May 28, 1940. J. L. BONANNO 2,202,546

TOY RAILROAD TRACK SWITCH

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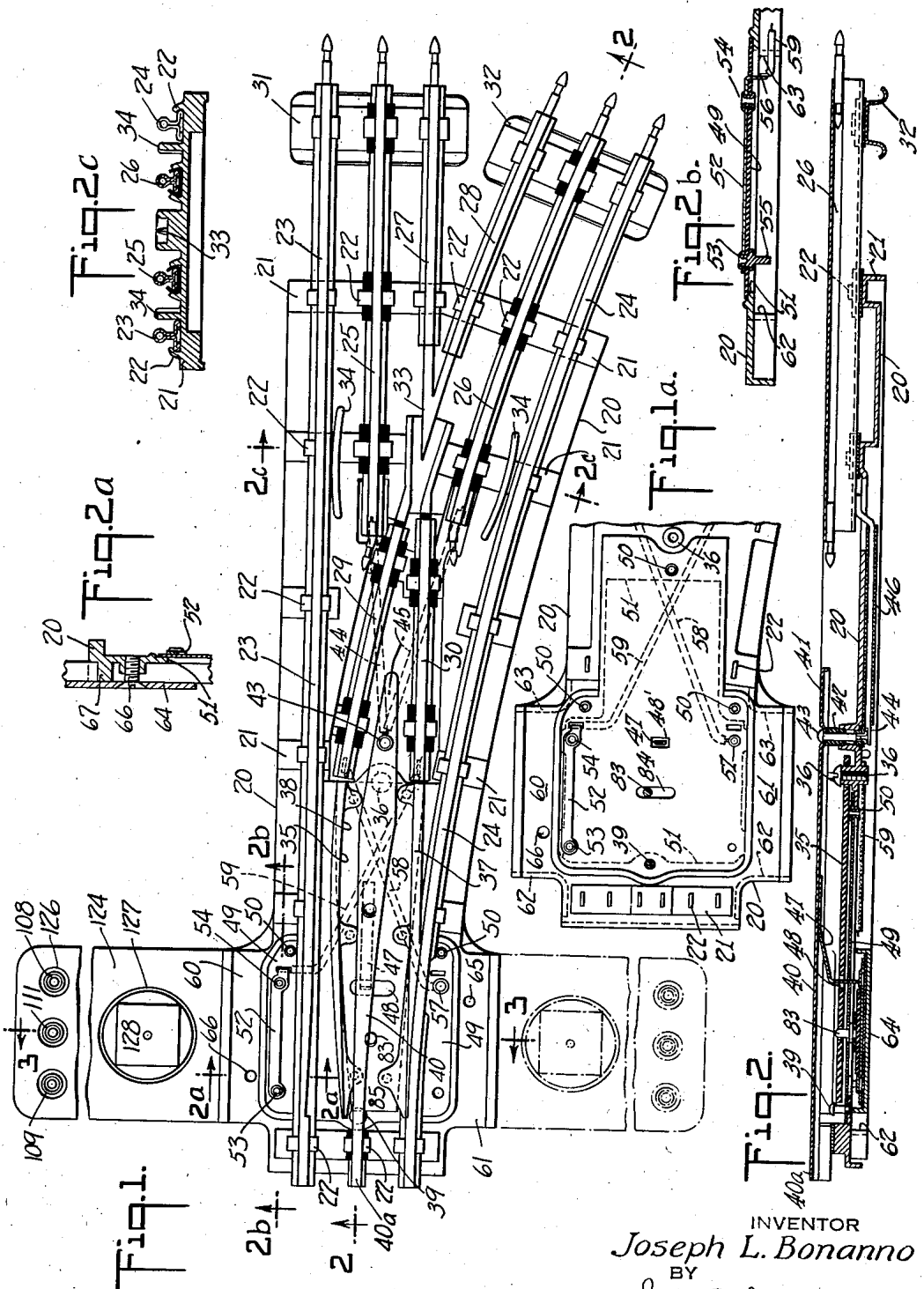

Fig. 1.

Fig. 2.

Fig. 2a

Fig. 2b.

Fig. 2c

Fig. 1a.

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Fig. 3.

