May 31, 1932. J. C. KOERBER 1,860,864

TOY RAILWAY

Filed June 2, 1928 2 Sheets-Sheet 1

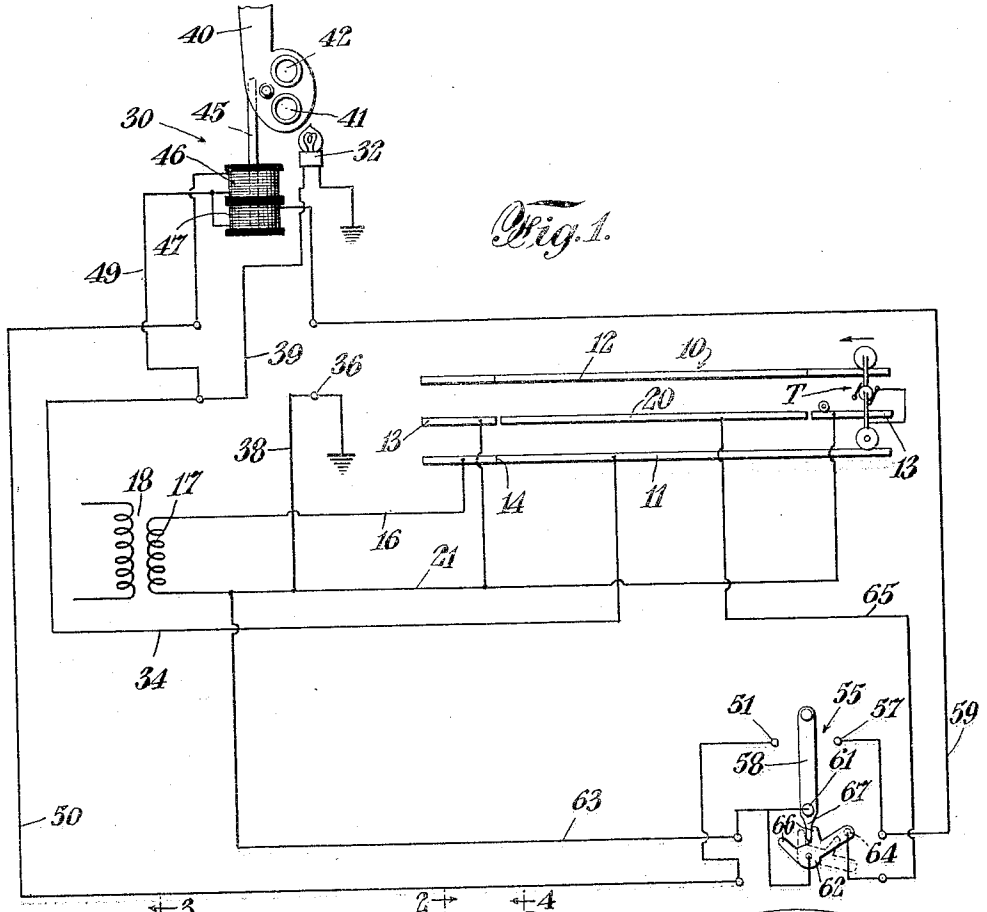


Fig. 1.

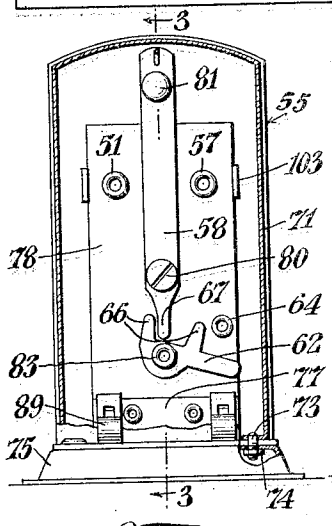


Fig. 2.

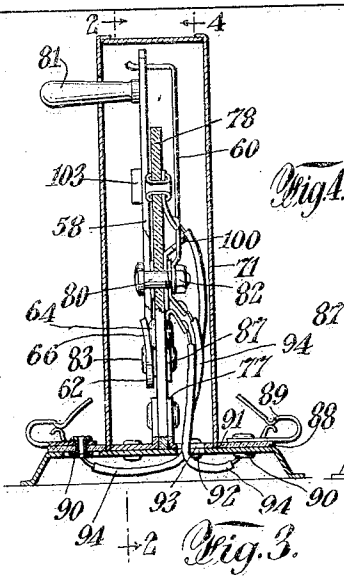


Fig. 3.

