Sept. 1, 1964 M. D. GABRIEL 3,146,547

REVERSIBLE LIGHTWIRE TOY

Filed Aug. 24, 1961 2 Sheets-Sheet 1

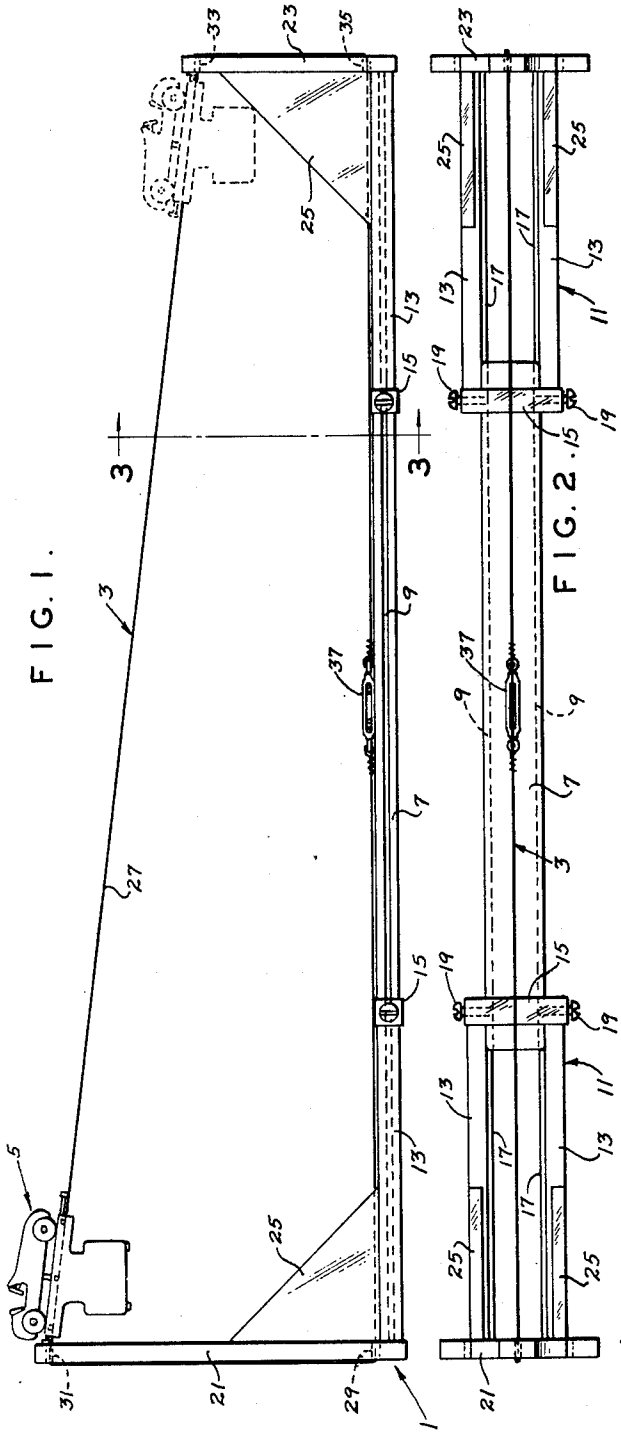

FIG. 1.

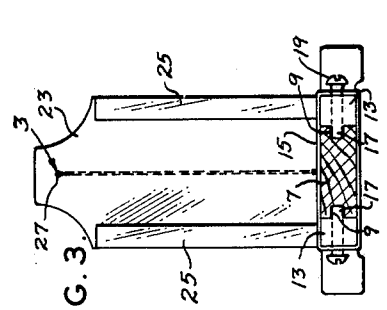

FIG. 3.

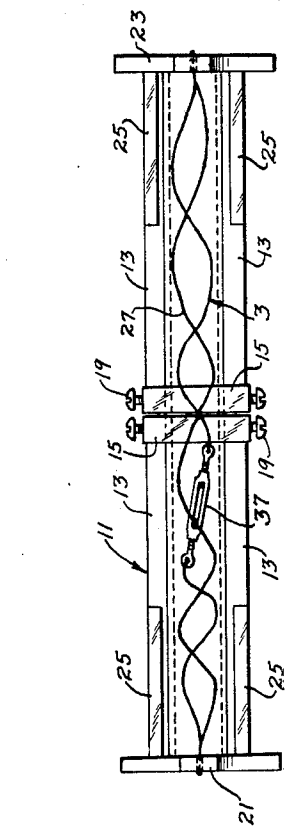

FIG. 4.

