Sept. 29, 1942. J. L. BONANNO 2,297,131

TOY RAILROAD TRACK SWITCH

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Fig. 1.

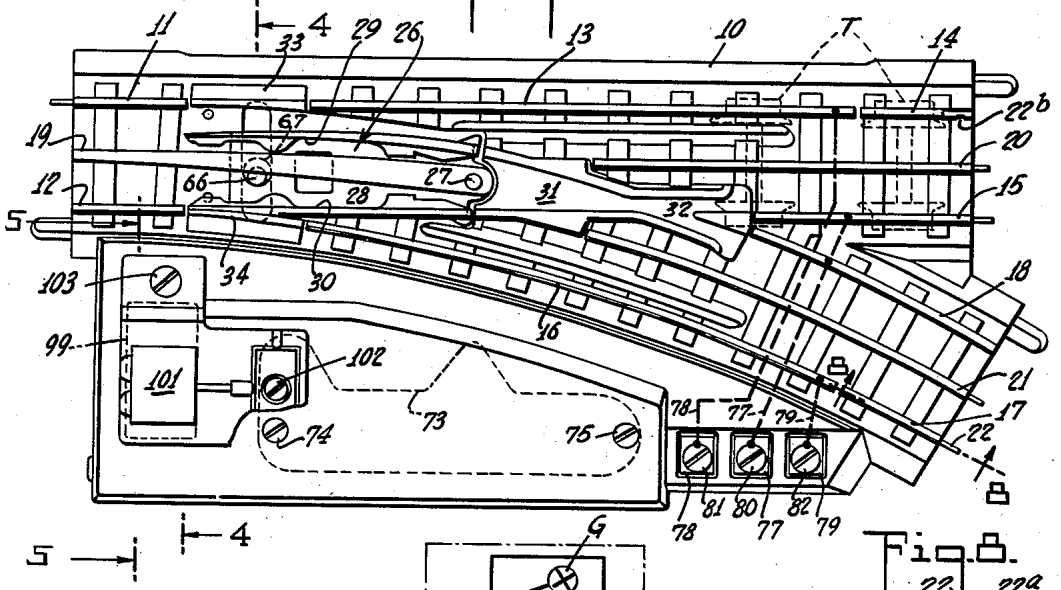

Fig. 2.

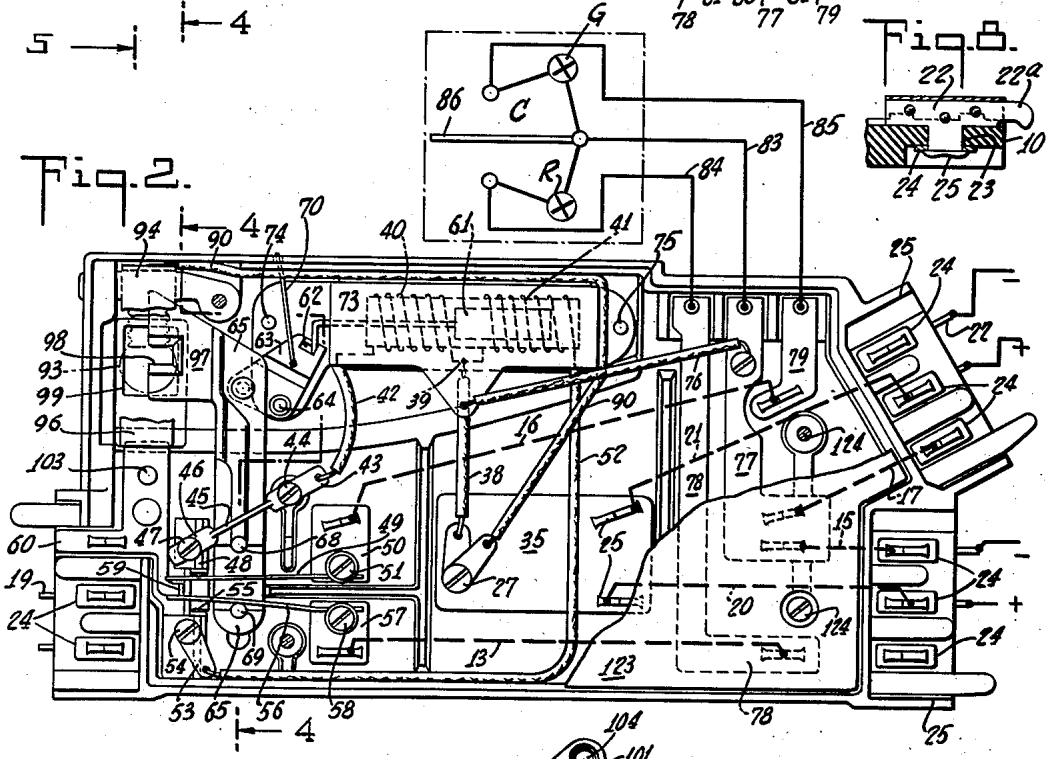

Fig. 3.

