United States Patent

Ruppel

[15] **3,696,557**

[45] **Oct. 10, 1972**

[54] **SELF-PROPELLED TOY**

[72] Inventor: **Reinhold Ruppel,** 17 Hillside Avenue, Hillside, Ill. 60162

[22] Filed: **Nov. 17, 1969**

[21] Appl. No.: **877,387**

[52] **U.S. Cl.**.....**46/243 M,** 46/243 LV, 46/243 MV

[51] **Int. Cl.**.....**A63h 33/26**

[58] **Field of Search**.....46/243, 245, 99, 100, 206

[56] **References Cited**

UNITED STATES PATENTS

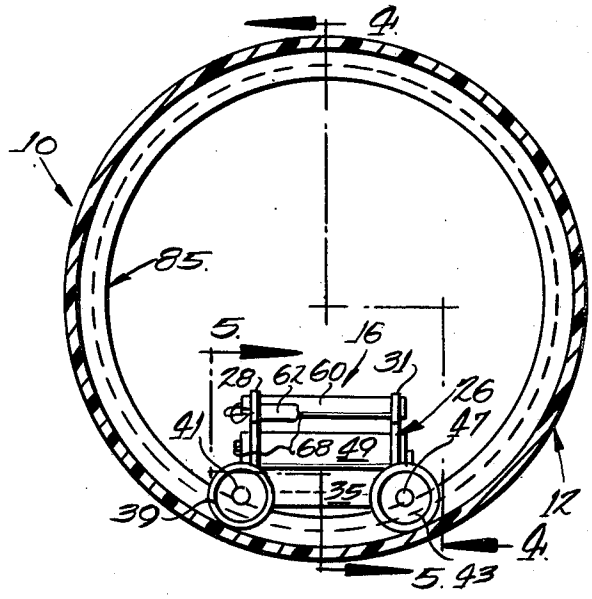
2,939,246	6/1960	Glos	46/243
3,500,579	3/1970	Bryer	46/243
3,312,013	4/1967	Graves	46/243
2,949,696	8/1960	Easterling	46/243
2,949,697	8/1960	Licitis et al.	46/243
2,535,396	12/1950	Dube	46/206 X

Primary Examiner—Louis G. Mancene
Assistant Examiner—D. L. Weinhold
Attorney—Bernard L. Kleinke

[57] **ABSTRACT**

A self-propelled toy includes a hollow shell and a motive means which includes a battery-operated motor, enclosed within the shell for causing the shell to roll along a supporting surface. A gravity-operated switch is mounted on the motive means for de-energizing the motor when the toy is not in use. In operation, the motive means is disposed at a lowermost portion of the shell, and the switch is disposed in a position to energize the motive means for causing the shell to revolve about the motive means. When the shell becomes restrained from movement, the motive means moves relative to the shell along the inner surface thereof until the switch reaches a position where it opens the circuit to the motor.

5 Claims, 6 Drawing Figures



PATENTED OCT 10 1972

3,696,557

Fig. 1.

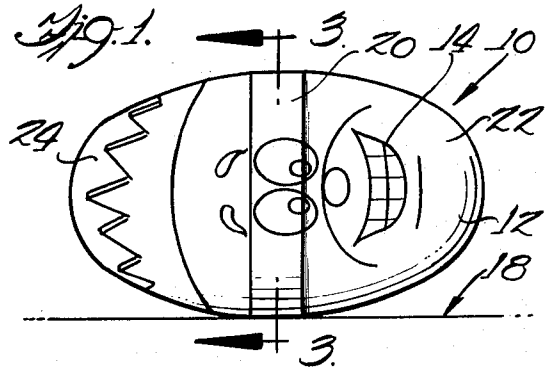


Fig. 2.

