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REVERSING MECHANISM FOR TOY ELECTRIC LOCOMOTIVES

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Fig. 1.

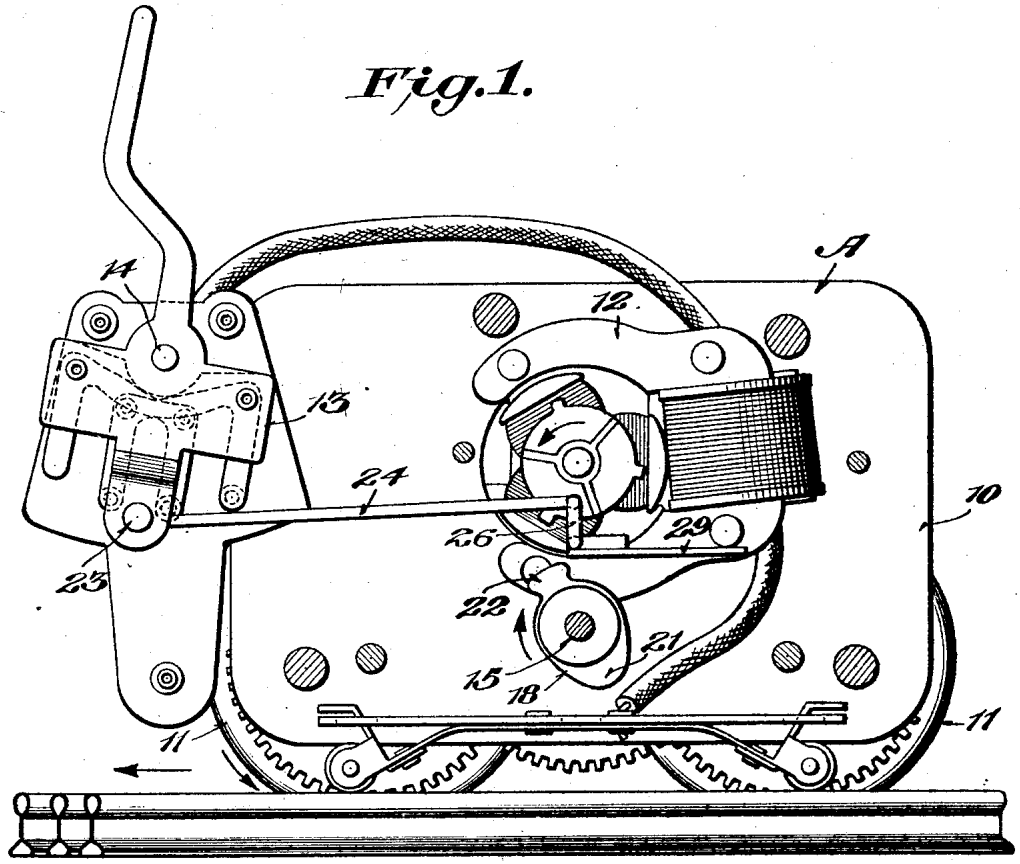


Fig. 2.

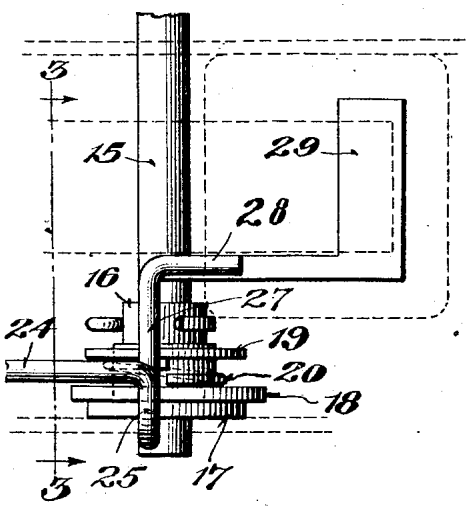
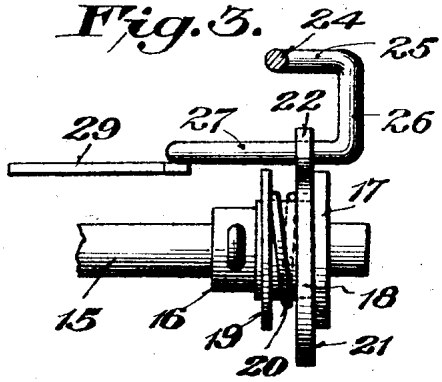


Fig. 3.



