central shaft, with the propelling means geared to the shaft so as to move the ball as the propelling means revolves relative to the shaft. Further objects of the present invention are to provide a self-propelled ball having a suitable switching mechanism for controlling the movement or operation of the ball; to provide a battery-powered motorized ball which may be easily disassembled for replacing the batteries in the ball; to provide a self-propelled ball which has a transparent outer casing and an internal operating mechanism suitably designed to provide an illusion of mystery and to maintain a viewer's interest in the ball; and to provide a simple, inexpensive motorized ball which can be economically manufactured and which will be durable in use.

Further objects and advantages of the present invention will become apparent from the following description taken in connection with the accompanying drawing.

Figure 1 is a perspective view of the toy ball formed in accordance with the present invention;

Figure 2 is an enlarged sectional view taken along line 2—2 of Figure 1; and

Figure 3 is a partial, enlarged sectional view taken along line 3—3 of Figure 2.

As illustrated in the drawings, the present toy includes a pair of interengaged hemispheres 5 and 7 which form a sphere or ball, a shaft 9 which extends axially between the hemispheres and is rigidly connected to the hemisphere 7, a frame or housing 11 enclosed within the sphere, carried by and rotatable about the shaft 9, power means 13 carried within the housing in eccentric relation to the shaft 9, the power means being suitably connected to the shaft 9 for rotating the housing 11 relative to the sphere, and suitable switch means 15 for controlling the operation of said power means.

The hemispheres 5 and 7 are made of a rigid material such as plastic or the like. While it is not necessary for the operation of the toy, it is desirable to make the hemispheres which form the outer surface or casing of the toy out of transparent material so that one can see the inner elements of the toy, thereby making the toy more attractive in appearance. The circumferential edge portions of the hemispheres are formed in stepped fashion as indicated at 17 so that the opposing edges may interlock and present a smooth continuous surface across the juncture of the two hemispheres which will not impede the rolling movement of the sphere. The stepped interengagement of the two hemispheres 5 and 7 assures the maintenance of the spherical conditions of the toy during use and permits the rotation of the hemispheres relative to each other about a central axis extending axially between the hemispheres without destroying the interlocking engagement of the hemispheres.

The shaft 9 extends axially along the central axis between the hemispheres 5 and 7. The shaft is constructed of any suitable structural material such as metal or the like. One end of the shaft 9 is rigidly connected to the hemisphere 7 so as to be rotatable therewith. In the illustrated embodiment this is accomplished by fixedly securing one end of the shaft 9 in one end of a short resilient bushing or anchor block 19 which in turn is secured tightly by means of a screw 21 in an annular boss or sleeve 23 which is formed integral with and extends inwardly from the hemisphere. If desired, the plug may be rectangular in cross-section and may fit in a rectangular recess in the sleeve thereby positively preventing the rotation of the plug 19 relative to the hemisphere 7 without relying upon the locking action of the screw 21. The connection between the end of the shaft 9 and bushing 19 can be made in any suitable manner. In the illustrated construction this is accomplished by swaging the end of the shaft to provide outwardly extending projections 25, and then press-fitting the end of the shaft into a suitable recess in the bushing 19.

The opposite end of the shaft 9 extends through a passageway 27 in an inwardly extending axially positioned boss 29 on the hemisphere 5. This end of the shaft is threaded and is interengaged by a cap nut 31 which extends into an enlarged recess 33 in the hemisphere 5 and outer portion of the boss 29. The length of the shaft 9 is such that the cap nut 31 may be rotated to bring the edges of the hemispheres in close abutting interengaged relation to each other. The cap nut and the recess in which it fits are circular in cross-section, and of uniform diameter so that the hemispheres can be rotated relative to each other without causing a loosing or tightening of the nut on the end of the shaft. As seen in Figure 2, the recess 33 is somewhat larger in diameter than the passageway 27 thereby providing an annular shoulder 35 which provides a limiting position for the inner end of the cap nut 31.

The housing 11 disclosed in the illustrated structure is designed to simulate a flying saucer. It should be realized, however, that other structural designs could have easily been utilized. The housing 11 includes a lower saucer-shaped base portion 37 and an upper cover section 39 having a central dome 41. The housing may be made of any suitable material such as plastic or the like. To enhance interest and curiosity of persons watching the operation of the toy, it is preferable that the housing be opaque, except for the dome of the housing, which is preferably transparent.

The housing 11 is arranged so as to be freely rotatable about the shaft 9. The housing is provided with suitable diametrically opposed openings 43 and 45 located at upper end portions of the base 37 of the housing 11 through which the shaft 9 and associated elements of the toy extend. The openings 43 and 45 are of a size such that the housing 11 may freely rotate relative to the shaft 9 and hemispheres 5 and 7.

The lower end of the base 37 is provided with a generally rectangular opening 47 which is of a size large enough to admit a pair of batteries 49 to be inserted therethrough. A rectangular battery case 51 having a removable plate 53 is inserted into the opening 47. As seen in Figure 2, the end portion of the battery case 51 adjacent the plate 53 includes an outwardly extending flange 55 which fits into an anular recess cut into the edge of the base about the opening 47 so that the outer edge of the battery case 51 lies flush with the bottom surface of the base 37. The battery case is preferably made of a suitable non-conductive material such as plastic or the like so as to avoid possible short circuiting of the bateries used in the toy. The batteries are held tightly within the battery case by a suitable spring member 57 and contacts 61 and 63 formed of conductive material.

Spaced parallel plate members 65 extend upwardly

from the battery case. These plate members have vertical slots 67 therein which admit the shaft 9. The plate members 65 snap into and are interengageable with a bracket 69 having a generally rectangular horizontal upper surface and downwardly extending side and end walls. The shaft 9 extends through suitable openings in the end walls of the bracket 69 and is journalled in bearings 71 attached to the opposed side walls of the bracket 69.