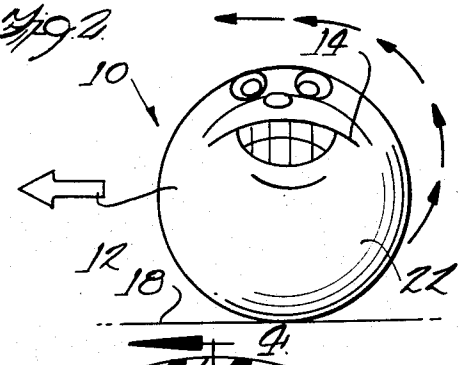


Fig. 5.

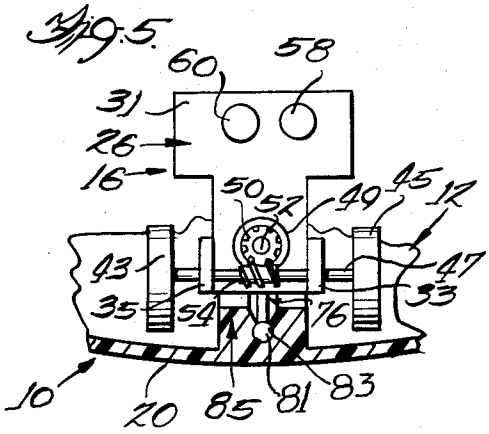


Fig. 3.

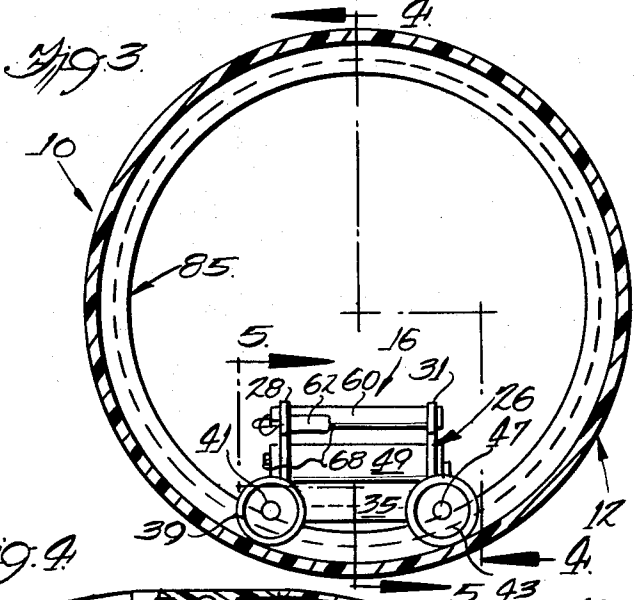


Fig. 4.

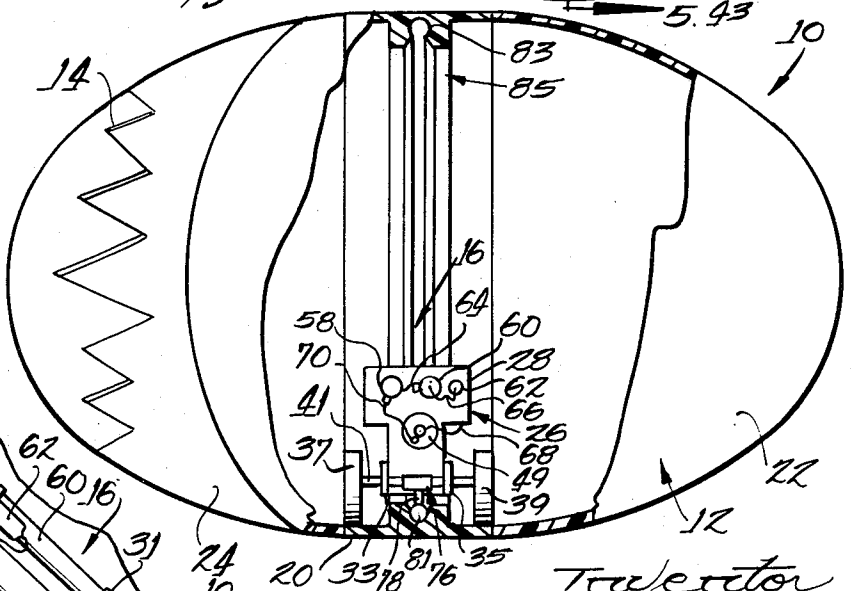
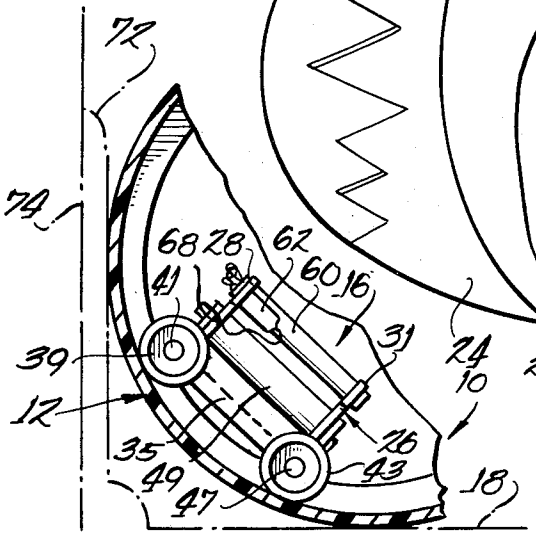