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REVERSING MECHANISM FOR TOY ELECTRIC LOCOMOTIVES

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Fig. 5.

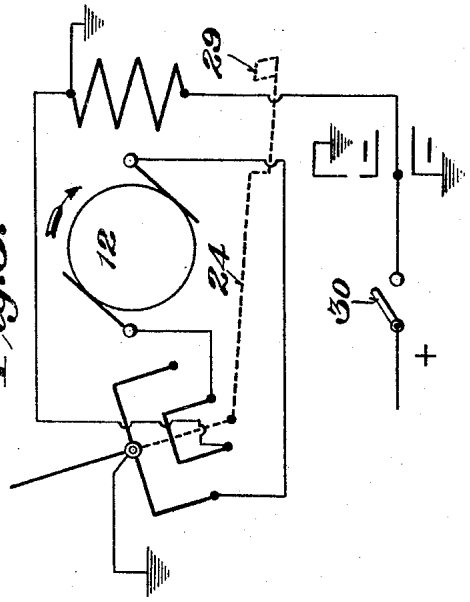


Fig. 7.

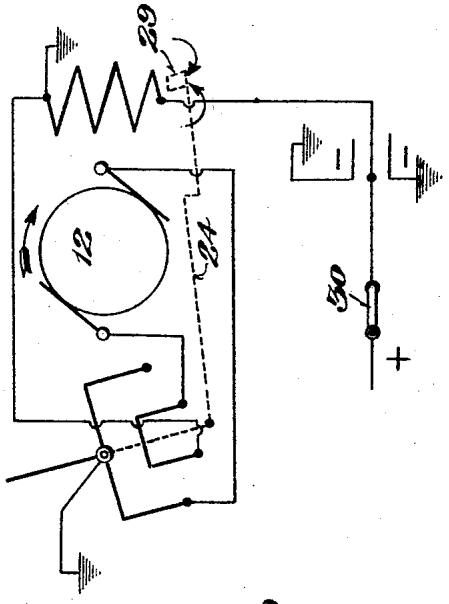


Fig. 4.

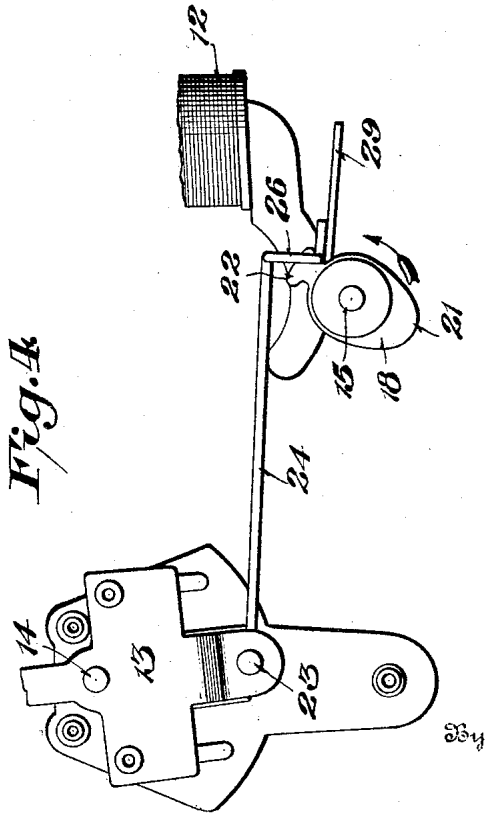
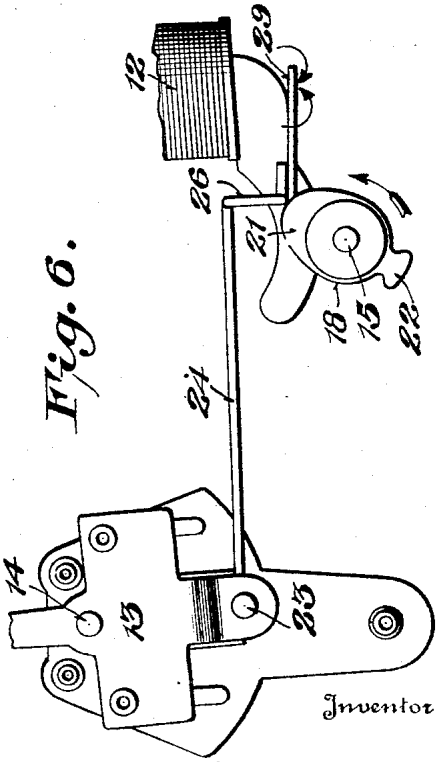


Fig. 6.