FIG. 2.

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REVERSIBLE LIGHTWIRE TOY

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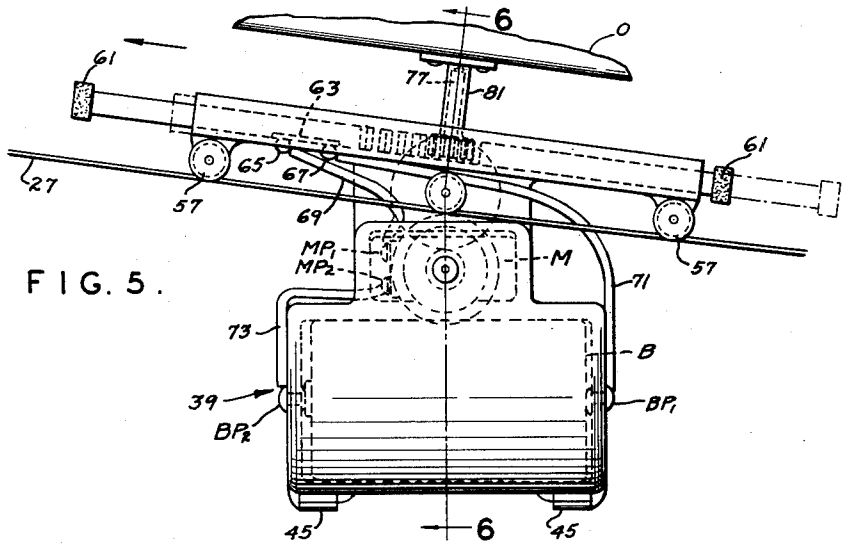

FIG. 5.

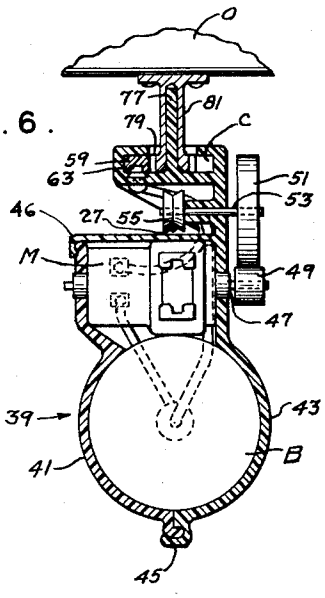

FIG. 6.

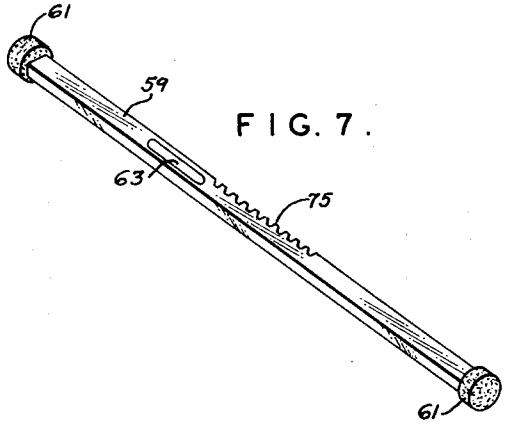

FIG. 7.

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United States Patent Office 3,146,547 Patented Sept. 1, 1964

3,146,547

REVERSIBLE LIGHTWIRE TOY

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Filed Aug. 24, 1961, Ser. No. 133,589
11 Claims. (Cl. 46—244)

This invention relates to electric toys, and more particularly to an electric toy adapted automatically to travel up and down an inclined track.