Fig. 6.



Inventor
Reinhold Ruppel

by Fidler, Bradley & Petrunde
Attys

SELF-PROPELLED TOY

The present invention relates to a self-propelled toy, and it more particularly relates to a toy having a shell which encloses an electrically energized motive means for propelling the shell across a supporting surface.

A self-propelled toy having an electrically energized motive means which is wholly enclosed within the shell of the toy and which causes the shell to roll along a supporting surface, such as a floor, has been found to be highly amusing and entertaining. The shell of the toy has taken various different fanciful appearances and shapes, such as a ball. In order to de-energize the battery-operated motor of the motive means in the shell when the toy is not in use, an actuator member of a manual switch extends through an opening in the shell and can be moved by the hand of the user to open the switch and thus to de-energize the motor for the purpose of preventing the batteries from being needlessly run-down. However, it would be highly desirable to have a self-propelled toy which automatically shuts off its electrically energized motive means when not in use without the necessity of any manipulations of the toy by the user. With such a toy, there would be no need for the user to shut off the motor after using the toy. Thus, should the user forget to de-energize the motor, the batteries would not become unnecessarily run-down.

Therefore, the principal object of the present invention is to provide a new and improved self-propelled toy.

A further object of the present invention is to provide a new and improved self-propelled toy which automatically de-energized its motive means without the need of manipulating the device in any way.

Briefly, the above and further objects are realized in accordance with the present invention by providing a toy having a hollow shell which encloses an electrically energized motive means operatively engaging the inner surface of the shell, and a gravity-operated switch mounted on the motive means. In operation, the motive means is disposed at a lowermost portion of the shell where the gravity-operated switch is disposed in a position to energize the motive means, and thus causes the shell to revolve relative to the motive means, whereby the shell rolls along a supporting surface. When the shell becomes restrained from movement upon contact with an immovable object, the motive means moves relative to the shell along the inner surface of the shell until the motive means reaches a position where the gravity-operated switch opens the circuit to the electrically energized motive means.

Further objects and advantages and a better understanding of the present invention will be had by reference to the following detailed description taken in connection with the accompanying drawings, wherein:

FIG. 1 is an elevational view of a toy constructed in accordance with the principals of the present invention;

FIG. 2 is an end elevational view of the toy of FIG. 1;

FIG. 3 is an enlarged cross-sectional view of the toy of FIG. 1 taken substantially along the line 3—3 thereof;

FIG. 4 is an enlarged cross-sectional view of the toy of FIG. 3 taken substantially along the line 4—4 thereof;

FIG. 5 is an enlarged fragmentary cross-sectional view of the toy of FIG. 3 taken substantially along the line 5—5 thereof; and

FIG. 6 is an enlarged, fragmentary cross-sectional view of the toy of FIG. 1, illustrating the toy in a restrained condition.