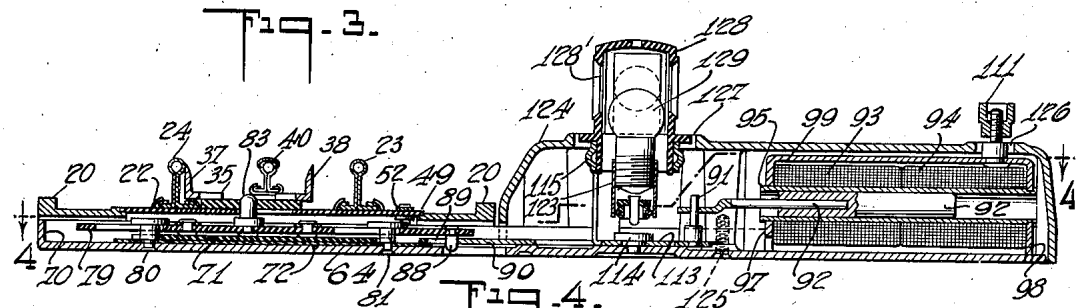

Fig. 4.

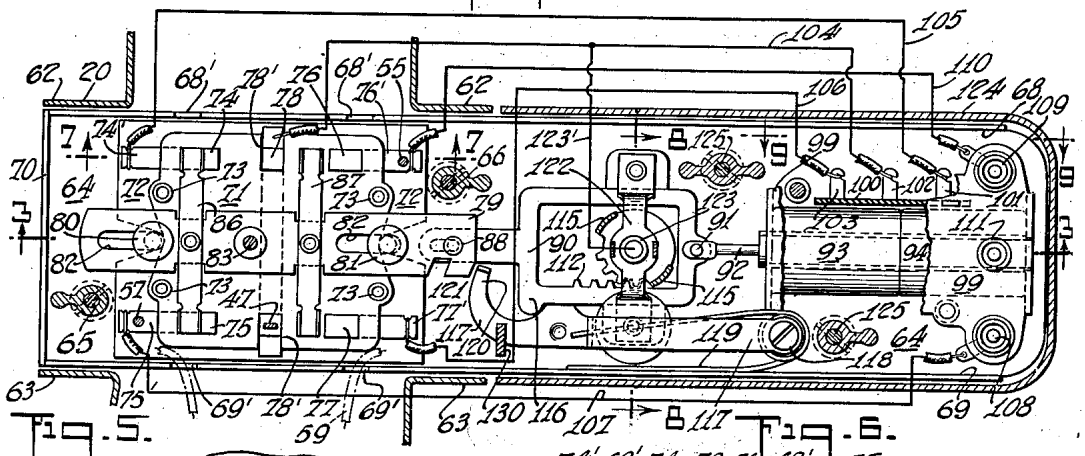

Fig. 5.

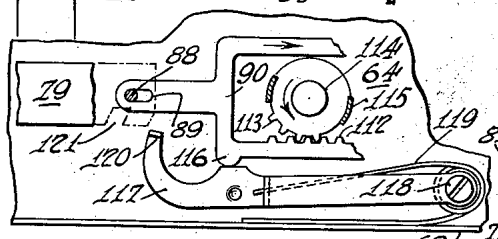

Fig. 6.

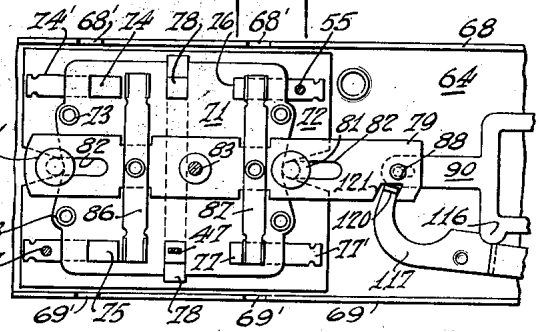

Fig. 8.

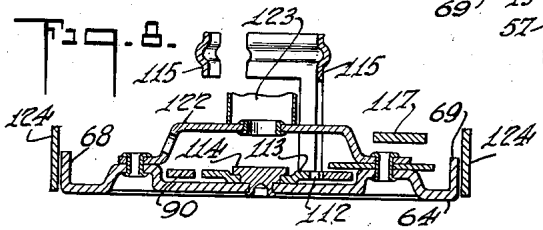

Fig. 9.

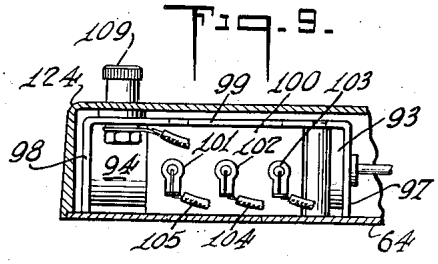

Fig. 7.

