

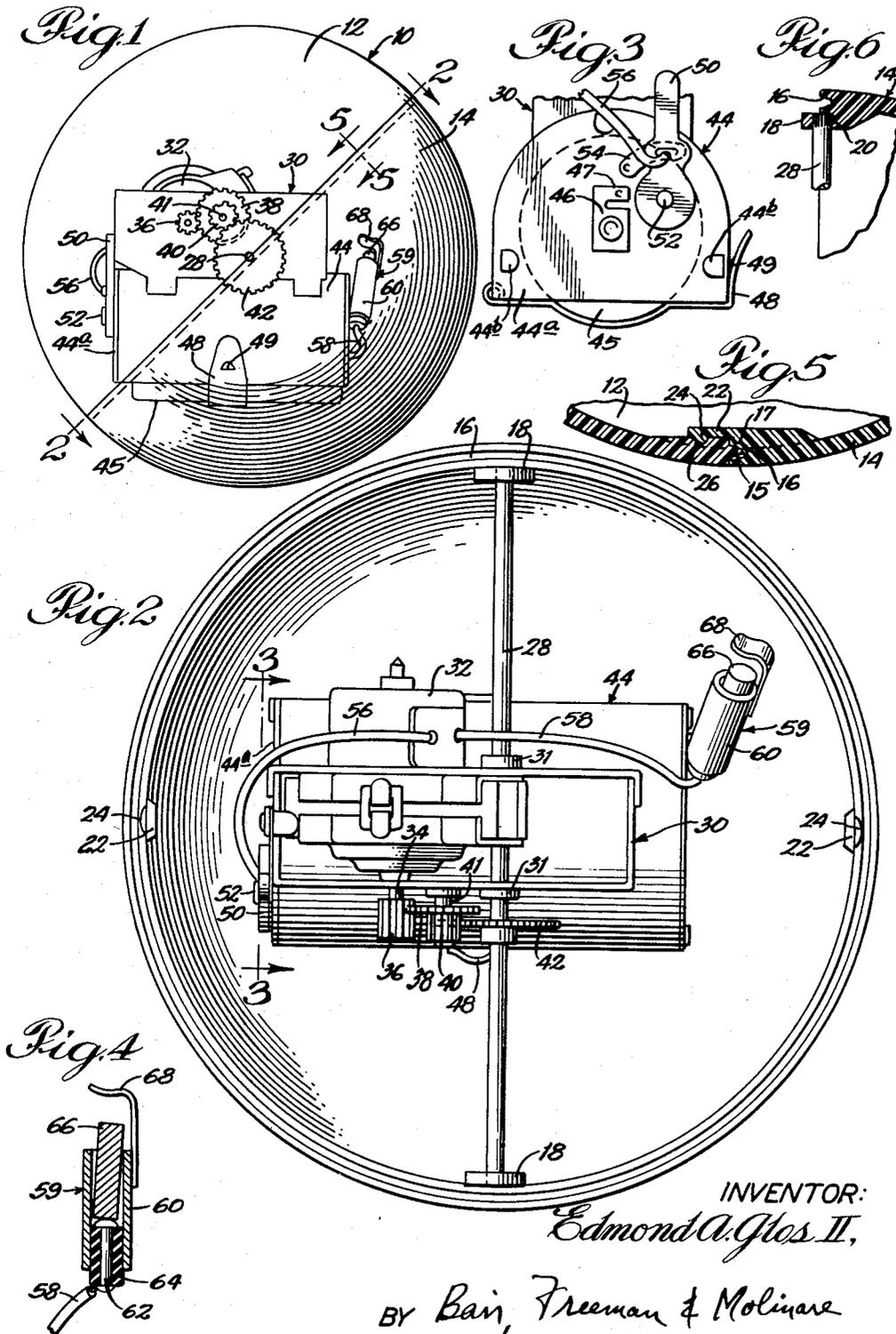
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TOY BALL

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TOY BALL

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This invention relates to a toy ball and a switch therefor, and more particularly relates to a ball which contains therein motive means to effect rolling movement of the ball across a surface when the ball is disposed on the surface at a selected attitude.

The object of this invention is to provide a toy ball which is highly amusing and fascinating.

