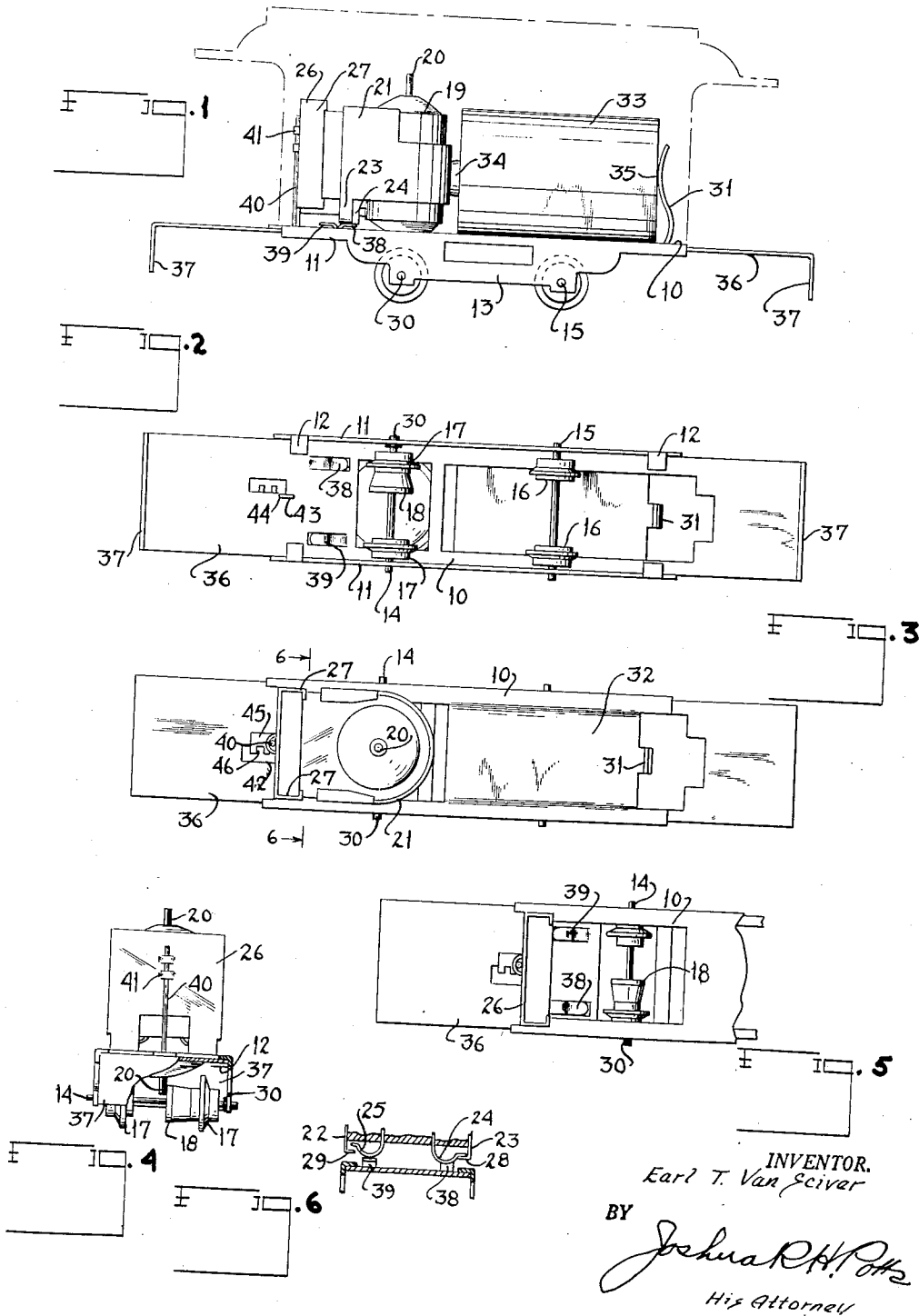


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REVERSING TOY TROLLEY CAR
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REVERSING TOY TROLLEY CAR

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The present invention relates to a toy that simulates a trolley car and is concerned primarily with such a toy that is self-powered.

At the present time there are various toys that are driven by electric motors. A good example of such toys is the well-known electric train. However, in toys of this type the power is derived from the track on which the toy operates. The present invention proposes to depart from this practice by providing a toy which includes as an essential element a small dry cell which affords the necessary motive power.