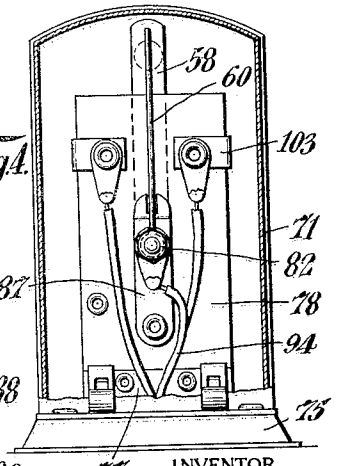


Fig. 4.

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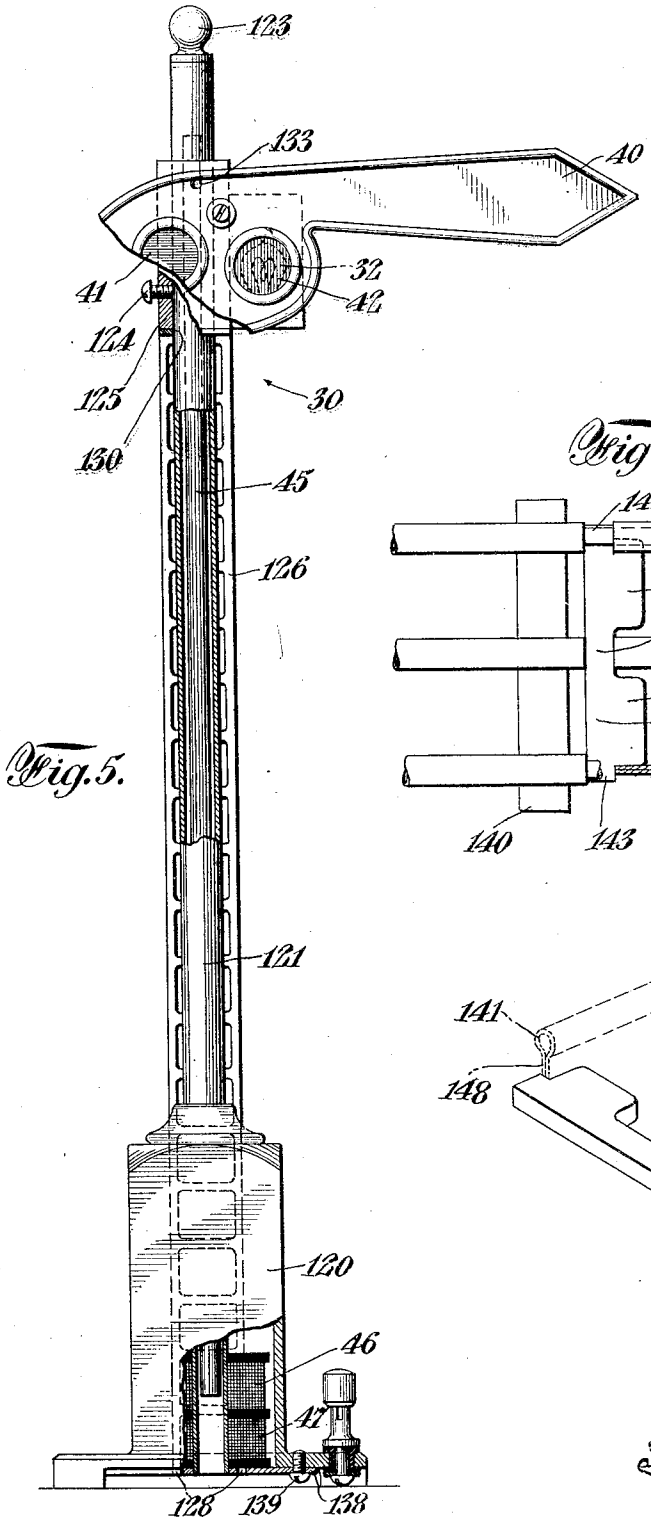


Fig. 5.

Fig. 6.

Fig. 7.

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TOY RAILWAY

Application filed June 2, 1928. Serial No. 282,481.

This invention relates to toy railways and has for its principal object to provide an improved signaling system for toy railways and also to provide an improved means adapted for use in conjunction with the signaling system for controlling the movement of trains.

A further object of my invention is to provide a system of this character which is simple and efficient in operation, economical to manufacture which is composed of parts which may be easily assembled and disassembled and which may be readily applied to toy railways now in use.