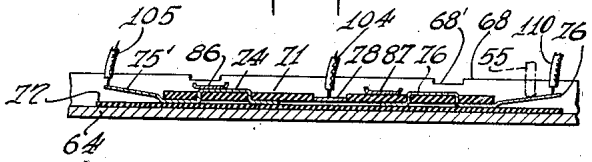

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Fig. 10.

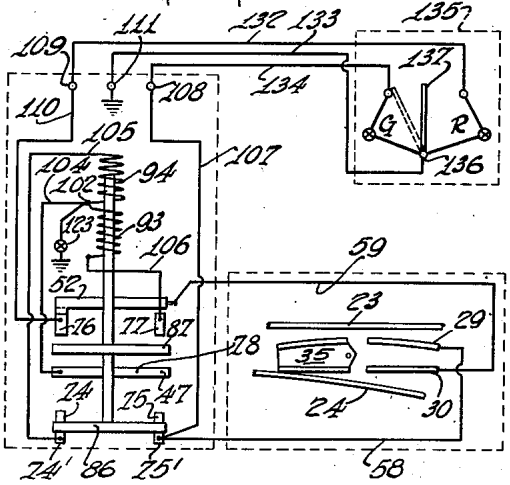
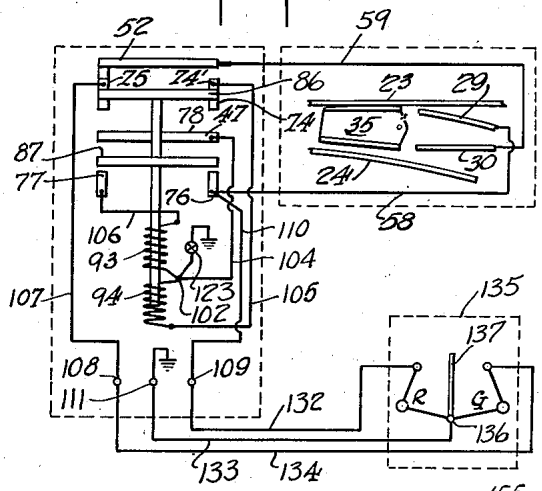


Fig. 11.



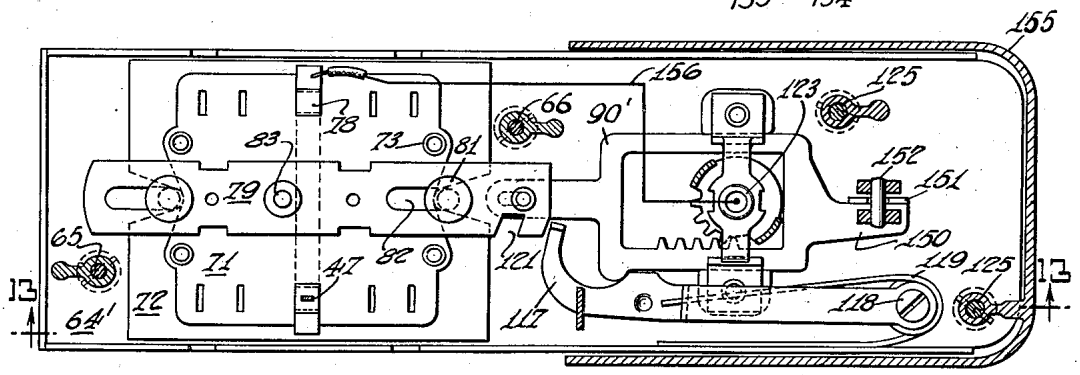


Fig. 12.