An important object of the invention is to provide a toy trolley of the type indicated in which the dry cell is removably positioned in the trolley car. Such an arrangement permits of ready replacement after the dry cell is run down.

Another highly important object of the invention is to provide a toy trolley car of the type indicated which is automatically reversible upon engaging some fixed object. Thus, the toy may be placed on a flat surface and started in operation. Upon hitting any fixed object it will automatically reverse itself and run in the opposite direction until it hits another fixed object. It will run back and forth between these two fixed objects as long as the operator desires.

In carrying out this idea the toy trolley car is provided with a main frame which supports the wheels, the motor that drives the wheels, and the dry cell. The motor includes an armature having a pair of terminals. A U-shaped conductor strip is interposed between the dry cell and the motor. A pair of contacts are carried at the free ends of the U-shaped strip and arranged so that the grounding of one armature terminal and the connection of the other with a contact on the U-shaped strip will cause current to flow through the armature in one direction, while the grounding of the other armature terminal and the connection of the remaining terminal to the U-shaped strip contact associated therewith will cause current to pass through the armature in the opposite direction.

A contact actuator is slidably mounted on the main frame and has end portions projecting beyond both ends of the main frame. This actuator is provided with a pair of cams, each of which is adapted to engage one of the armature terminals aforesaid and ground that terminal, at the same time breaking the connection of that terminal with the contact associated therewith. The actuator projects well beyond the superstructure which may be mounted on the frame so that definite assurance may be had that it will

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strike against a fixed object which may be in the path of the toy in advance of any other part of the car.

Various other more detailed objects and advantages of the invention such as arise in connection with carrying out the above noted ideas in a practical embodiment will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

The invention therefore comprises a toy trolley car which includes an electric motor for driving the wheels thereof, which electric motor is powered by a dry cell. Means are included for automatically reversing the direction of the drive of the motor upon the car encountering a fixed object.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing in wherein:

Figure 1 is a view in side elevation of the main body of the toy trolley car that is designed in accordance with the precepts of this invention, with the superstructure shown in phantom outline;

Figure 2 is a bottom plan view;

Figure 3 is a top plan view with the dry cell removed;

Figure 4 is a view in end elevation with the parts broken away and shown in section;

Figure 5 is a fragmentary bottom plan view showing the contact actuator locked against sliding movement; and

Figure 6 is a detailed section taken about on the plane represented by the lines 6—6 of Figure 3.

Referring now to the drawing, wherein like characters of reference indicate corresponding parts, the trolley car of this invention is shown as comprising a main body or platform 10 having depending side flanges 11, with each end of each flange 11 carrying an inwardly turned tab 12. This platform 10 is of metal having good conducting properties and may be considered as the ground of the motor circuit to be later described. The flanges 11 include central enlarged portions 13 which are formed with two pairs of aligned openings which receive axles 14 and 15. Wheels shown at 16 are mounted on the axle 15, while driving wheels 17 are keyed to the axle 14. Also keyed to the axle 14 is a transmission member in the form of a rubber disk 18. This disk 18 bears against one of the driving wheels 17 as shown in Figure 4 and a thrust bearing 30 is interposed between this wheel 17 and the enlarged portion 13 of the flange 11 on that side.

3 Supported on the platform 10 substantially directly above the axle 14 is an electric motor 19 having a drive shaft 20. This drive shaft 20 extends downwardly through an opening in the platform 10 and its lower end engages one face of the rubber transmission member 18. This engagement is created by a force normal to the axis of the shaft 20 and which force is resisted by the thrust bearing 30. Obviously, the rotation of the drive shaft 20 will rotate the rubber member 18 and thus the axle 14 and driving wheels 17.

Enclosing the electric motor 20 is a U-shaped piece of copper sheet metal designated 21 which conducts current from the dry cell (to be later described) to the motor. This member 21 is formed with two downwardly extending arms 22 and 23, each of which has a turned in end flange providing contacts 28 and 29 such as shown in Figure 6.

Upstanding from one end of the platform 10 is a vertical support 26. The support 26 has side flanges 27 which support the motor 19. The motor 19 is a direct current motor of a well known type having a field provided by a permanent magnet and an armature. This armature has a pair of terminals shown at 24 and 25. These armature terminals 24 and 25 overlie the contacts 28 and 29 with which they are adapted to engage. Either one of them may be pressed out of this engagement by an arrangement to be later described.