A further object of my invention is to provide an improved means for manually operating toy railway electric signals and for controlling the movements of toy railway trains, and a further object is to provide a novel switch or circuit controlling means adapted for use in my improved system.

Toy electric railways now in use comprise a track formed in sections which are joined together end to end, each section comprising two wheel bearing rails and a third rail which is insulated from the wheel bearing rails. The third rail is adapted to supply current to the motor of the vehicle on the track, the return circuit from the motor usually passing through the car wheels to one or both of the wheel bearing rails and thence back to the source of current supply. In applying my improved system to toy railways of the type described, I connect the track sections together in such a way that one or more of the rails of one of the sections is insulated from the corresponding rail or rails of adjacent sections, the insulated rail or rails serving to carry current when the vehicle is in contact therewith as will be more fully explained hereafter.

A further object of my invention is to provide an improved means by which rails of adjacent sections may be insulated from one another.

Other objects of my invention will appear from the following description taken in connection with the following drawings, wherein

Fig. 1 is a circuit diagram of one form of my improved system.

Fig. 2 shows one form of my improved switch adapted for use in the system shown in Fig. 1, this figure being a sectional view partly in elevation taken on the line 2—2 of Fig. 3.

Fig. 3 is a sectional view partly in elevation taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view partly in elevation taken on the line 4—4 of Fig. 3.

Fig. 5 is a side elevation partly in section showing a semaphore adapted for use in the system shown in Fig. 1.

Fig. 6 is a plan view of parts of two successive sections of a toy railway track showing one form of means employed by me to insulate rails of the two sections from one another, and

Fig. 7 is a perspective view of part of the structure shown in Fig. 6.

Referring to Fig. 1, 10 represents a portion of the railway track comprising two outside wheel bearing rails 11 and 12 and a third or middle rail 13 which is insulated from the wheel bearing rails. The track is formed of sections joined end to end. The two outside rails of each section being mechanically and electrically joined at their ends as indicated at 14 to corresponding rails of the adjacent sections, the corresponding rails of successive sections thus forming a continuous conductor. One or both of the outside rails is connected by means of a conductor 16 to one terminal of a suitable source of current supply such as the secondary 17 of the transformer 18.

The third rail 13 is not a continuous conductor but comprises one or more portions or sections 20 which are insulated at their ends from the remaining portions of the third rail. The insulated sections 20 are located at those points of the track at which a slowing-down or stopping of the train is desired. All parts of the third rail other than the sections 20 are connected, as by a conductor 21 to the other terminal of the source of supply.

Reference character 30 represents a semaphore which may be located at the side of

the track adjacent the insulated rail section 20. The semaphore 30 comprises an incandescent signal lamp 32, one terminal of which is connected to one terminal of the source of supply by means of a conductor 39, a conductor 34, outer rail 11 and conductor 16. The other terminal of lamp 32, which is grounded on the semaphore casing is connected to the other terminal of the source of supply through the casing to binding post 36 and thence through conductors 38 and 21.

Adapted to be swung or rotated in front of the signal lamp 32 is a semaphore arm 40 having two colored screens 41 and 42. The arm 40 is adapted to occupy two positions, one a raised position in which the color screen 41 is positioned in front of the lamp, this screen preferably being green to indicate "clear" and a lowered position in which the screen 42 is positioned in front of the lamp, the screen 42 being preferably red to indicate "danger".

The semaphore arm 40 is rotated by a rod 45 which is moved by a solenoid comprising coils 46 and 47. The coil 46 when energized raises the rod 45 and swings the arm 40 to its lower position, thus moving the red screen 41 to position in front of the lamp. The coil 47 when energized lowers the rod 45 and swings the arm 40 to its upper position, thus moving the green screen 42 to position in front of the lamp. The semaphore arm 40 and actuating rod 45 are so constructed and supported that when the semaphore arm is moved by a solenoid coil to either of the two positions above described, it will remain in such position after the solenoid coil is deenergized.

One terminal of each of the solenoid coils 46 and 47 is connected to the upper terminal of the transformer secondary 17 as shown in Fig. 1 through conductor 49, conductor 34, outside rail 11 and conductor 16. The other terminal of coil 46 is connected through conductor 50 to the stationary contact 51 of a hand switch or circuit controlling means 55. The other terminal of coil 47 is connected to a stationary contact 57 of the switch 55 by means of a conductor 59.