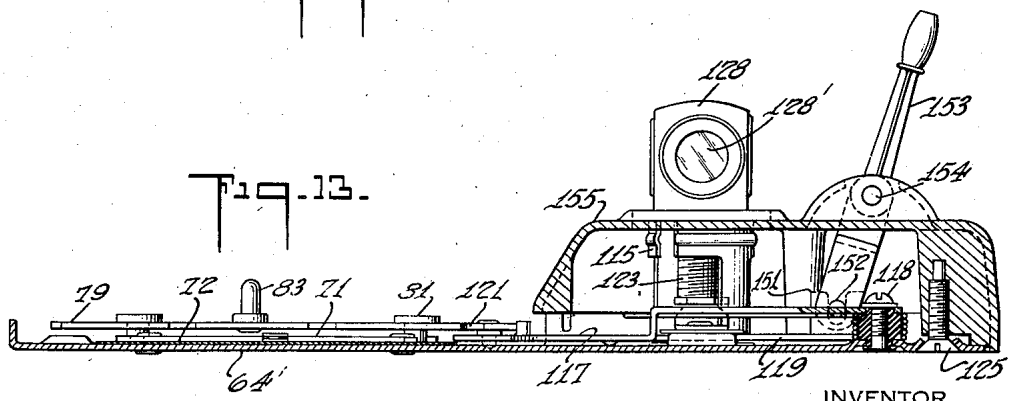


Fig. 13.

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UNITED STATES PATENT OFFICE

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TOY RAILROAD TRACK SWITCH

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Application November 26, 1937, Serial No. 176,525

11 Claims. (Cl. 246—219)

The present invention relates to toy railroad track switches.

The present invention contemplates toy railroad track switches having trackage units adapted for complete preassembly and operating units also adapted for complete preassembly, so that when a trackage unit and an operating unit are fastened together all mechanical and electrical connections extending between the two units are completed.

The trackage unit of the present invention contemplates the use of a cast base (generally a die casting) which simulates the appearance of the roadbed of a railroad, in that it has tie simulating elements in its upper surface. This casting also preferably has integral upwardly extending prongs adapted to receive the fixed rails and be bent over onto the bases of these rails to secure them in place. The casting is also preferably provided with an integral frog element to provide a short length of wheel bearing rail area and integral anti-derailing devices opposite this frog element. The fixed insulated and wheel bearing rails and shiftable switch tongue are secured to this base, and the base is also adapted to carry certain contacts whereby current may be conducted from the power rail and insulated sections on wheel bearing rail to control elements embodied in the operating unit to be described.

According to the present invention the operating unit is also a preassembled structure. It has a reciprocable tongue shifter adapted to be operated either by electromagnets or mechanically, and is provided with a fixed contact adapted to receive energy from the power rail of the trackage unit and supply a signal lamp and the circuits for the magnet coils, where the trackage unit is of the electromagnetic type. This unit also is provided with self-disconnecting switches adapted to open the circuit for one of the solenoid coils after it has functioned to shift the switch. The operating unit is also associated with a remote control unit whereby a coil may be energized to shift the switch tongue. The circuit for this remote control includes two lamp bulbs, each arranged in series with one of the coils, so that, when the circuit to a coil has been established by the shifting of the switch tongue to one position, the corresponding lamp is lighted thereby giving a remote indication of the position of the switch tongue. Where the track switch is of the type having an automatic non-derailing feature, according to which the switch tongue is shifted to anticipate the arrival of the train from the branch track against which it has previously been set, the circuits for the signal lamps are automatically changed in the same way as though the switch were shifted by the remote control.

A further object of the present invention is to provide trackage units and control operating units which can be assembled with the operating unit to the right or the left of the trackage unit as convenience indicates, it being merely necessary to reverse the assemblage, whereupon all wiring connections are automatically reestablished in the same relation as before.

A further object of the invention is to provide trackage units and operating units in which to a large extent the same parts are employed in mechanically operated switches as in the electrically operated switches.

Other and further objects will appear as the specification proceeds.

The accompanying drawings show, for purposes of illustrating the present invention one of the many forms in which the invention may take form, together with modifications of certain parts, 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 complete right hand track switch with the operating unit shown in full lines on the outward side of the track layout and indicating its position in dotted lines when on the inward side of the track layout;

Figure 1*a* is a fragmentary plan view of the trackage unit with all rails omitted to show parts concealed by these rails;

Figure 2 is a longitudinal sectional view through the switch on the line 2—2 of Figure 1, indicating the arrangement of the power rail and the mounting of the switch tongue;

Figures 2*a*, 2*b* and 2*c* are fragmentary sectional views taken on the lines 2*a*—2*a*, 2*b*—2*b* and 2*c*—2*c*, respectively, of Figure 1;

Figure 3 is a cross sectional view on the line 3—3 of Figures 1 and 4, showing the trackage unit and the operating unit jointly;

Figure 4 is a sectional view taken on the broken line 4—4 of Figure 3, showing the switch tongue shifting mechanism locked in the extreme left position;