Upstanding from the other end of the platform 10 is a spring clip 31. Between the spring clip 31 and the U-shaped member 21 the platform 10 is formed with a depression 32 which is curved to conform to the contour of the dry cell shown at 33. This dry cell 33 has an electrode 34 at one end thereof, with the other electrode taking the form of the casing as indicated at 35. The electrode 35 engages the spring clip 31 and is thus grounded to the platform 10. The electrode 34 engages the bend of the U-shaped member 21 and current passes through one side or the other of this U-shaped member, depending on which of the contacts, 28 or 29, is in engagement with its complemental armature terminal, 24 or 25.

A contact actuator is designated 36 and takes the form of a slide which is positioned on the underface of the platform 10 and is retained in its sliding position relative thereto by the inverted tabs 12. The actuator 36 is in conductive engagement with the platform 10 and hence is grounded. This actuator 36 projects well beyond each end of the platform 10 and has downturned end flanges 37. Struck from the actuator 36 are a pair of tongues 38 and 39. These tongues 38 and 39 are adapted to function as cams with respect to the contacts 24 and 25. Thus, when the slide 36 is actuated to cause the tongue 38 to engage the underface of the armature terminal 24, the camming action lifts the free end of the terminal 24 from the contact 28 to break the circuit to the armature terminal 24 at that point, and ground the armature terminal 24. At the same time, however, the tongue 39 will be removed from beneath the armature terminal 25 to permit the latter to come into engagement with the contact 29. Thus the direction of current through the armature of the motor 19 is controlled by which of the terminals 24 or 25 is in engagement with one of the contacts 28 or 29 and which is grounded. The direction

of current through the armature determines the direction of rotation of the motor shaft 20.

It is desirable to provide means for locking the actuator 36 in a neutral position relative to the platform 10. That is, it must be locked in a position in which the circuit through both of the armature terminals 24 and 25 is broken. To this end a spring keeper 40 has its upper end received between a pair of metallic loops 41 which are struck from the vertical support 26. This keeper 40 extends down through an opening shown at 42 in the actuator 36 and its lower end is formed with a manipulating loop 43. This opening 42 is formed with a notch at 44 which is adapted to snugly receive the keeper 40 immediately above the loop 43. When the keeper is so received in the notch 44, the actuator 36 is held against sliding movement relative to the platform 10.

Obviously the platform 10 may carry any superstructure which is desired for appearance effects. Thus, the superstructure may be made to simulate a trolley car which is depicted in the phantom outline in Figure 1. Other representations of moving vehicles could also be carried by the platform 10.

While a preferred embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions, mechanisms and devices illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a toy trolley car, a metallic platform, wheels supporting said platform including a pair of driving wheels, a metallic clip upstanding from one end of said platform, a U-shaped metallic strip on said platform adjacent to the other end and in insulated relation with respect thereto, said U-shaped strip being arranged with its bend confronting said clip, a dry cell detachably positioned between said clip and U-shaped strip and having an electrode engaging said U-shaped strip, the other electrode of said dry cell engaging said clip, an electric motor within said U-shaped strip having an armature with a pair of terminals, each of said terminals being adapted to be connected to one end of said U-shaped strip while the other terminal is grounded to said platform, a vertical drive shaft included as a part of said motor, and means for operatively connecting the lower end of said drive shaft to said driving wheels.

2. In a toy trolley car, a metallic platform, wheels supporting said platform including a pair of driving wheels, a metallic clip upstanding from one end of said platform, a U-shaped metallic strip on said platform adjacent to the other end and in insulated relation with respect thereto, said U-shaped strip being arranged with its bend confronting said clip, a dry cell detachably positioned between said clip and U-shaped strip and having an electrode engaging said U-shaped strip, the other electrode of said dry cell engaging said clip, an electric motor within said U-shaped strip and having an armature with a pair of terminals, each of said terminals being adapted to be connected to one end of said U-shaped strip while the other terminal is grounded to said platform, a vertical drive shaft included as a part of said motor, means for operatively connecting the lower end of said drive shaft to said driving wheels, a pair of contacts carried at the

free end of said U-shaped strip, means adapted to connect either of said contacts with one of said armature terminals, a contact actuator slidably mounted on said platform and extending from opposite ends thereof, and a pair of cam elements carried by said contact actuator, each of which is adapted to engage one of said armature terminals to break the electrical connection thereat.