The switch 55 comprises a hand lever 58 pivoted at 61 and normally biased by means of the spring 60 to position between the stationary contacts 51 and 55. Switch lever 58 is adapted to be swung or moved to the left or right so as to engage the switch contacts 51 or 57. Switch lever 58 is connected by means of a conductor 63 with the lower terminal of the transformer secondary as shown in Fig. 1.

Pivoted below the switch lever 58 is a conducting member 62 which is electrically connected to the lever 58 and is adapted to be moved into and out of engagement with a stationary switch contact 64. Contact 64 is connected by means of a conductor 65 to the insulated third rail section 20.

The pivoted member 62 is formed with two upwardly extending projections or lugs 66, one or the other of which is adapted to be engaged by a downwardly extending projection 67 on the switch lever 58, and moved into or out of engagement with the contact 64, as this lever is swung in one direction or the other from its central position. The projections 66 on the member 62 are so spaced that after the member 62 has been moved to position into or out of engagement with contact 64, the switch lever 58 may return to its normal or central position without further moving the member 62.

In operation assuming that the parts are in the positions shown in Fig. 1; the switch lever in its central position; the member 62 in engagement with the contact 64 as shown in full lines and the semaphore arm 40 is in its raised position. Assume further that a train indicated by T is approaching the insulated section 20 from the right as is indicated by the arrow. With the train in the position shown current for operation of the train motor flows from the lower terminal of the secondary 17 through the third rail 13, and thence through the train motor to the outside rail 11 and thence to the upper terminal of the secondary 17. Both of the coils of the semaphore solenoid are deenergized, the circuit through these coils being broken at the switch contacts 51 and 55. The signal lamp 32 which as shown is connected across the terminals of the secondary 17 is lighted and as the semaphore arm is shown in its raised position, the semaphore shows a green or clear signal.

If the hand switch is allowed to remain as shown, the train T passes over the insulated section 20, the train motor receiving current from the section 20 which is connected to the lower terminal of the secondary 17 through conductor 65, contact 64 and member 62 of the hand switch 55 and conductor 63.

If however, it is desired to have the train stop automatically at the section 20, the hand lever 58 is moved toward the left so as to engage the contact 51. The hand lever 58 after momentarily engaging contact 51, may then be released. Engagement of the lever 58 with contact 51 closes the circuit through the upper coil 46 of the semaphore solenoid, thus lowering the arm 40 to danger position. The movement of the hand lever 58 into engagement with contact 55, moves the member 62 out of engagement with the contact 64 and thus breaks the circuit connection between the secondary 17 and the insulated rail section 20. When therefore the train reaches the section 20, its motor is deprived of current and the train stops.

To start the train, the switch lever 58 is then swung toward the right to engage mo-

mentarily the contact 57. This movement of the lever 58 returns the member 62 to position in engagement with the contact 64, thus closing the circuit between the lower terminal of the secondary 17 and the insulated rail section 20, and causing current to be supplied to the train motor. Engagement of the lever 58 with the contact 51 energizes the coil 47 of the semaphore solenoid and swings the arm to its raised for clear position.

Figs. 2, 3 and 4 show the detail construction of the hand controlling switch 55. This switch comprises a casing 71 preferably formed of sheet metal open at its bottom and having at its bottom inwardly extending flanges provided with downwardly extending screw threaded lugs 73 adapted to receive nuts 74 to secure the casing 71 removably to a base plate or member 75. Secured by brackets 77 to the base plate 74 is an insulated panel member 78 which extends upwardly into the casing 71 and serves to support the fixed and movable contacts of the switch. The switch lever 58 is pivotally mounted on a screw 80 extending through the panel 78 and secured in position by a holding nut 82. The switch lever 58 is provided with an operating handle 81 which projects outwardly through an arcuate slot in the side of the casing 71. The member 62 is pivoted on an eyelet 83 located below the lever 58 and both lever and member 62 are electrically connected by a strip 87 secured by the eyelet 83 and nut 82 to the back of the panel 78.