Referring now to FIGS. 1, 2 and 3 of the drawings, a toy 10 includes a hollow, thin-wall shell or housing 12 which is generally egg-shaped and which has a fanciful design 14 on its outer surface to enhance the enjoyment of the toy. It is to be understood that the hollow shell 12 may also be in the shape of a ball. An electrically energized motive means 16 is wholly enclosed within the shell 12 and engages the inner surface of the shell 12 to cause the shell to rotate about its longitudinal axis and thereby to roll along a supporting surface, such as a floor 18.

The shell 12 may be composed of a suitable plastic material or other suitable material, such as metal. As shown in the drawings, the shell 12 comprises a hollow cylindrical center portion 20 and a pair of hollow dome-shaped end portions 22 and 24 which are joined to the center portion 20 by any suitable technique such as heat welding. The generally cylindrical center portion 20 engages the supporting surface 18 so that as the shell 12 rolls along the supporting surface 18, only the center portion 20 contacts the supporting surface 18. In order to repair or replace parts of the motive means 16 in the shell 12, the shell 12 may include a door (not shown) to permit access to the motive means 16, or the three portions of the shell 12 may be joined together by a tongue and groove arrangement or other suitable arrangement to permit the shell 12 to be disassembled to permit access to the motive means 16. In any event, the shell 12 must be watertight so that, if desired, the toy 10 may be used in water, such as in a tub of water.

Considering now the motive means 16 in greater detail with reference to FIGS. 3, 4, 5 and 6 of the drawings, the motive means 16 includes a carriage 26 which comprises a pair of T-shaped end plates 28 and 31 which are joined together by a pair of side plates 33 and 35. A pair of front wheels 37 and 39 are fixed to a front axle 41 which is rotatably supported by the front end portions of the side plates 33 and 35. A pair of rear wheels 43 and 45 are fixed to a rear axle 47 which is rotatably mounted on the rear end portions of the side plates 33 and 35, whereby the carriage 26 is rollably supported by the front wheels 37 and 39 and the rear wheels 43 and 45 on the inside surface of the hollow center portion 20 of the shell 12.

A d.c. motor 49 is mounted between the end plates 28 and 31 for driving the rear wheels 43 and 45 of the carriage 26. A worm gear 50 is fixed to the end of an output shaft 52 of the motor 49 and meshes with a worm 54 which is fixed to the central portion of the rear axle 47, thereby drivingly connecting the output of the motor 49 to the rear axle 47. A pair of batteries 58 and 60 are mounted on and extend between the end plates 28 and 31 and provide the necessary power to energize the motor 49. A gravity-operated switch 62 is mounted on the end plate 28 and is a mercury-type switch which is connected electrically in series with the motor 49. In this regard, as best seen in FIG. 4, the batteries 58 and 60 are connected in series by means of a wire 64, and a wire 66 connects the battery 60 to one terminal of the switch 62 which in turn is connected at its other terminal to the motor 49 by a wire 68. A wire 70 completes the circuit by connecting the motor 49 and the battery 58. As a result, when the switch 62 is

closed, the batteries 58 and 60 and the motor 49 are connected in series.

As shown in FIGS. 3 and 4, the switch 62 is disposed in a horizontal position when the carriage 26 is located at the lowermost portion of the shell 12, and in the horizontal position the switch closes the circuit to the motor 49 to cause it to be energized, whereby the motor drives the rear wheels 43 and 45 of the carriage 26 to cause the shell 12 to revolve about the motive means 16 and thus to roll along the supporting surface 18.