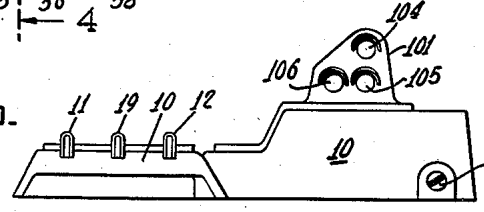

Fig. 4.

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Fig. 4

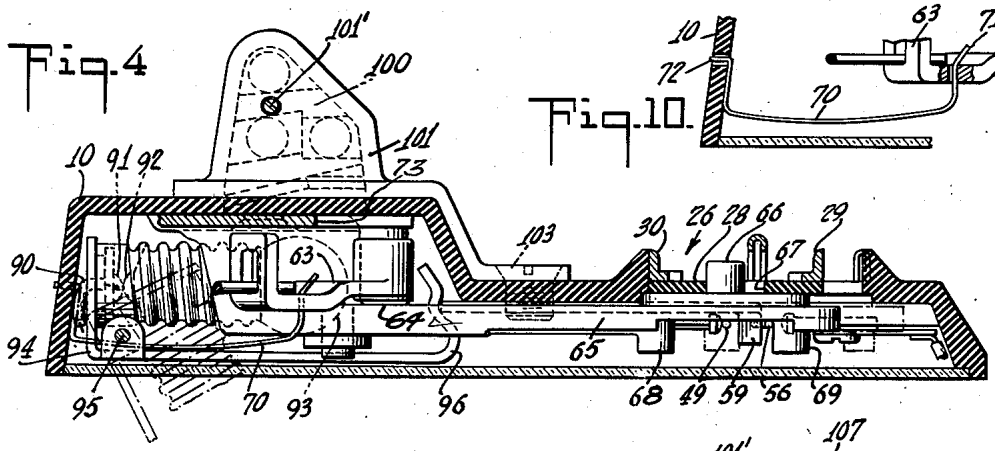


Fig. 10.

Fig. 9.

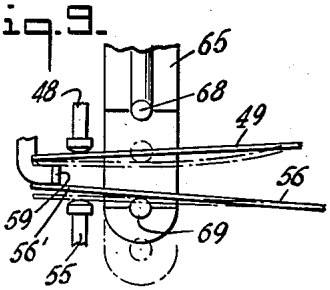


Fig. 5.

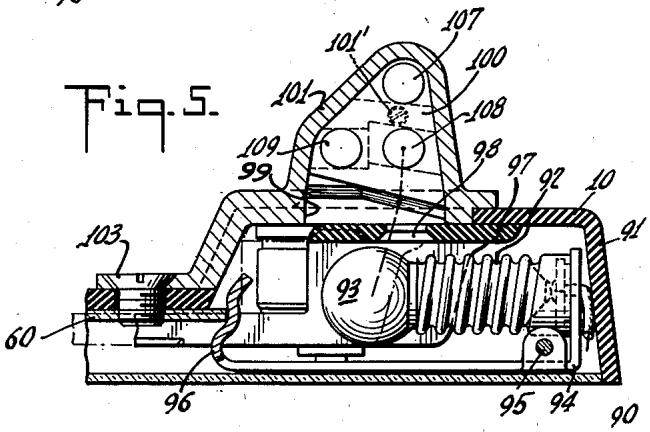


Fig. 6.