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REVERSING MECHANISM FOR TOY ELECTRIC LOCOMOTIVES

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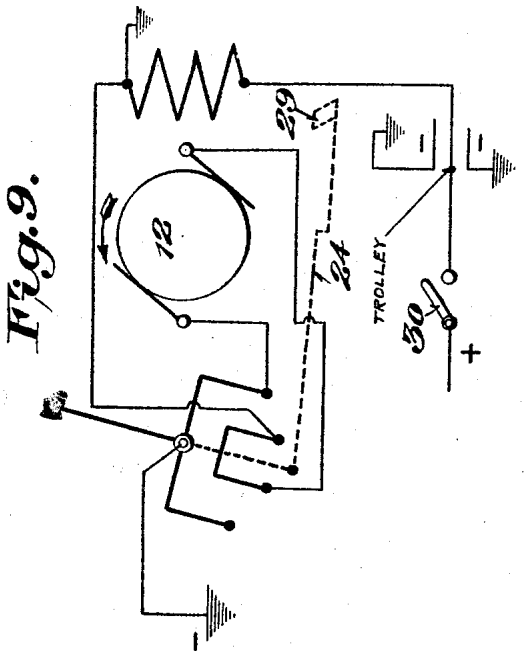

Fig. 9.

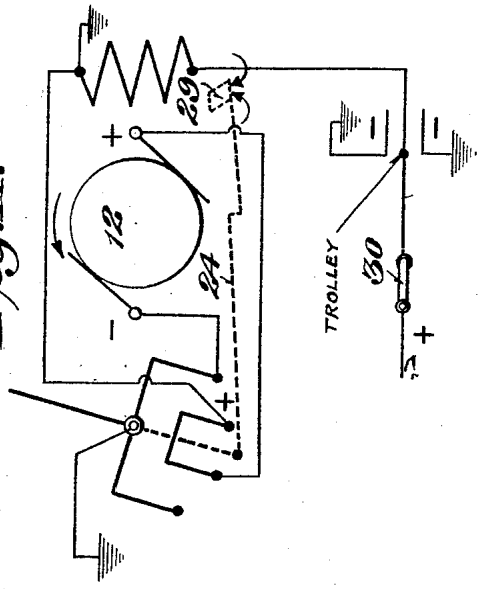

Fig. 11.

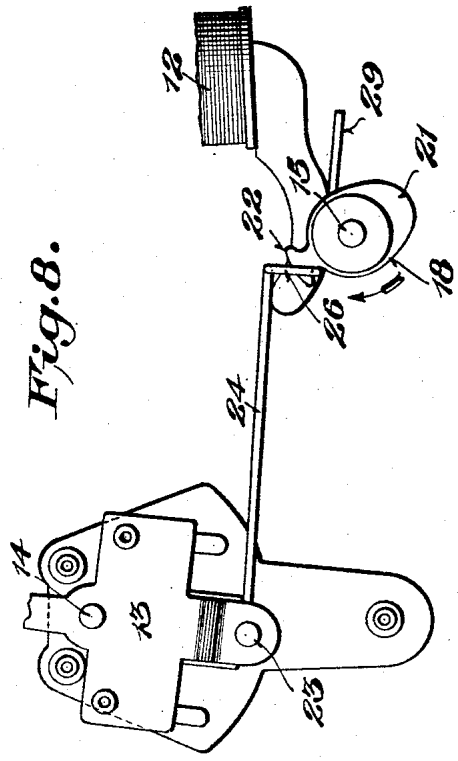

Fig. 8.