Another object of this invention is to provide a toy ball which carries its own motive power and which may be caused to either roll across a substantially flat surface or to move across the surface of a body of water.

A further object of this invention is to provide a toy ball which carries its own motive power and which has a novel gravity-actuated control which initiates operation of the motive power when the ball is in one position and which shuts off the motive power when the ball is in another position.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

A preferred embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is an illustration of a ball constructed in accordance with this invention and showing the internal construction of the ball.

Figure 2 is an enlarged cross-section view taken substantially on line 2-2 of Figure 1.

Figure 3 is a fragmentary view taken substantially on line 3-3 of Figure 2 and shows the manually operable switch.

Figure 4 is a vertical cross-section view showing details of the gravity switch.

Figure 5 is an enlarged detail view taken on line 5-5 of Figure 1.

Figure 6 is an enlarged detail view showing the connection between one end of the drive shaft and the shell portion to which it connects.

Referring now to the drawings, there is shown a hollow toy ball generally indicated at 10, which ball is formed of a pair of substantially hemi-spherical shell portions 12 and 14. As best seen in Figure 5, the hemi-spherical shell portion 12 is provided with a peripheral tongue 15 on the circular edge thereof, and the hemi-spherical shell portion 14 is provided with a peripheral groove 16 on the circular edge thereof. The tongue 15 and groove 16 are adapted for mating cooperation. A gasket 17 of rubber, or like material, is provided between the adjacent mating surfaces of the tongue 15 and groove 16 for sealing the hollow ball. The gasket material 17 is preferably deposited either on the tongue 15 or in the groove 16 by spraying, painting, or the like, by using gasket material in liquid form which sets upon exposure to air.

The shell portion 14 is provided with a pair of diametrically disposed flanges 18 which extend outwardly of the

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circular edge of portion 14 and which are bored and splined at 20 for reasons that will become apparent hereinafter. The shell portion 14 is also provided with a pair of elongated diametrically disposed latch members 22 formed on the inside thereof and being shaped to define hooks, or enlargements, 24 on the extended ends thereof. The latch members 22 extend from shell portion 14 beyond the circular edge thereof and are adapted for selectively releasable cooperation with latch-receiving recesses 26 formed on the inner side of shell portion 12 for securing the pair of shell portions 12 and 14 together. The latch members 22 are somewhat resilient, thereby providing selectively releasable latch means. It will be seen that the latch members 22 are offset approximately 90° from flanges 18.

Mounted in the splined flanges 18 are the splined ends of an elongated drive shaft 28, the splines of the shaft 28 cooperating with said drive shaft engaging means on ball 10 to effect a driving connection therebetween. Mounted on the drive shaft 28 are motive means for causing the ball to rotate. Said motive means include frame means, generally indicated at 30, provided with bearings 31 through which the drive shaft 28 extends. The frame means 30 carries thereon a battery-driven electric motor 32, of a type which is readily available and has been used to provide a drive for battery-operated devices. The motor 32 is offset from shaft 28 and has a drive shaft 34 extending therefrom and carries thereon a gear 36. A gear-reducing arrangement is provided by means of sprocket 38, meshed with gear 36, and gear 40, which rotate together on a shaft 41 rotatably mounted on the frame means 30, and the gear 40 drives a sprocket 42, which is keyed, or otherwise appropriately drivingly connected, to the drive shaft 28. The gear-reducing means, comprising gears and sprockets 36, 38, 40 and 42, provides means for transmitting torque from the motor 32 to the drive shaft 28.

Also secured to the frame means 30, by any appropriate means, and offset from the axis of shaft 28, are battery-receiving means generally indicated at 44. The frame means 30 together with battery-receiver 44 constitute what may be referred to as unitary frame means for carrying the motor 32 and the battery for energizing the motor. The battery-receiving means 44 is appropriately shaped to receive a battery 45. One end wall 44a of the battery-receiving means 44 is formed of an electrically non-conducting material and is connected to means 44 by tabs 44b. The end wall 44a is provided with a contact member 46 having a detented arm 47 extending therefrom. The contact 46 electrically connects to the battery's center tap and is appropriately insulated by wall 44a from the remainder of battery-receiving means 44 which electrically connects to the battery's casing. An appropriate latch member 48 is provided, pivotally connected at one end to the battery-receiving means 44, and provided with a detent 49, for releasably securing battery 45 in position.