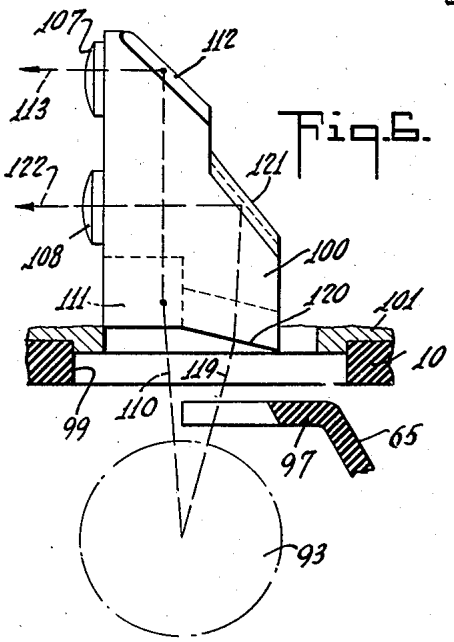
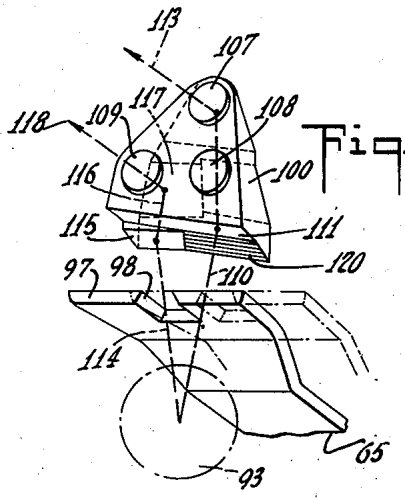


Fig. 7.



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Patented Sept. 29, 1942

2,297,131

UNITED STATES PATENT OFFICE

2,297,131

TOY RAILROAD TRACK SWITCH

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Application December 6, 1940, Serial No. 368,806

10 Claims. (Cl. 246—220)

The present invention relates to toy railroad track switches.

The present invention contemplates toy railroad track switches having fixed wheel guiding rails and a shiftable switch tongue to guide wheeled trucks of toy electric trains from a main line to either of two branch lines, together with power rail and electrically operated mechanism for controlling the movements of the switch tongue.

According to the preferred construction the device is made up in the form of a track switch section adapted to be interchangeable with the usual toy track sections of the same gauge and style. In this toy track switch section all the parts are secured to an insulating base which is designed to support the conducting rail elements and conducting third rail elements on its upper face. The control elements are secured to the lower face of the insulating base.

In its preferred embodiment the present toy track switch section is provided with controls which automatically shift the switch tongue to anticipate the arrival of a train approaching on a branch track against which the switch has been set. This shifting of the switch tongue to prevent derailing is accomplished by the grounding of an insulated section or length of wheel bearing rail by the trucks of an approaching car. According to the present invention this rail which was insulated and used as a control rail is immediately grounded so that it now provides a source of propulsion current to the vehicle.

Other and further objects will appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, an embodiment in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a top plan view of a right-hand switch showing the switch tongue in the position to direct trains through the straight line track;

Figure 2 is an inverted plan view of the track switch of Figure 1 showing in addition the wiring diagram for remote control;

Figure 3 is an end elevational view taken from the left of Figure 1;

Figure 4 is a vertical sectional view taken on the broken line 4—4 of Figures 1 and 2 in the direction of the arrows;

Figure 5 is a sectional view taken on the line 5—5 of Figure 1 looking in the direction of the arrows;

Figures 6 and 7 are diagrammatic views illustrating the signal associated with the track switch;

Figure 8 is a fragmentary sectional view on the line 8—8 of Figure 1 illustrating the securement of the rail to the insulating base;

Figure 9 is an enlarged inverted plan view showing the switch elements which control the circuit relations between the solenoid coils of the switch throwing mechanism and the rails, which are alternately grounded and reconnected; and

Figure 10 is a fragmentary view indicating a detail.

The molded piece of insulation, to which all the other parts of the track switch section are secured, is indicated at 10. It carries short lengths of U-shaped sheet metal wheel bearing rails 11 and 12 forming what may be termed the main line wheel bearing rails of the track switch section. It also carries two pieces of straight rail 13 and 14 in line with the rail 11, a piece of straight rail 15 in line with the rail 12, and three pieces of curved rail 16, 17 and 18 forming wheel bearing elements in a branch track which diverges from the branch formed by the rails 13, 14 and 15.

These metal wheel bearing rails, as well as the third rails 19, 20 and 21 are secured to the insulating body by anchoring plates 22 which, as shown in Figure 8, pass through openings 23 in the insulating base 10 and are upset on to bottom plates, such as 24 as indicated at 25. The shape of the anchoring plates and bottom plates depends upon where they are used in the track switch section. The mode of securement of the track and third rails to the insulating base forms no part of the present invention, the same being shown in my copending application Serial No. 285,853, filed July 22, 1939. The plate 22 has a projection 22a adapted to enter the corresponding rail of an adjacent section. The short track rails 12, 14 and 18, adapted to receive similar projections on the rails of adjacent sections, are made of resilient bronze and are indented, as indicated at 22b (Figure 1), to frictionally engage the projection.