In order to ensure that the wheels of the motive means 16 remain in operative engagement with the inside surface of the shell 12, a restraining member 76 is rotatably mounted on the front axle 41 between the side plates 33 and 35 and has a downwardly depending finger portion 78 having at its distal end a knob portion 81 which is loosely retained in a groove 83 of a monorail 85, which extends along the inner periphery of the hollow cylindrical center portion 20 of the shell 12 and forms an integral part thereof. Thus, the wheels of the carriage 26 are maintained in operative engagement with the inner surface of the shell 12.

In operation, the motive means 16 is disposed at the lowermost portion of the shell 12, and thus the switch 62 permits the energization of the motive means 16 which causes the shell 12 to revolve about the motive means 16, whereby the shell rolls along the supporting surface 18. As shown in FIG. 6, when the shell 12 strikes an immovable object such as the baseboard 72 of a wall 74, the shell 12 is restrained from further movement, and therefore the carriage 26 of the motive means 16 moves relative to the now stationary shell along the inner surface of the shell until the carriage 26 reaches a position as indicated in FIG. 6. In this position, the gravity-operated switch 62 opens the circuit to the motor 49, thereby preventing any unnecessary drain on the batteries 58 and 60. The carriage 26 is prevented from returning to its position at the lowermost portion of the shell 12 by the gears 50 and 54 which do not permit the wheels 43 and 45 to rotate in a reverse manner. In order to energize the motive means 16, the toy 10 is placed in an unrestrained condition to cause the shell to roll due to the weight of the motive means 16 which is disposed in an off-center position when de-energized as shown in FIG. 6. Once the motive means 16 becomes disposed at the lowermost portion of the shell 12, the switch 62 permits the energization of the motive means 16. When placed in a tub of water, the toy 10 revolves at the surface of the water, but it does not move along the surface of the water.

Therefore, in view of the foregoing description, it will now be apparent that there is provided in accordance with the principles of the present invention a toy which is self-propelled by an electrically operated motive means wholly enclosed within the shell of the toy, and which automatically de-energizes itself when disposed in a restrained condition. As a result, there is no need for any manipulation of the toy to cause the de-energization of the motive means.

While the present invention has been described in connection with a particular embodiment thereof, it will be understood that many changes and modifications of this invention may be made by those skilled in the art without departing from the true spirit and scope thereof. Accordingly, the appended claims are intended to cover all such changes and modifications as fall within the true spirit and scope of the present invention.

What is claimed is:

1. A toy comprising:

a hollow sphere-like shell;

electrically energized motive means enclosed wholly within the shell, said motive means having a plurality of spaced-apart drive wheels engaging the inside surface of said shell at the lowermost portion thereof to support solely said motive means in a stable manner and to cause the shell to move relative to a supporting surface when said shell is disposed in an unrestrained condition, said plurality of wheels for carrying said motive means upwardly along the inside surface of said shell away from said lowermost portion thereof when said shell is disposed in a restrained stationary condition;

gravity actuated switch means enclosed wholly within the shell for permitting energization of said motive means when said shell is disposed in the unrestrained condition and for causing the de-energization of said motive means when said shell is stationary in its restrained condition; and

means for mounting said switch means in a position on said motive means to energize said motive means when it is disposed at said lowermost portion of said shell and to de-energize automatically said motive means when said shell is disposed in its restrained condition and when said drive wheels carry said motive means along the inside surface of the stationary shell away from the lowermost portion of said shell to a point on the inside surface thereof spaced by substantially less than 180 degrees from said lowermost portion of said shell.

2. A toy according to claim 1, further comprising restraining means movably connecting said motive means to the shell to maintain said motive means in operative engagement with the shell.

3. A toy according to claim 2,

wherein said motive means includes a carriage having a plurality of wheels, an electric motor mounted on the carriage, and means drivingly connecting the output shaft of said motor and said wheels.

4. A toy according to claim 3,

wherein said switch means comprises a mercury switch.

5. A toy according to claim 2,

wherein said restraining means comprises a track extending along an inside surface of said shell, and a member connecting said carriage and said track.

* * * * *