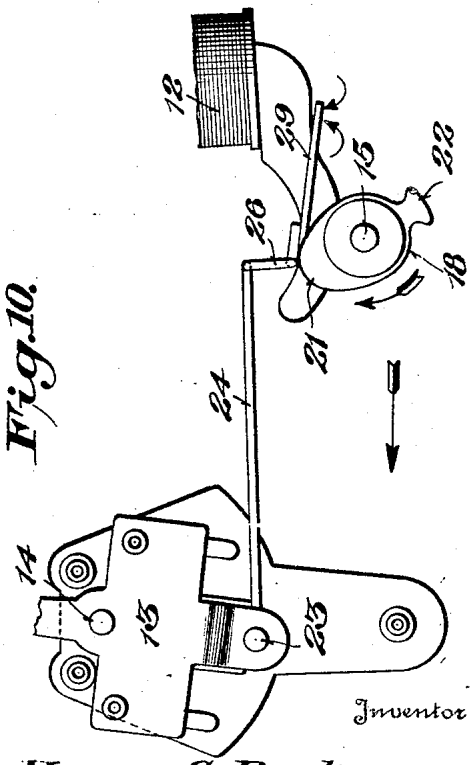

Fig. 10.

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UNITED STATES PATENT OFFICE

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REVERSING MECHANISM FOR TOY ELECTRIC LOCOMOTIVES

Application filed July 24, 1929. Serial No. 380,680.

This invention relates to toy electric locomotives, and has particular reference to a remote control reversing mechanism for such locomotives.

Heretofore it has been the general practice to provide for remote control reversing movements of toy electric locomotives by mounting on such locomotives a solenoid or coil for operating in conjunction with a various related mechanisms so that upon actuation of a manually operable switch to open the electric circuit to the motor of the locomotive, the solenoid or coil automatically operates the various mechanisms which in turn actuates a motor reversing switch, whereby the locomotive is caused to proceed in a direction opposite to the direction it last traveled, when the manually operable switch again is closed. This means of providing for remote control of toy electric locomotives has proven an extremely costly one, inasmuch as it necessitates the provision of a special solenoid or coil, a special mounting therefor, and various other special parts to be used in conjunction with said coil and its mounting. Therefore, the general object of the present invention is to provide a remote control reversing mechanism for toy electric locomotives which eliminates the necessity of providing a special solenoid or coil with its special adjuncts, and which is of simple, inexpensive, strong and durable construction, positive in its operation, and thoroughly reliable and efficient in use.

With the foregoing and other objects in view, the invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein like characters of reference denote corresponding parts in the different views:—

Fig. 1 is a longitudinal section through the operating mechanism of a toy electric locomotive equipped with the present reversing mechanism, the parts of the latter being shown in the position they occupy when the locomotive is traveling to the left as viewed in the drawing.

Fig. 2 is a top plan view of the clutch element of the present reversing mechanism.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a side elevation illustrating the position automatically assumed by the parts of the mechanism when electrical energy to the motor of the locomotive is cut off during travel of the locomotive to the left as viewed in Fig. 1 of the drawings.

Fig. 5 is a diagrammatic view illustrating the path of electrical energy through the motor of the locomotive when the reversing mechanism is in the position shown in Fig. 4.

Fig. 6 is a view similar to Fig. 4 illustrating the initial action of the reversing mechanism when electrical energy is supplied to the motor of the locomotive with the parts of the mechanism positioned as shown in Fig. 4.

Fig. 7 is a diagrammatic view illustrating the final position assumed by the parts of the mechanism following supply of electrical energy to the motor of the locomotive with the mechanism positioned as shown in Fig. 4.

Fig. 8 is a view similar to Figs. 4 and 6 illustrating the position automatically assumed by the parts of the mechanism when electrical energy to the motor of the locomotive is cut off during travel of the locomotive to the right and with the mechanism positioned as shown in Fig. 4.

Fig. 9 is a diagrammatic view illustrating the path of electrical energy through the motor of the locomotive when the mechanism is positioned as shown in Fig. 8.

Fig. 10 is a view similar to Figs. 4, 6 and 8 illustrating the initial action of the mechanism when electrical energy is supplied to the motor of the locomotive with the parts of the mechanism positioned as shown in Fig. 8; and

Fig. 11 is a diagrammatic view illustrating the path of electrical energy through the motor of the locomotive when the mechanism is positioned as shown in Fig. 10.