Figure 5 is a fragmentary view showing the switch tongue shifting mechanism making the initial movement for shifting the tongue to the right;

Figure 6 is a fragmentary view illustrating the position of parts when the switch tongue is completely shifted to the right and locked in position;

Figure 7 is a fragmentary sectional view on the

line 7—7 of Figure 4, showing the fixed and movable bridging contacts;

Figure 8 is a fragmentary sectional view on the line 8—8 of Figure 4, showing the lamp mounting;

Figure 9 is a fragmentary sectional view on the line 9—9 of Figure 4, showing the magnet mounting;

Figure 10 is a diagrammatic view illustrating the electrical connections for a right hand switch with the operating unit on the outside, as shown in full lines in Figure 1;

Figure 11 is a view similar to Figure 10, showing the electrical connections for a right hand switch with the operating unit on the inside;

Figure 12 is a top plan view of the operating unit for a mechanically operated track switch, parts being broken away to show interior construction; and

Figure 13 is a vertical sectional view on the line 13—13 of Figure 12.

The base for the trackage unit section is indicated at 20. It has a series of tie simulating elements 21 spaced along the upper surface and these are provided with prongs 22 which are adapted to be folded over on to the bases of the rails, as will appear particularly clearly in Figure 2c.

These rails include long straight and curved wheel bearing rails 23 and 24 carried at the outside of the base, and extending beyond the base at the right, as indicated in Figure 1; insulated lengths of power rail 25 and 26, insulated as shown and extending to the right as indicated in Figure 1; short lengths of wheel bearing rail 27 and 28 extending to the right, as indicated in Figure 1; and two short lengths of wheel bearing rail 29 and 30 insulated from the base. The outer ends of the rails 23, 25 and 27 are secured to a crosstie 31, while the extended ends of the rails 24, 26 and 28 are secured to a crosstie 32.

The ends of the rails 30 and 27 are spaced apart, and the ends of the rails 29 and 28 are spaced apart, and intermediate these ends the casting 20 is provided with an upwardly extending frog element 33. Opposite this frog element the casting is provided with ground rails or anti-derailing devices 34. The fixed rails 23, 30 and 27 with the interposed portion of the frog 33 will conduct the wheels of a toy railroad truck through the main line, while the rails 24, 28, 29 and the frog element 33 will conduct them through the branch line.

The shiftable switch tongue is indicated at 35. It is pivoted at 36 and has rail forming elements 37 and 38 which are adapted to form continuations of the fixed rails, so as to guide the truck through the main or branch line. Its free end is held down by a headed rivet 39.

A portion of the power rail common to both branch and main lines is indicated at 40. The left end 40a is insulatedly secured to the base by prongs 22 bent over on insulation as above described. The right hand end 41 of this section of power rail is mounted on an insulator 42 secured about a pin 43, which is insulatedly mounted in the base 20. The lower end of the conducting pin 43 is connected by wires 44 and 45 with the power rails 25 and 26 of the main and branch lines, so as to form a continuous power circuit. These wires are insulated from the base by insulating sleeves one of which is indicated at 46.

The power rail element 40 is provided with a downwardly extending spring contact 47 which passes through the aperture 48 in the switch tongue 35, and through the aperture 48' in an insulating plate 49. This plate 49 is secured to the base casting 20 by rivets, indicated at 50, and the pin 39 and covers a large aperture 51 provided in the casting under the switch tongue. The plate 49 carries a conducting strap 52 which is disposed adjacent the straight wheel bearing rail 23. This strap is secured in place by rivets, indicated at 53 and 54, and one of these rivets carries a downwardly extending integral pin 55 for a purpose to be described. The other end of the strap 52 extends down through the insulating plate 49 to provide a terminal indicated at 56. The insulating plate 49 also carries a second downwardly extending pin 57 similar to the pin 55. The pin 57 and the terminal 56 are connected by wires, indicated at 58 and 59, with the insulated sections of wheel bearing rail 29 and 30, respectively, so that the contacts 55 or 57 may be grounded when a truck stands on the rails 29 and 24 or on the rails 23 and 30.

When the insulating plate 49 is to be used for a left hand switch instead of a right hand switch, the strap 52 is mounted in the lower set of holes appearing in the plate 49 and the contact 57 is mounted in the hole provided for the rivet 54.