Mounted on the base 75 outside the casing 71 are two spaced parallel insulating plates or strips 88. Binding clips 89 of which there are four, are secured by means of eyelets 90 to the insulating strips 88, two of the clips being secured to each strip. Connection between the binding clips 91 and the stationary and movable contacts of the switch is made by conductors 94, which are secured at one end to the bottoms of the eyelets 90 and extend beneath the base 75 and thence through openings 92 and 93 in the base 75 and bracket 77 respectively to their respective contacts. The metal of the base 75 is cut away immediately below the eyelets 90 so as to prevent contact of the connections with the metal of the base, and the base 75 as shown is dished or formed with downwardly projecting outer edges so as to provide a space beneath the base to accommodate the conductors 94. When the casing 71 is secured in position on the base 75 opposite lower edges of the casing are each positioned between an insulating strip 88 and a bracket 77, the strip and bracket thus serving to hold the lower edges of the casing.

The spring 60 which serves to retain the lever 58 in its central position is preferably formed of a steel wire secured at its lower end to the back of the panel 75 by the nut 82 and extends upwardly through a slot or opening 100 in the connecting strip 87. The upper end of spring 60 is bent over the top of the panel 75 and engages the lever 58 through an opening in the upper end of the lever. The spring 60 which serves to bias the lever 58 towards its central position is preferably tensioned in such a way that it also pulls the upper end of the lever 58 toward the panel 75, and in this manner insures a good electrical contact between the lever and the stationary contacts 51 and 55.

As a means for limiting the swinging movement of the lever 58 in either direction I provide sheet metal pieces or brackets 103, which are secured to the back of the panel 75 by eyelets that form the contacts 51 and 57. These metal pieces 103 are bent forwardly around the side edges of the panel and extend into the path of the lever 58.

In the form of switch shown in Figures 2 and 4 the closing of the contacts to one or another of the solenoid coils always precedes the making or breaking of the circuit to the rail section 20. Thus in moving the switch handle toward the right from its position shown in Figure 2, the switch arm 58 engages the contact 57 an instant before the member 62 engages the contact 64. This results in the semaphore moving toward safe position before the train actually starts.

The semaphore 30, shown in detail in Fig. 5 comprises a bottom casing 120 preferably formed of non-magnetic metal by die casting. The casing 120 carries a vertical tube 121 screw-threaded into the upper end of the casing and closed at its top by a screw threaded knob 123. Secured to the upper part of the tube 121 by means of a set screw 124 is a sheet metal casing 125 to which the semaphore arm 40 is pivoted and in which casing the lamp 32 is supported. An imitation ladder 126 formed of stamped sheet metal extends from the base of the lower casing 120 to the upper casing 125. The lower end of the ladder 126 is seated in openings 128 in the base of the casing 120 and its upper end is bent horizontally beneath the casing 125 and provided with an opening 130 through which the tube 121 extends. As will be seen when the upper casing 125 is secured to the tube 121 by the set screw 124 the ladder is held between the casing 125 and the base of casing 120 without other securing means. In assembling the semaphore the ladder 126 may serve as a convenient means for positioning casing 125 on the tube 121.

Longitudinally movable in the tube 121 is the rod 45, the lower end of which forms the core of the semaphore solenoid. Secured to the upper end of the rod 45 is a pin 133 which projects outwardly through openings in the tube 121 and casing 125 and is connected at its outer end to the semaphore arm. The rod

45 when moved by the solenoid serves to swing the arm 40.

The casing 120 is open at its bottom and extending across this opening is a plate 138 removably secured by screws 139 to the bottom of the casing 120. The solenoid coils 46 and 47 which are located inside the casing 120 are mounted on the plate 138. It will be seen that removal of the plate 138 from the casing serves to remove the solenoid coils from the casing.

In Figs. 6 and 7, I have shown one form of means employed to insulate one or more of the rails of a section of the track from corresponding rails of adjacent sections. The track sections disclosed in Fig. 6 are of the type now commonly employed and comprise two outer rails and a middle or third rail secured together by sheet metal ties 140. The rails are formed of sheet metal, the upper part or heads of the rails being tubular as indicated at 141. In Fig. 6, I show the corresponding outer rails of the two sections mechanically and electrically connected by metal pins 143, which extend into the tubular heads of the rails of adjacent sections. The middle rails of the two sections are not connected by a pin, but are spaced from one another as indicated at 144. In order to assist in holding the track sections in proper alignment with one another and also for holding the adjacent ends of the metal rails spaced apart and insulated from one another, I provide an insulating plate or member 146, which is adapted to be positioned between the rail sections. Member 146 is formed with projections 147 which extend on opposite sides of the middle rail and engage the inner faces of the webs 148 of the outer rails.

It is obvious that by the use of the insulating plate 146 any one of the three rails of a section may be insulated from the corresponding rails of adjacent sections, it being merely necessary to remove the proper metal pins 143 prior to assembling the sections with the member 146.