The rail elements 11, 12, 14, 15, 17 and 18 are interconnected with the other wheel bearing rails of the toy track layout when the toy track switch section is inserted into the track layout and are all at what is generally termed ground potential.

The third rail elements are connected to the power source and form a power rail.

The insulating base 10 supports a shiftable switch tongue 26 pivoted at 27. The tongue has an insulating bottom plate 28, shown more clearly in Figure 4, and two metal wheel bearing rails 29 and 30. The rails of the shiftable switch tongue need not be electrically connected with any of the other rails. Adjacent the pivot 27 the insulating base is provided with raised frog forming portions 31, 32 which provide wheel bearing rail elements between the switch tongue rail elements 29 and 30 and the fixed wheel bearing elements 15 and 18. The insulating base 10 is also provided with upwardly extending elements 33 and 34 intermediate the rail elements 11 and 13 and the rail elements 12 and 16, respectively.

To facilitate reading the drawings the inverted plan view of Figure 2 has heavy broken lines bearing the reference characters 13, 15, 16, 17, 20 and 21 corresponding with the same rail elements on the upper face of the track switch. From the circuit diagram superposed at Figure 2 it will be seen that the power rail elements 20, 21 and 19 are connected to a central plate 35. The plate 35 is connected by a wire 38 with the midpoint 39 of two solenoid coils 40 and 41. The coil 40 is connected by a wire 42 with a lug 43 secured to the insulating base by a screw 44. This lug is connected by a wire 45 with a lug 46 secured to the insulating base by a screw 47. The lug 46 holds a contact element 48 in adjusted position to be engaged by a wire spring 49 clamped against a plate 50 by a screw 51 and tensioned to press against the contact 48. The plate 50 is connected to the rail element 16 and when the parts are in the position indicated in Figure 2 the coil 40 is connected to the rail 16 so that when this rail is grounded by a vehicle approaching the switch tongue from the lower right-hand branch, as indicated in Figure 1, the circuit to the coil 40 will be completed. The operation effected by energizing the coil 41 will be described below.

The coil 41 is connected by a wire 52 with a lug 53 secured to the insulating base by a screw 54 which also clamps a contact 55 similar to the contact 48 in place. This contact 55 is opposite, but not in contact with, a spring 56 similar to the spring 49 when the parts are in the position indicated. The spring 56 is secured to a plate 57 by a screw 58 and the plate 57 is connected to the length of track rail 13. When the parts are in the position shown it is apparent that the rail 13 is disconnected from the coil 41. At this time the rail 13, however, is grounded because the left end 56' of the wire spring 56 is in engagement with the upwardly bent lug 59 of the plate 60 employed in anchoring the short length of main line track 11 to the insulating base.

Reference to Figure 1 will show that the switch tongue is set to carry the train through the upper branch of the track switch and from the foregoing it will be apparent that two-axle wheeled trucks, such as indicated at T in Figure 1, may proceed through the straight line portion of the track switch section and ground the vehicle all the time. The insulated rail element 33 is so short that at least one pair of wheels is on a grounded rail and hence the circuit to the train is not broken and there is no likelihood of accidental operation of the reversing unit of the locomotive.

Should a train, however, approach the track switch section from the right and on the lower branch track the wheels will come on to the rail element 16 and ground this rail element through the wheels and axles which extend over to the element 18. This will establish a circuit through the rail element 16, plate 50, spring 49, contact 48 and thence through the coil 40 to the power rail. The energizing of the coil 40 will attract the armature 61 to the left. It has a lost motion connection 62 with a bell crank 63 pivoted at 64 to a sheet metal member 73 to be described. The bell crank is connected with a slider 65 and moves it from the full line position of Figures 2, 4 and 9 to the dotted line position of Figures 4 and 9. The slider 65 has a lug 66 which passes through an enlarged opening 67 in the insulating plate 28 so that the switch tongue can be shifted from the position indicated in Figure 1 to place the rails of the switch tongue in position to receive the wheels of the approaching vehicle and guide the train through the track switch section.