The base casting 20 is provided with lateral extensions 60 and 61 opposite the wide end of the aperture 51, and these lateral extensions have downwardly extending flanges 62, 63 which provide a transverse downwardly opening channel to receive the base 64 of the switch tongue operating unit. This base is secured to the cast base of the trackage unit by two screws, indicated at 65 and 66, the base 64 engaging lugs 67 carried by the casting 20, as indicated in Figure 2a.

The base 64 is stiffened by side flanges 68 and 69, notched as indicated at 68' and 69' over the wires 58 and 59. The end under the trackage unit is provided with an end flange, indicated at 70. Two insulating plates 71 and 72 are secured to the base plate 64 by rivets indicated at 73. The upper plate 71 carries four fixed contacts 74, 75, 76 and 77, arranged in pairs as indicated in the drawings. These fixed contacts have extensions 74', 75', 76' and 77' which overlie the bottom insulating plate 72 and which are disposed in position to be contacted by the contacts 55 and 57 carried by the trackage unit, so that diagonally opposite fixed contacts may be connected in circuit. The conductor strap 78 is also secured between the two insulating plates 71 and 72, and the plate 71 is notched at 78' to expose the ends of this strap. These ends are located so that one or the other of them will be engaged by the spring contact 47 carried by the power rail of the trackage unit, whereby current can be conducted to the strap 78.

An insulating bar 79 is reciprocably guided above the insulating plate 71 by fixed pins 80, 81 which enter slots 82 in the bar 79. This reciprocatory bar has an upwardly extending pin 83 which passes up through a slot 84 in the insulating plate 49 carried by the trackage unit, and enters a hole 85 in the switch tongue 35. The reciprocatory bar 79 also carries bridging contacts 86 and 87 adapted to connect the contacts 74 and 75, or to connect the contacts 76 and 77 depending upon whether the bar is in the left position, as shown in Figure 4, or in the right position, as shown in Figure 6.

The outer end of the bar 79 has a pin 88 which enters a slot 89 in a slider 90. The opposite end of the slider 90 is connected by a pin 91 with an

armature 92 carried inside two aligned solenoid coils 93 and 94. These coils are mounted on tube 95 which extends between the downwardly bent ends 97 and 98 of a plate 99. Between this upper plate and the lower plate 64 is secured an insulating plate 100 which has three terminals, indicated at 101, 102 and 103. The terminal 102 is connected to the midpoint of the two coils 93 and 94, and is connected by a wire 104 with the conducting strap 78, so that the midpoint of the coils is energized from the power rail. The contact 101 is connected by a wire 105 with the fixed terminal 74', and the terminal 103 is connected by a wire 106 with the fixed terminal 77'. The fixed terminal 75' is connected by a wire 107 with a binding post 108 carried by the plate 99. This plate also carries a binding post 109 which is connected by a wire 110 with the terminal 76', and a grounded binding post 111. The wires just mentioned extend down alongside the side flanges 68 and 69, and the binding posts 108, 109, 111 are adapted for connection to a remote control to be described.

The slider 90 is provided with a rack, indicated at 112, which is in mesh with a pinion 113 secured to the base plate by rivet 114. This pinion carries two upwardly extending arms 115, and is adapted to be turned a quarter of a revolution when the slider is moved from one position to another. The slider also has a cam 116 cooperable with a locking finger 117 pivoted on a screw 118 and biased in a clockwise direction by a spring 119. The free end 120 of this locking finger is adapted to enter into a notch 121 in the reciprocatory operator 79, or to fall behind the end of this operator, as will be clear from Figures 4 and 6, so as to lock the operator in either extreme position. The slider 90 is held adjacent the bottom plate by a bridging strap 122 which carries a lamp socket 123 connected by a wire 123' with the wire 104.

The magnet coils and operating mechanism outside the trackage unit are concealed by a cover member 124 which is secured to the base plate by screws indicated at 125. It is apertured, as indicated at 126, to accommodate the binding posts and at 127 to accommodate a signal element 128. This element has translucent faces 128' alternately red and green. This element is supported from the arms 115 of the pinion member and covers a lamp bulb 129 carried by the lamp socket. The cover has a downwardly extending element 130 which overlies the finger 117, as indicated in Figure 4.