Among the several objects of this invention may be noted the provision of a toy adapted to be electrically powered up an inclined track, and upon reaching the upper end of the track automatically to turn off the electric power, thereby permitting the toy to descend the track to the lower end thereof, whereupon the electric power is again turned on and the toy again climbs up the track; the provision of such a toy having an object, such as a toy race car, which is always headed in the direction of movement of the toy regardless of whether the toy is ascending or descending, i.e., the object is automatically turned substantially 180° at the end of each run; the provision of a toy of the class described including a novel expansible frame which is relatively compact before the toy is set up, but which can be substantially expanded for providing a long track; and the provision of such a toy which is of relatively simple and economical construction and reliable in operation. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

FIG. 1 is a side view of the toy of this invention showing the frame thereof expanded;

FIG. 2 is a plan view of FIG. 1;

FIG. 3 is a section taken on line 3—3 of FIG. 1;

FIG. 4 is a plan view of the frame of the toy in its collapsed position;

FIG. 5 is an enlarged view in elevation of the power apparatus for the toy;

FIG. 6 is a section taken on line 6—6 of FIG. 5; and

FIG. 7 is a perspective view of a plunger of the toy.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, a toy device of this invention is shown to comprise a frame generally indicated at **1**, a track or wire means **3**, and a movable toy generally designated **5**.

Frame **1** includes a central base **7** adapted to rest upon the floor or ground. A groove **9** is provided in each side of the base **7**. Slidably mounted on base **7** are two extension arms **11**. Each arm **11** has two parallel side pieces **13**, the inner ends of each of which are joined by a bracket **15**. Tongues **17** on side pieces **13** are received within grooves **9** of base **7**. Screws **19** extend through the brackets **15** and side pieces **13** for clamping the arms **11** rigidly to the base **7**. A relatively long upstanding leg **21** is attached to the outer end of one arm **11** and a shorter upstanding leg **23** is attached to the outer end of the other arm **11**. Both of the legs **21** and **23** are supported by triangular brace members **25**.

Track **3** is shown in the form of a wire **27**. However, it will be understood that track **3** could be of other forms, such as string for example. Wire **27** extends from a point adjacent base **7** along the left arm **11** as viewed in FIG. 1, through a hole **29** at the bottom of leg **21**, up the outside of leg **21**, through a hole **31** in the upper end of leg **21**, down to a hole **33** in the upper end of leg **23**, down the outside of leg **23**, through a hole **35** in the bottom of leg **23**, and along the right arm **11** back to a point adjacent

base **7**. A turnbuckle **37** is attached to the ends of wire **27** for tightening the wire on the frame **1**.

The frame **1** and track **3** are shown in collapsed form in FIG. 4. Thus the frame of the toy device may conveniently be reduced in size for storage or shipping. In its expanded position the frame may have a length of 40", for example, and the legs **21** and **23** may have heights of 12" and 7", respectively, with the holes **31** and **33** being spaced 1" from the top of the respective legs.

The movable toy **5** is shown in FIG. 1 in solid lines as it appears just as it begins its descent down wire **27**, and in dotted lines as it appears just as it begins its ascent up wire **27**. In FIGS. 5–7 the detailed construction of the movable toy is seen more clearly. A body or housing is indicated at **39**. Mounted within body **39** is a conventional flashlight battery B and a small motor M. Body **39** comprises two parts **41** and **43** hinged together at **45** and releasably latched at **46** so that the body may be opened for insertion or removal of battery B and motor M.

Motor M is provided with a power shaft **47** which extends out through body **39**. Mounted on shaft **47** is a small roller **49** adapted to be in frictional contact with a larger roller **51**. Roller **51** is fixed on one end of a shaft **53** extending through body B. On the other end of shaft **53** is a V-grooved driven wheel **55** adapted to ride on wire **27**. Energization of motor M will cause wheel **55** to rotate in a counterclockwise direction as viewed in FIG. 5.

A pair of wheels **57** is attached to the upper portion of body **39** for maintaining the movable toy balanced on the wire **27**. A channel C is provided in the upper portion of body **39**. An elongate bar or plunger **59** having enlarged heads **61** is slidably mounted within channel C and extends outwardly from each end of body **39**. Bar **59** is adapted to be pushed to a first position (solid line position in FIG. 5) when the head **61** on the lower end of the bar engages leg **23**, and to be pushed to a second position (dotted line position in FIG. 5) when the head **61** on the left end of the bar engages leg **21**.

An electrically conductive plate **63** is embedded in bar **59**. Body **39** is provided with two contacts **65** and **67** facing channel C. Contact **65** is connected by a wire **69** to one pole MP_1 of motor M. Contact **67** is connected by a wire **71** to a pole BP_1 of battery B. A wire **73** connects the other pole MP_2 of the motor M to the other pole BP_2 of battery B. When the bar **59** is in its first position, i.e., when pushed to the left as viewed in FIG. 5, plate **63** connects contacts **65** and **67**, thereby energizing the motor M for rotating wheel **55**. When bar **59** is in its second position, i.e., when pushed to the right as viewed in FIG. 5, contacts **65** and **67** are disconnected and motor M is deenergized.