The slider 65 is provided with two bosses 68 and 69 which alternately engage the springs 49 and 56. When the shifter 65 is in the up position at Figure 2, the spring 56 is held flexed and in contact with the projection 59 of the anchorage lug 60, and when the slider 65 is moved to the down position the lug 69 moves away from the spring 56 and the lug 68 is brought against the spring 49 causing the latter mentioned spring to engage the upper side of the lug 59. From this it will be apparent that the grounding of the rail 16 by the oncoming train has not only brought about a shifting of the switch tongue to carry the train through the track switch section, but it has also grounded the rail 16, ungrounded the rail 13, disconnected the coil 40 and connected in the coil 41, so that the track switch section is in condition for continued operation of trains through the lower branch track and ready to shift the switch tongue should a train approach on the upper branch line. The armature, the switch tongue and intermediate movable parts are held in the extreme position to which they have been shifted by an over-the-center spring 70, illustrated more in detail in Figure 10. One end 71 of the spring is secured to the bell crank 63, while the other end 72 is passed through a hole in the insulating base 10.

The coils 40, 41, the armature 61 and bell crank 63 are secured to a sheet metal housing 73 fastened to the base 10 by screws 74 and 75. This housing is connected by a wire 76 to a plate 77 to which the grounded wheel bearing rails 15 and 17 are secured. The right-hand end of the rail 13 is secured to an L-shaped plate 78, while the right-hand end of rail 16 is secured to a shorter plate 79. The plates 77, 78 and 79 are indicated in Figure 1 by heavy dash lines with the same reference characters. They extend to the side of the insulating base and carry binding screws 80, 81 and 82. These binding screws are connected by wires 83, 84 and 85 to a controller C having lamps G and R and a shiftable switch element 86 adapted to short circuit one or the other of the lamps and apply the power voltage to the corresponding coil 40 or 41 of the electromagnetically operated switch tongue shifting mechanism.

The central plate 35, connected as above described with the power rails, is connected by a wire 90 with the center contact 91 of a lamp socket 92. This socket carries a lamp bulb 93. The socket is secured to an L-shaped lever 94 pivoted on a screw 95 which extends in through the end of the insulating base 10. The long end

96 of the lever 94 has a snap connection with the plate 60 so that the lamp may be grounded when in the position indicated in full lines in the drawing and so that the socket may be swung down, as indicated in dot-and-dash lines in Figure 4, for relamping. Reciprocatory tongue shifter 65 has an extension 97 which overlies the lamp bulb 93 and terminates adjacent the vertical plane through the socket axis. This extension 97 has a slot 98 adapted to be moved back and forth relative to the center of the lamp, as will be apparent from Figures 5 and 7.

The insulating base 10 is provided with an opening 99 above the lamp 93 so that light rays from the lamp might pass upwardly. Above this opening is a light transmitter 100 (made of plastic such as "Lucite") which receives the light rays passing up through the opening 99 in the insulating body and through this opening and the shutter opening 98 in the shifter 65. The light transmitter 100 is clamped in a metal housing 101 by a screw 101'. The housing 101 is secured in place by screw 102 entering the housing 73 and by screw 103 entering plate 60. The housing 101 is a metal casting shaped to simulate the signal head of a railroad track switch and has three openings 104, 105 and 106 opposite the lens elements 107, 108 and 109 of the light transmitter 100. The light ray 110 from the lamp 93, passing to the left of the extension 97 of the shifter 65, is intercepted by a surface 111 on the bottom of the light transmitter 100 and passes to an upper totally reflecting rear surface 112, where it is reflected and passes out through the lens-like surface 107, as indicated at 113. Rays such as 113 will be projected all the time that the toy track switch is connected in circuit.

A light ray, such as 114 in Figure 7, passing through the shutter opening 98 will fall on a surface 115 deflected upwardly, as indicated at 116, reflected by a rear surface 117 and projected out through the lens area 109, as indicated at 118. When the shifter 65 is moved to the dot-and-dash line position of Figure 7, the light ray 114 is intercepted and light ray, such as 119 Figure 6, falls on the lower surface 120 of the light transmitter, passes up to the reflecting surface 121 and is projected out through the lens area 118 as indicated at 122.

It will thus be seen that the shifting of the switch tongue, whether by the approach of a train on a branch track against which the switch has been set, or by the remote controller C, or manually by merely shifting the switch tongue itself, will bring about a change in the light signal sent out by the light transmitter, and the operator can see by looking at the lights which setting is made for the track switch and can thus readily control the switch from a remote point to direct trains as desired from the main track into one or the other of the branch tracks.