Referring to the drawings in detail, A designates, generally, a well known form of power unit for toy electric locomotives, same being inclusive of a frame 10, drive wheels 11, a motor 12 geared to said drive wheels, and

a reversing switch inclusive essentially of a contact carrying element 13 pivoted as at 14 for rocking movement between two positions, in one of which, the position shown in Figs. 1, 8 and 10 in this instance, it is effective to direct current through the motor 12 to cause the armature thereof to rotate in a direction to produce movement of the locomotive to the left as viewed in Fig. 1, and in the other of which, the position shown in Figs. 4 and 6 in this instance, it is effective to direct current through the motor to cause the armature thereof to rotate in a direction to produce movement of the locomotive to the right as viewed in Fig. 1.

Located in this instance below the motor 12 is a shaft 15, suitably geared to the armature of the motor 12 for rotation by the latter. On this shaft is fixed a sleeve 16 which is flanged as indicated at 17, and rotatably mounted on said sleeve, and at one side frictionally engaging the flange 17 is a cam 18. Suitably secured to said sleeve is a ring or other form of abutment 19, and between said abutment and the opposite side of said cam 18 is an expansion coil spring 20 which constantly reacts from said abutment to maintain said cam in frictional engagement with the flange 17. The cam 18 is inclusive of a protuberance 21 and a lug 22 which latter is disposed preferably but not necessarily diametrically opposite to said protuberance.

Pivoted to the switch element 13, as at 23, is a rod 24 which extends to a point approximately above the shaft 15 and then is extended laterally as at 25, downwardly as at 26, again laterally as at 27 parallel to the portion 25 in spaced relation thereto and overlying the cam 18, its free end portion 28 having an L-shaped armature plate 29 suitably secured thereto for cooperation with the electromagnet constituted by the wire wound field laminations of the motor 12 whereby, when current is supplied to the motor, the rod 24 is maintained in an elevated position in which the cam 18 is free to rotate without the protuberance 21 or the lug 22 thereof engaging the lateral portion 27 of the rod, as illustrated in Fig. 1, and whereby, when current is cut off from the motor, said rod 24 is adapted to drop to a position in which the lateral portion 27 thereof rests on the cam 18.

With the switch element 13 positioned as shown in Figs. 1, 8 and 10, current is adapted to be supplied to the motor 12 as indicated in the diagrammatic views, Figs. 9 and 11, to cause the armature of the motor to rotate in a counter-clockwise direction as viewed in the drawings, which, through the gearing aforesaid, causes the shaft 15 to rotate in a clockwise direction and the wheels 11 to rotate in a counter-clockwise direction to produce movement of the locomotive to the left as viewed in the drawings. On the other hand, with the switch element 13 positioned as shown in Figs. 4 and 6 of the drawings, current is adapted to be supplied to the motor 12 as indicated in the diagrammatic views, Figs. 5 and 7, to cause the armature of the motor to rotate in a clockwise direction as viewed in the drawings, which through the gearing aforesaid, causes the shaft 15 to rotate in a counter-clockwise direction and the wheels 11 to rotate in a clockwise direction to produce movement of the locomotive to the right as viewed in the drawings.

A manually operable switch 30 indicated in the diagrammatic views, Figs. 5, 7, 9 and 11, is provided for controlling the supply of current through the switch element 13 to the motor 12, and, as is apparent, said switch 30 may be located at any desired point adjacent to or remote from the track layout over which the locomotive is adapted to travel.