The driving means for the toy includes a motor 73 which is seated on the upper surface of the bracket 69 and connects to the shaft 9 through a gear train which includes a gear wheel 75 attached to the motor shaft 77, a gear wheel 79 and a worm gear 81 attached to a shaft 83 journalled in the side walls of the bracket 69 and a gear 85 on the shaft 9. As seen in the drawing, the gear 75 connects with the gear 79 thereby rotating the shaft 83 and worm gear 81 which is interengaged with the gear 85 on the shaft 9.

The batteries 49 connect with the motor 73 in the following manner. One pole of the battery set connects directly to a suitable connection on the motor 73 through the contact 61 and a lead wire 87. The other pole of the battery set connects to the motor casing (the ground side of the motor) through the contact 63, a lead wire 89, a leaf-spring 91, the switch 15, the shaft 9 and gears 85, 81, 79 and 75.

The switch 15 is formed of the leaf-spring 91 which is connected to the lead wire 89, a sliding cam 93, and the boss 29. The leaf-spring 91 is secured to an end wall of the bracket 69 and has a curved outer end overlying a portion of the shaft 9 which is adapted for engagement with the inner surface of a bell-shaped section 95 of the sliding cam 93. The sliding cam 93 comprises a sleeve having a square passageway extending centrally therethrough which slidably extends over a squared section 97 of the shaft 9 which is adjacent the threaded end portion of the shaft which extends into the boss 29 of the hemisphere 5. The inner end of the sleeve terminates in an outwardly flared annular flange portion which forms the bell-shaped section 95 previously referred to. The sliding cam 93 is adapted for lateral sliding movement along the squared section 97 of the shaft 9. The outer end of the sliding cam 93 is suitably bevelled and engages a similarly bevelled surface at the outer end of the boss 29. The leaf-spring 91 of the switch is suitably shaped and dimensioned so that it is in contact with the inner surface of the bell-shaped section 95 of the sliding cam 93 but just out of contact with the shaft 9 when the bevelled surfaces of the sliding cam 93 and the boss 29 are in complete engagement in the manner shown in Figure 2. When the hemispheres are rotated relative to each other around the shaft, the bevelled surface of the boss acts as a cam and causes the sliding cam 93 to move inwardly against the pressure of the leaf-spring 91 and the bell-shaped section 95 forces the leaf-spring 91 into contact with the shaft 9. When the rotation of the hemispheres relative to each other is reversed, the pressure of the leaf-spring 91 on the sliding cam 93 causes the sliding cam to move outwardly back to the position illustrated in Figure 2 thereby opening the circuit to the motor 73.

Suitable markings such as the line indicated at 99 may extend across the outer surface of the sphere and across the juncture between the hemispheres 5 and 7 to indicate the position of the hemispheres when the circuit to the motor is open.

As is clear from the foregoing discussion, all that is required to operate the ball is to rotate the hemispheres 5 and 7 relative to each other from an initial open to a closed circuit position. The motor 73 will then rotate causing rotation of the gears 75, 79 and 81. This will cause the housing 11 to rotate about the gear 85 and shaft 9. When the ball is positioned on a flat surface the off-center movement of the center of gravity of the housing 11 and its contained elements will cause the ball to begin rotating. If the ball comes into glancing contact with an obstruction, it will roll about the obstruction. The movement of the ball may, therefore, be controlled in a simple manner by an operator by means of a suitable stick or wand. To stop the movement of the ball, all that is necessary is to rotate the hemispheres 5 and 7 relative to each other back to their original position.

If the outer hemispheres are of transparent material, one may see the inner housing which has the appearance of a flying saucer, and if the dome 41 is also transparent one may also see the whirring gears within the housing.

To change the batteries in the toy, one may first remove either the screw 21 or the cap nut 31 and then separate the hemispheres 5 and 7, after which one removes the bottom plate 53 in the base 37 of the housing 11 whereby providing access to the batteries.

Various changes and modifications may be made in the disclosed construction without departing from the scope of the invention which is to be determined from the appended claims.

We claim:

1. A toy comprising a pair of interengaged hemispheres forming a sphere, a shaft extending through the center of said sphere perpendicular to the plane of engagement of said hemispheres, said shaft being rigidly connected to one of said hemispheres and being rotatably connected to the other of said hemispheres, a frame which is rotatably supported on said shaft and which is located within said sphere, power means carried on said frame in eccentric relation to said shaft, a gear secured to the shaft, said power means connected with said gear for rotating said frame relative to the sphere to thereby impart rolling movement to the sphere, switch means within the sphere for controlling the power means, and means operated by rotation of said hemisphere relative to one another connected to said switch means to actuate said switch means so as to energize and deenergize said power means.

2. A toy comprising a pair of interengaged hemispheres forming a sphere, a shaft extending through the center of said sphere perpendicular to the plane of engagement of said hemispheres, said shaft being rigidly connected to one of said hemispheres and being rotatably connected to the other of said hemispheres, a frame which is rotatably supported on said shaft and which is located within said sphere, power means carried on said frame in eccentric relation to said shaft, a gear secured to the shaft, said power means connected with said gear for rotating said frame relative to the sphere to thereby impart rolling movement to the sphere, switch means within the sphere for controlling the power means, and means operated by the rotation of said hemispheres relative to one another to actuate said switch means including a first cam member movable along said shaft, a second cam member on the hemisphere to which the shaft is rotatably connected and located within said sphere, a spring biasing said first cam member into engagement with said second cam member, the rotation of said hemispheres relative to one another causing the second cam member to move the first cam member against the force of said spring, the movement of said first cam member being operable to actuate said switch means so as to energize and deenergize said power means.

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