The base 10 extends down to a flat plane surface to rest on the floor or other support and all the parts carried on its underface are received in recesses as will be apparent from the drawings. All are covered by an insulating sheet 123, preferably transparent, and secured in place by screws 124.

It is obvious that the invention may be embodied in many forms and constructions within the scope of the claims and I wish it to be understood that the particular form shown is but one of the many forms. Various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A toy railroad track switch having a shiftable switch tongue, a slidable shift bar connected with the tongue, a rockable bell crank for operating the bar, electromagnetic means for shifting the bell crank including a lost motion connection, an over-the-center spring acting on the bell crank to hold it in either extreme position, two electric switches each including a yieldable contact controlled by the shift bar and a fixed contact toward which the yieldable contact is biased, one yieldable contact being held against the corresponding fixed contact when the shift bar is held in an extreme position by the over-the-center spring, and a grounded fixed contact away from which the yieldable contacts are biased.

2. A toy railroad track switch section having an insulating base, fixed wheel guiding rails and a shiftable switch tongue to guide wheeled trucks from either of two branch tracks to a main track and vice versa, portions of the fixed rails being of metal to contact wheels thereon, the frog forming portions of the rails being insulating and disposed opposite insulated metal rails so that at least one of the wheels on an axle will be on a metallic rail, a power rail common to both branch tracks and the main track, switch tongue operating means, and a pair of electric switches each connected with one of said insulated metal rails opposite said frog forming portions and operable by the switch tongue operating means to ground said rail to the other metallic rails of the track switch section when the tongue is set to guide wheeled trucks thereover and to disconnect it when the tongue is shifted.

3. A toy railroad track switch section such as claimed in claim 2, having a two coil solenoid for operating the switch tongue shifting means, each coil being connected with a back contact engageable by the movable part of the electric switch which is disconnected from the ground.

4. A toy railroad track switch having a main line and two branch lines each including grounded wheel guiding rails and an insulated wheel guiding rail, fixed contacts connected with the grounded wheel guiding rails, a pair of cooperable yieldable electric switch contacts each connected with an insulated rail and biased away from the corresponding fixed contact, a switch tongue, and switch tongue shifting means acting on the yieldable contacts to hold the yieldable contact connected to the rail for the branch to which the switch tongue is set against the corresponding fixed contact so that the said rail is also grounded.

5. A toy railroad track switch such as claimed in claim 4, wherein the switch tongue shifting means includes solenoid coils each connected with a back contact against which the yieldable contacts are biased.

6. A toy railroad track switch having fixed wheel bearing rail elements, a rail frog, and a movable switch tongue for controlling the movement of a toy train from a main line to either of two branch lines, the two main line rail elements being conducting and normally grounded, the end portions of the rail elements of each branch track being conducting and normally grounded, the rail elements of the switch tongue and of the rail frog being insulated, the other branch line rail elements being conducting but disconnected at their ends from the grounded rail elements, a

switch tongue shifter, and electric switch operator controlled by the shifter for grounding the insulated branch line rail element over which the switch tongue is set to guide a wheeled truck.

7. A toy railroad track switch such as claimed in claim 6, having electromagnetically operated means for actuating the switch tongue shifter including two coils and a corresponding switch connected to the ungrounded rail element when it is disconnected from the ground.

8. A toy track layout having wheel guiding rails which extend through the layout to guide wheeled trucks along the same, the dominant portion of said rails being metallic and adapted to form a return circuit from the wheeled trucks, a portion of the metallic rails being insulated from the remainder, a solenoid coil adapted to be energized when said insulated rail portion is grounded to a wheel bearing rail by passage of wheeled trucks thereover and a coil operated switch for grounding the said rail portion and disconnecting it from the coil when said solenoid coil is energized.

9. A multiple path toy track layout having wheel guiding rails which extend through the layout to guide wheeled trucks along the same, the dominant portion of said rails being metallic and adapted to form a return circuit from the wheeled trucks, a portion of the metallic rails in each path being alternatively insulated from the remainder, two opposed solenoid coils each adapted to be energized when the corresponding insulated rail portion is grounded to a wheel bearing rail by passage of wheeled trucks thereover, and coil operated switches for grounding the insulated rail portion, disconnecting it from its operating coil, ungrounding the other rail portion and connecting it to the other coil.

10. A toy track layout such as claimed in claim 9, having a shiftable switch tongue operated by the coils and movable to place a rail thereof in line with the rail which energized the first mentioned coil.

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