In the specific embodiment of the signaling system herein disclosed, I have described the semaphore as adapted to display a red and green signal indicating respectively danger and clear conditions. I may if desired substitute for the red screen on the semaphore arm a yellow screen to indicate caution and I may connect the insulated rail section 20 to the remaining portions of the third rail by means of a resistance which will supply to the train motor a relatively small current sufficient to operate the motor at a low speed. With such a connection and with the parts in the positions shown in Fig. 1, this resistance will be short circuited and the train will pass over the insulated section 20 without change in speed. If however, it is desired to display a caution signal and cause the train to slow down when passing over the section 20, the switch lever arm 58 is moved toward the left to engage fixed contact 51. This operates the semaphore to caution position and breaks direct connection between the secondary 17 and the insulated section 20 at the contact 64. The train when it reaches insulated section 20 will then slow down, the train motor receiving relatively low current through the resistance connecting the section 20 with the remainder of the third rail. If desired, the section 20 may be connected to adjacent sections of the third rail by pins similar to the pins 143, except that they are formed of material having sufficient electrical resistance to materially reduce the current flowing into section 20.

I claim:

1. A switch having a lever and two spaced contacts adapted to be engaged by said lever, a third contact, a switch member adapted to engage said third contact, connections between said lever and member for operating said member to engage or disengage said third contact when said lever is moved into contact with one or the other of said first named contacts, said connections permitting said lever to move out of contacting engagement without moving said member, a source of current connected to said lever and member, a toy railway track having an insulated rail section connected with said third contact and a signaling device having selective controlling means electrically connected to said first named contacts.

2. A switch having a lever and two spaced contacts adapted to be engaged by said lever, means biasing said lever to a position out of engagement with said contacts, a third contact, a switch member adapted to engage said third contact, connections between said lever and member for operating said member to engage or disengage said third contact when said lever is moved into contact with one or the other of said first named contacts, said connections permitting said lever to move out of contacting engagement without moving said member, a source of current connected to said lever and member, a toy railway track having an insulated rail section connected with said third contact and a signaling device having selective controlling means electrically connected to said first named contacts.

3. A toy electric railway comprising a track and vehicle adapted to run on said track, a semaphore comprising an element movable to different positions to display different signals and adapted to remain in the position into which it is moved, means for moving said element comprising a plurality of coils, a switch adapted to be moved to different positions for selectively energizing said coils and subsequently controlling said vehicle and means biasing said switch to a neutral position.

4. A toy electric railway comprising a

track and a vehicle mounted to run on said track, a semaphore comprising an element movable to different positions to display different signals, a switch adapted to be moved to different operative positions to control said vehicle and signal and circuit connections between said semaphore, switch and track, said switch in moving to each operative position serving to control said semaphore and subsequently to control said vehicle.

5. A toy electric railway having a track and vehicle adapted to move on said track, a wayside accessory, independent circuit connections to said vehicle and accessory, and a switch having contacts connected respectively to said circuit connections for controlling the movements of the vehicle and the accessory, said switch serving to control the movement of the vehicle subsequent to the control of the accessory.

6. A toy electric railway having a track and vehicle adapted to move on said track, a signal, independent circuit connections to said vehicle and signal and a hand operated switch having contacts connected respectively to said circuit connections for controlling the movements of said vehicle and said signal, said switch serving to control the movement of the vehicle subsequent to the control of the signal.

7. A switch having a lever and two spaced contacts adapted to be engaged on said lever, a third contact, a switch member adapted to engage said third contact and connections between said lever and member for operating said member to engage or disengage said third contact when said lever is moved into contact with one or the other of said first named contacts, said connections permitting said lever to move out of contacting engagement without moving said member, means biasing said lever to a position out of said contacting engagement, a source of current connected to said lever and member, a toy railway track having an insulated railway section connected to said third contact and a signal device having selective controlling means electrically connected to said first named contacts.

8. A toy electric railway comprising a track having an insulated rail section and a vehicle adapted to move on said track, a wayside accessory, a switch having two movable contacts, cooperating contacts adapted to be engaged by said moving contacts, circuit connections between said switch, and accessory and said section, and a lost motion connection between said movable contacts to permit controlling of said accessory without altering the circuit connections of said section.

Signed at New York in the county of New York and State of New York this 28th day of May, A. D. 1928.

JOHN C. KOERBER.