Bar **59** is also provided with a rack **75**. Rotatably mounted on a post **77** extending up from body **39** is gear **79** in mesh with rack **75**. A sleeve **81** extends upwardly from gear **79** and around post **77**. Sleeve **81** is attached to the undercarriage of an object O, such as a race car or airplane. As bar **59** moves from the position shown in solid lines in FIG. 5 to the position shown in dotted lines or vice versa, rack **75** causes the object O to be rotated substantially 180°.

Referring to FIG. 1, and assuming the frame **1** and track **3** have seen set up, the movable toy placed on the track, the motor M deenergized, and the object O is a racing car, operation is as follows:

The movable toy **5** rolls down the inclined track toward leg **23** due to gravity. The head **61** on the right end of bar **59** strikes the upper portion of leg **23** upon arrival of the toy at the right end of the track and is thereby pushed from a position wherein it extends out from the right side of body **39** to a position wherein it extends out from the

left side of body 39. Contacts 65 and 67 are thereby connected and motor M is energized to drive wheel 55. During movement of bar 59 from one position to the other as described above, rack 75 causes the gear 79, sleeve 81 and racing car to be rotated 180°, thereby turning the car around to head up the track. Rotating wheel 55 then causes the toy 5 to climb the track toward the upper end thereof. Upon arrival at the upper end of the track, bar 59 is pushed to the right to its original position, thereby deenergizing the motor M and rotating the car 180° so that it faces down the track, whereupon the above process is repeated.

While it is contemplated that the body B and rod 59 be constructed of plastic, it will be understood that other materials may be used without departing from the spirit of this invention. It will also be understood that other types of driving connection may be used between motor M and wheel 55, such as a belt or gear arrangement.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A toy comprising a body, an object rotatably mounted on said body, said object having a front end and a rear end, electric power means for moving the toy up an inclined track, said toy being adapted to move down the track by gravity, means operable in response to the arrival of said toy at the lower end of said track for energizing said electric power means and operable in response to the arrival of said toy at the upper end of said track for deenergizing said electric power means, and means operable in response to the arrival of said toy at either end of said track for rotating said object substantially 180°, the object upon arriving at the lower end of the track being rotated to a position wherein its front end is above its rear end and upon arriving at the upper end of the track being rotated to a position wherein its front end is below its rear end, whereby said object faces in the direction of its movement along the track.

2. A toy comprising a power source, a wheel adapted to ride on an inclined track, said power source when energized being adapted to rotate the wheel, an object positioned above the track and operative with said wheel, said object having a front end and a rear end, means for energizing the power source for rotating the wheel in response to arrival of the toy at the lower end of the track to drive the toy up the track and for deenergizing the power source in response to arrival of the toy at the upper end of the track for permitting the toy to ride down the track, and means for rotating the object substantially 180° in response to the arrival of the toy at either end of the track, the object upon arriving at the lower end of the track being rotated to a position wherein its front end is above its rear end and upon arriving at the upper end of the track being rotated to a position wherein its front end is below its rear end, whereby said object faces in the direction of its movement along the track.

3. A toy as set forth in claim 2 wherein the means for energizing and deenergizing the power source comprises a body having a channel therein, an elongate bar slidably mounted in said channel and extending outwardly from each end of said body, said bar being adapted to be pushed to a first position upon arrival of the toy at the lower end of the track and pushed to a second position upon arrival of the toy at the upper end of the track, a pair of contacts mounted in said body adjacent said channel, said contacts being connected to the power source whereby energization thereof is caused when the contacts are electrically connected together, and means on said bar adapted to connect electrically said contacts when the bar is in its first position and to disconnect electrically said contacts when the bar is in its second position.

4. A toy as set forth in claim 2 wherein the means for rotating the object substantially 180° comprises a body having a channel therein, an elongate bar slidably mounted in said channel and extending outward from each end of said body, said bar being adapted to be pushed to a first position upon arrival of the toy at the lower end of the track and to be pushed to a second position upon arrival of the toy at the upper end of the track, a rack on a portion of said bar, a post on said body connected to said object, and a gear rotatably mounted on said post and in mesh with said rack, the movement of said bar from one position to the other causing said rack to rotate said gear and object substantially 180°.