3. In a toy trolley car, a metallic platform, wheels supporting said platform including a pair of driving wheels, a metallic clip upstanding from one end of said platform, a U-shaped metallic strip on said platform adjacent to the other end and in insulated relation with respect thereto, said U-shaped strip being arranged with its bend confronting said clip, a dry cell detachably positioned between said clip and U-shaped strip and having an electrode engaging said U-shaped strip, the other electrode of said dry cell engaging said clip, an electric motor within said U-shaped strip and having an armature with a pair of terminals, a vertical drive shaft included as a part of said motor, means for operatively connecting the lower end of said drive shaft to said driving wheels, a pair of contacts carried at the free end of said U-shaped strip, means adapted to connect either of said contacts with one of said armature terminals, a contact actuator slidably mounted on said platform and extending from opposite ends thereof, a pair of cam elements carried by said contact actuator, each of which is adapted to engage one of said armature terminals to break the electrical connection thereat, and means to lock said sliding actuator in a fixed position relative to said platform and in which position neither of said contacts engages the armature terminal associated therewith.

4. In a toy trolley car, a metallic platform, wheels supporting said platform including a pair of driving wheels, a metallic clip upstanding from one end of said platform, a vertical support upstanding from the other end of said platform, a U-shaped metallic strip carried by said support in insulated relation with respect to said platform and having a bend confronting said clip, said platform being formed with a depression between said clip and U-shaped strip, a cylindrically shaped dry cell resting in said depression and detachably held by said clip and strip, said dry cell having a casing conductively engaging said clip and an electrode conductively engaging said strip, a reversible motor within said strip and having a vertically arranged drive shaft, and means for operatively connecting the lower end of said drive shaft to said driving wheels.

5. In a toy trolley car, a metallic platform, wheels supporting said platform including a pair of driving wheels, a metallic clip upstanding from one end of said platform, a vertical support upstanding from the other end of said platform, a U-shaped metallic strip carried by said support in insulated relation with respect to said platform and having a bend confronting said clip, said platform being formed with a depression between said clip and U-shaped strip, a cylindrically shaped dry cell resting in said depression

and detachably held by said clip and strip, said dry cell having a casing conductively engaging said clip and an electrode conductively engaging said strip, a reversible motor within said strip and having a vertically arranged drive shaft, means for operatively connecting the lower end of said drive shaft to said driving wheels, and means for automatically causing current from said dry cell to pass through one side or the other of said strip and thereby reverse the flow of current through said motor, said means including an abutment member projecting beyond opposite ends of said platform and slidable relative thereto, said abutment member being adapted to engage a fixed object to reverse the direction of said current through said motor.

6. In a toy trolley car, a metallic platform, wheels supporting said platform including a pair of driving wheels, a metallic clip upstanding from one end of said platform, a vertical support upstanding from the other end of said platform, a U-shaped metallic strip carried by said support in insulated relation with respect to said platform and having a bend confronting said clip, said platform being formed with a depression between said clip and U-shaped strip, a cylindrically shaped dry cell resting in said depression and detachably held by said clip and strip, said dry cell having a casing conductively engaging said clip and an electrode conductively engaging said strip, a reversible motor within said strip having an armature with a pair of terminals and having a vertically arranged drive shaft, means for operatively connecting the lower end of said drive shaft to said driving wheels, a contact actuator slidably carried by said platform and projecting beyond the opposite ends thereof, a pair of contacts on the free ends of said U-shaped strip, each of which is adapted for engagement with one of said armature terminals, a pair of cam elements carried by said actuator and adapted to engage said armature terminals to cause one or the other of them to break the circuit through the armature of the motor, and locking means carried by said vertical support for locking said actuator in a fixed position relative to said platform.

7. In a toy trolley car, a platform, a horizontally arranged U-shaped strip carried by said platform and having two sides joined by a bend, an electric motor within said strip having a vertically arranged drive shaft and an armature, a dry cell on said platform having an electrode engaging said strip at the bend thereof, and means for causing electric current to pass from said dry cell from said bend through one side or the other of said U-shaped strip to said armature.

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