In view of the foregoing description considered in connection with the drawings the operation of the invention is believed to be apparent. Assuming the switch element 13 to be positioned as shown in Figs. 1, 8 and 10 of the drawings, and the switch 30 closed, with the rod 24 elevated and held elevated by the magnetism of the field of the motor 12 as shown in Fig. 1 of the drawings, it is manifest that the locomotive will travel to the left as viewed in said figure. If now, the switch 30 is opened, current will be cut off from the motor 12 and the rod 24 will drop by gravity to a position in which the lateral portion 27 thereof rests on the cam 18. Inasmuch as the momentum of the locomotive will cause same to continue moving to the left when the switch 30 is opened the shaft 15 and the cam 18 will continue to rotate in a clockwise direction. This manifestly will result in the lug 22 engaging the lateral portion 27 of the rod 24 and pulling of said rod to the right as shown in Fig. 4, thereby reversing the position of the switch element 13. Suitable stops (not shown) prevent movement of the switch element 13 beyond its two predetermined operative positions and, therefore, when said switch element has been pulled to the position shown in Fig. 4 the cam 18 will be prevented from further rotation and due to its frictional clutching engagement with the flange 17 will act as a brake to stop the locomotive. With the position of the switch element 13 thus automatically reversed upon opening of the switch 30, it follows that if said switch 30 then is closed current will be supplied to the motor 12 to produce movement of the locomotive to the right as viewed in Fig. 1. This will result in counter-clockwise rotation of the shaft 15 and the cam 18 from the position shown in Fig. 4 so that the protuberance 21 will engage the lateral portion 27 of the rod 24 and elevate said rod as shown in Fig. 6 to bring the armature plate 29 into the effective zone of

the magnetic flux of the field of the motor 12, whereupon said rod will be elevated and maintained elevated by said magnetic flux so that the cam 18 may rotate freely until the switch 30 again is opened. With the locomotive now traveling to the right as viewed in Fig. 1, and the cam 18 rotating in a counter-clockwise direction, opening of the switch 30 will, of course, cut off current from the motor 12 and the rod 24 will drop until the lateral portion 27 thereof rests on the cam. The momentum of the locomotive will cause the cam to continue to rotate with the result that the lug 22 will engage the portion 27 of the rod and push same to the left, thereby again reversing the switch element 13 so that upon again closing the switch 30 the rod 24 will be elevated by the protuberance 21 and the locomotive will travel to the left until the switch 30 is opened.

Without further description it is thought that the features and advantages of the invention will be readily appartent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:

1. In a toy electric locomotive inclusive of a reversible electric motor for driving the same, the combination of a reversing switch for said motor, a switch operating member maintained in an inoperative position by the magnetic field of said motor when current is supplied to the latter and adapted to move automatically to a position out of the effective magnetic field of the motor to be actuated to reverse said switch when current is cut off from the motor, means operable by the momentum of the locomotive following cutting off of the current to the motor to actuate said member to reverse said switch, and cam means operable by movement of the locomotive to move said member into the effective magnetic field of the motor.

2. In a toy electric locomotive, a reversing switch, a switch operating member, a device operable by movement of the locomotive to actuate said member to reverse said switch, means for holding said member in an inoperative position with respect to said actuating device when current is supplied to the locomotive, said member being adapted to move automatically to a position to be actuated by said device to reverse the switch when current is cut off from the locomotive, and mechanical means operable by movement of the locomotive following supply of current thereto to move said member to its first mentioned position.

3. In a toy electric locomotive, a reversing switch, a switch operating member, a device operable by movement of the locomotive to actuate said member to reverse said switch, means for holding said member in an inoperative position with respect to said actuating device when current is supplied to the locomotive, said member being adapted to move automatically to a position to be actuated by said device to reverse the switch when current is cut off from the locomotive, a shaft rotatable when the locomotive is in motion, and means operable by rotation of said shaft to move said member to its first mentioned position.

4. In a toy electric locomotive, a reversing switch, a switch operating member, a device operable by movement of the locomotive to actuate said member to reverse said switch, electro-magnetic means for holding said member in an inoperative position with respect to said actuating device when current is supplied to the locomotive, said member being adapted to move automatically out of the effective magnetic field of said electro-magnetic means and to a position to be actuated by said device to reverse the switch when current is cut off from the locomotive, and mechanical means operable following supply of current to said electro-magnetic means to move said member to its first mentioned position.

5. In a toy electric locomotive, a reversing switch, a switch operating member, a device operable by movement of the locomotive to actuate said member to reverse said switch, means for holding said member in an inoperative position with respect to said actuating device when current is supplied to the locomotive, said member being adapted to move automatically to a position to be actuated by said device to reverse the switch when current is cut off from the locomotive, a shaft rotatable when the locomotive is in motion, and cam means operable by rotation of said shaft to move said member to its first mentioned position.

In testimony whereof I hereunto affix my signature.

HARRY S. BECKER.