Mounted on the insulator end 44a of battery-receiving means 44 is a manually operable switch member 50, pivoted at 52, and carrying a detented contact member 54, adapted for cooperation with detented arm 47, and for selectively opening or closing the energizing circuit for motor 32. An electrical lead 56 connects contact member 54 to the battery-driven motor 32, and extending from motor 32 is a second electrical lead 58 which leads to a gravity-actuated switch, generally indicated at 59.

The gravity-operated control means is clearly illustrated in Figure 4 and includes a tubular body 60, serving as a first contact, and electrically connected to the battery's casing through member 44 to which body 60 is brazed. A second contact 62 is disposed axially within tubular

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body 60 and is insulated therefrom by the annular insulator 64. The contact 62 serves to close off one end of the tubular body 60. Mounted within the tubular body 60 is an elongated contact pin 66, one end of which is adapted to engage contact 62, and the side of which is adapted to engage the inner side of tubular body 60, to thereby complete the circuit between contact 62 and body 60. When the switch of Figure 4 is in an inverted position, gravity will cause the conductor pin 66 to separate from contact 62, thereby opening the switch. The body 60 carries a retainer member 68 which is disposed across the path of travel of the elongated pin 66 and prevents loss thereof when the gravity switch is inverted. The transverse portion of retainer 68 is spaced from contact 62 a distance greater than the length of conductor 66, and is spaced from the open end of body 60 a distance less than the length of conductor 66.

The gravity switch 59 is so mounted on the frame means 30, or on the battery-receiving member 44, carried thereby, that when the drive shaft 28 is disposed horizontally, the gravity switch 59 is closed and if the manually-controlled switch 50 is also closed the circuit through the electric motor is completed. This will cause torque from the motor 32 to be transmitted to the drive shaft 28. Since the center of gravity of the unitary frame means 30-44, motor 32, and battery 45 carried thereby, is offset from the axis of the drive shaft 28, said center of gravity will tend to remain below the axis of drive shaft 28 when drive shaft 28 is disposed substantially horizontally, and the torque transmitted from motor 32 will effect rotation of the drive shaft 28 about its axis together with the ball connected thereto. This will cause the ball to roll over a surface onto which the ball is disposed.

If placed on a body of water, say in a tub or the like, the ball will travel across the surface thereof. The mass of the ball and the drive means therefor is such that the entire mechanism will float. The gasket means 17 prevents any leakage through the body of the ball.

When the ball is completely upended from the position shown in Figure 2, then the conductor pin 66 will tend to fall away from the contact 22, thereby opening the gravity switch and shutting off the motor 32. This permits one to selectively affix some sort of designation, such as a color spot, on the outside of ball 10 adjacent the lower end of the drive shaft 28 (as seen in Figure 2) and, by mounting the ball 10 on a base, or holding means, so that the designation is facing upwardly, the gravity switch 59 is maintained in its open condition.

The shell portions 12 and 14 are preferably formed of a thermosetting transparent plastic, so that the interior mechanism may be viewed, thereby further enhancing the fascination of the toy. Alternatively, the shell portions may be opaque, colored, or otherwise decorated as desired. The flexibility of the shell portions 12 and 14 permit of manual distortion thereof to effect their securement together or separation thereof, and also permits of selective connection of drive shaft 28 with the drive shaft engaging means as herein provided.

While there has been shown and described a particular embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and, therefore, it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. A toy ball comprising, in combination: a hollow ball formed of a pair of substantially hemispherical shell portions; electrically energized motive means enclosed wholly within the ball for causing the ball to roll when disposed in unrestrained condition on a support surface; and gravity actuated switch means enclosed

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wholly within the ball and permitting energization of the motive means when the ball is disposed in an operative position, said gravity switch means being arranged, when the ball is disposed in an inoperative position, at substantially right angles to said operative position to de-energize the motive means.