5. A toy as set forth in claim 4 wherein the means for energizing and deenergizing the power source comprises a pair of contacts mounted on said body adjacent said channel, said contacts being connected to the power source so as to cause energization thereof when the contacts are electrically connected together, and means on said bar adapted to connect electrically said contacts when the bar is in its said first position and to disconnect electrically said contacts when the bar is in its said second position.

6. A toy comprising a body, a driving motor and a battery mounted in said body, an inclined track, a wheel carried by said body and adapted to ride on said track, said driving motor when energized being adapted to rotate said wheel, a post extending upwardly from said body, an object rotatably mounted on said post, said object having a front end and a rear end, means operable in response to arrival of the toy at the lower end of the track for electrically connecting the driving motor and the battery for rotating the wheel to drive the toy up the track and operable in response to arrival of the toy at the upper end of the track for electrically disconnecting the driving motor and battery for permitting the toy to roll down the track, and means for rotating the object substantially 180° in response to the arrival of the toy at either end of the track, the object upon arriving at the lower end of the track being rotated to a position wherein its front end is above its rear end and upon arriving at the upper end of the track being rotated to a position wherein its front end is below its rear end, whereby said object faces in the direction of its movement along the track.

7. A toy as set forth in claim 6 wherein the means for electrically connecting and disconnecting the driving motor and the battery comprises an elongate bar slidably mounted in a channel in said body and extending outwardly from each end of said body, said bar being adapted to be pushed to a first position upon arrival of the toy at the lower end of the track and pushed to a second position upon arrival of the toy at the upper end of the track, a pair of contacts mounted in said body adjacent said channel, said contacts being connected to the motor and battery so as to cause energization of the motor when the contacts are electrically connected together, and means on said bar adapted to connect electrically said contacts when the bar is in its first position and to disconnect electrically said contacts when the bar is in its second position.

8. A toy as set forth in claim 6 wherein the means for rotating the object substantially 180° comprises an elongate bar slidably mounted in a channel in said body and extending outward from each end of said body, said bar being adapted to be pushed to a first position upon arrival of the toy at the lower end of the track and pushed to a second position upon arrival of the toy at the upper end of the track, a rack on a portion of said bar, a post on said body connected to said object, and a gear rotatably mounted on said post and in mesh with said rack, the movement of said bar from one position to the other causing said rack to rotate said gear and object substantially 180°.

9. A toy as set forth in claim 8 wherein the means for

electrically connecting and disconnecting the driving motor and battery comprises a pair of contacts mounted in said body adjacent said channel, said contacts being connected to the motor and battery so as to cause energization of the motor when the contacts are electrically connected together, and means on said bar adapted to connect electrically said contacts when the bar is in its said first position and to disconnect electrically said contacts when the bar is in its said second position.

10. A toy comprising an expansible frame having an upstanding leg at each end, one of said legs being longer than the other, wire means extending between the upper ends of said legs so as to be inclined, means for increasing the tension in said wire means, a body mounted for movement along said wire means, an object rotatably mounted on said body, electric power means for moving the body up the inclined wire means, said body being adapted to move down the wire means by gravity, means operable in response to the arrival of said body at the lower end of said wire means for energizing said electric power means and operable in response to the arrival of said body at the upper end of said wire means for deenergizing said electric power means, and means operable in response to the arrival of said body at either end of said wire means for rotating said object substantially 180°.

11. A toy comprising an expansible frame, said frame comprising a central base member, two side arms, each side arm being slidably attached to said central base member, means on the inner ends of said side arms for clamping the arms to said base, and an upstanding leg at the outer end of each arm, one of said legs being longer than the other, a wire extending from a point adjacent the base, along one arm, up the longer leg to the top thereof, down to the top of the shorter leg, down the shorter leg, and back along the other arm to a point adjacent the base, means joining the ends of said wire adapted to pull said ends together to tighten the wire, a body, an object rotatably mounted on said body, electric power means for moving the body and object up the wire from a point adjacent the shorter leg to a point adjacent the longer leg, said body and object being adapted to move down the wire by gravity, means operable in response to the arrival of said body and object at the lower end of said wire for energizing said electric power means and operable in response to the arrival of said body and object at the upper end of said wire for deenergizing said electric power means, and means operable in response to the arrival of said body and object at either end of said wire for rotating said object substantially 180°.

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