2. A toy ball comprising, in combination: a hollow ball with a substantially uninterrupted spherical exterior surface formed by a pair of substantially hemispherical shell portions having a mating tongue and groove joint between the circular edges of said shell portions, and gasket means in said tongue and groove joint for sealing the hollow ball; motive means enclosed wholly within the ball for causing the ball to roll when disposed in unrestrained condition on a support surface; and gravity actuated control means enclosed wholly within the ball and affording energization of the motive means when the ball is disposed in an operative position, said gravity control means being arranged, when the ball is disposed in an inoperative position, at substantially right angles to said operative position to de-energize the motive means.

3. A toy ball comprising, in combination: a hollow ball with a substantially uninterrupted spherical exterior surface formed by a pair of substantially hemi-spherical moulded shell portions; motive means enclosed wholly within the ball for causing the ball to roll when disposed in unrestrained condition on a support surface; one of said shell portions being formed to integrally define on the inside thereof a pair of diametrically disposed drive shaft engaging elements and a pair of diametrically disposed resiliently mounted, latch elements extending outwardly of the circular edge of said moulded shell portion, and the other shell portion having latch-receiving means formed integrally therein for releasably receiving the resiliently mounted latch elements of the first said shell portion; and said motive means including a frame and drive means carried on said frame, and an elongated drive shaft rotatably carried by said frame and driven by said drive means and having its opposite ends drivingly engaging said diametrically disposed drive shaft engaging elements of said hollow ball.

4. A toy ball comprising, in combination: a hollow ball with a substantially uninterrupted spherical exterior surface formed by a pair of substantially hemi-spherical shell portions; and motive means enclosed wholly within the ball for causing the ball to roll when disposed in unrestrained condition on a support surface, said motive means comprising a unitary frame means carrying an electric motor and a battery for energizing the motor, an elongated drive shaft rotatably carried by said frame and having its opposite ends drivingly engaging diametrically disposed portions of said hollow ball, gear reducing means operatively connecting the electric motor and said drive shaft, gravity actuated switch means enclosed wholly within the ball and positioned on said frame and in an electric circuit, said gravity switch means being arranged for closing said circuit when said drive shaft is disposed substantially horizontally, and for opening the circuit when the drive shaft is disposed substantially vertically with a selected one end thereof extending upwardly.

5. A toy ball comprising, in combination: a hollow ball with a substantially uninterrupted spherical exterior surface formed by a pair of substantially hemi-spherical shell portions; and motive means enclosed wholly within the ball for causing the ball to roll when disposed in unrestrained condition on a support surface, said motive means comprising a unitary frame means carrying an electric motor and battery receiving means for releasably receiving a battery for energizing the motor, an elongated drive shaft rotatably carried by said frame and having its opposite ends drivingly engaging diametrically disposed portions of said hollow ball, gear reducing means operatively connecting the electric motor and said drive shaft, an electric circuit between the battery and

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the electric motor for energizing the motor, manually operable switch means carried on said frame and enclosed wholly within said ball and in said circuit for selectively opening or closing the circuit, and gravity actuated switch means carried on said frame and enclosed wholly within said ball and being in said circuit for closing the circuit when the drive shaft is disposed substantially horizontally, and for opening the circuit when the drive shaft is disposed substantially vertically with a selected one end thereof extending upwardly.

6. A toy ball comprising, in combination: a hollow ball with a substantially uninterrupted spherical exterior surface formed by a pair of substantially hemi-spherical shell portions; electrically energized motive means enclosed wholly within the ball for causing the ball to roll when disposed in unrestrained condition on a support surface; and gravity actuated switch means enclosed wholly within the ball for permitting energization of the motive means when the ball is in an operative position, said gravity switch means being arranged, when the ball is disposed in an inoperative position at substantially right angles to said operative position, to de-energize the motive means, said gravity switch means including a tubular first contact, a second contact disposed axially within one end of the tubular contact and insulated therefrom, an elongated conductor slidably disposed in the

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other end of said tubular contact and being operative, when the tubular contact is in a first upright position, for engaging one end thereof with the second contact and for engaging the inner periphery of the first contact to close a circuit between said contacts, and a retainer carried by said first contact and disposed across the path of travel of said elongated conductor for preventing loss of said conductor when said tubular contact is inverted to open the circuit between said contacts, said retainer being spaced from said second contact a distance greater than the length of said elongated conductor and said retainer being spaced from the open end of said tubular contact a distance less than the length of said elongated conductor.

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