The remote control is diagrammatically illustrated in Figure 10. It consists of a multiple conductor cable having three wires, indicated at 132, 133 and 134 connected to the binding posts 109, 111 and 108, respectively, and a control unit diagrammatically indicated by the dotted box 135. This control unit carries two lamps, one indicated at G, and the other indicated at R. The lamp G is connected to the wire 134, while the lamp R is connected to the lamp 132. The two lamps are connected to a common terminal 136 which is connected to the ground wire 133. This terminal 136 is provided with a switch member 137 biased to a neutral position which can be shifted to the right or to the left, so as to short circuit the corresponding lamp G or R.

Assuming that the structure is assembled as shown in Figures 1 to 10, according to which the mechanism is set to carry the train through the branch line. It will be apparent that a circuit is completed from the power rail 40 through the contact 47, the strap 78, wire 104, coil 94, wire 105, terminal 74', contact 74, bridging strap 86, contact 75, terminal 75', wire 107, binding post 108, wire 134, lamp G, wire 133 to ground, and then through the base of the control unit and the trackage unit to the return track rail. The lamp G is therefore in series with the coil 94, but it has so high a resistance as not to energize the coil enough to have it attract the armature. If one operates the switch element 137 to short circuit the lamp G sufficient current flows through the coil 94 to shift the mechanism operated by the armature. This will turn the signal 128 and will shift the switch tongue to the other position, also will shift the fixed bridging strap 86 off the contacts 74 and 75 opening the circuit for the coil 94, and at the same time will bring the strap 87 onto the contact 76 and 77, so as to establish a circuit through the coil 93 and the lamp R. Should the insulated rail 29 on the trackage unit be grounded by a truck bridging from this rail to the grounded rail, a circuit will be completed through the wire 58 and coil 94, and the switch operated as though the remote control had been actuated.

Where the control unit is placed on the inside of the trackage layout, as indicated in dotted lines of Figure 1, the circuit arrangement becomes that shown in Figure 11 and the same reference characters are applied to the same parts. Tracing the circuits of Figure 11 will show that the automatic operation either from remote control or from the anti-derailing contacts 29 and 30 is identically the same as previously set forth. Furthermore the switch tongue operating units and control units may be identical for right hand and for left hand switches, so that one set of tools and one set of structure suffice for all conditions.

Where the switch is to be operated by mechanical control instead of electrical control, the structure shown in Figures 12 and 13 is substituted for that shown in Figures 3 to 9. Here the plate 64' is shorter than the plate 64, and the slider 90' is provided with an extension 150 having upwardly bent slotted end 151 to receive a pin 152 carried on the lower end of a lever 153. This lever is pivoted at 154 in a cover member 155 similar to the cover member 124, but shorter.

The manually operable unit shown in Figures 12 and 13 may employ the same insulating plates 71 and 72, also the same reciprocating bar 79 which was shown in the electromagnetically operated device, the contacts for the coil connections being omitted, but the contacts 78 being retained so they can be connected by a wire 156 with the lamp socket in the same way that the wire 123' connects the lamp socket in Figure 4. The same locking finger 117 may also be employed.

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. In a trackage unit for toy railroad track switches, a cast base, outside uninterrupted main and branch line wheel bearing rails, a shiftable switch tongue secured to the base between said outside rails, diverging wheel bearing rail elements insulatedly secured to the base, each

parallel with an outside rail and disposed opposite thereto to convey the wheels of one side of a toy railroad truck to and from the tongue, the base having an aperture underneath the tongue and adjacent rails, a contact-carrying insulating plate closing the aperture, wires connected with the insulated rail elements and to contacts on the plate, movable switch elements cooperable with said contacts to control circuits including the insulated rail elements, and means for shifting the tongue and the switch elements simultaneously.

2. A toy railroad track switch having a trackage unit comprising a base, fixed main and branch line rails and a switch tongue carried by the base, the base having a downwardly opening transverse channel underneath the free end of the tongue, and a switch tongue operating unit occupying said channel and having a slidable member below the switch tongue and connected to it, a base under the switch tongue operating unit and at the same level as the base of the trackage unit, an operating mechanism laterally of the track unit, and a cover for the operating mechanism.

3. In a toy railroad track switch; a trackage unit comprising a base, fixed main and branch line wheel bearing and power supply rails carried by the base, a shiftable switch tongue for guiding car trucks and a downwardly extending contact carried by the power rail; a switch tongue operating unit having a base; and means to secure the bases of the units together so that the operating unit extends laterally to either side of the trackage unit, the operating unit having a pair of insulated contacts connected together and disposed so that one or the other of them is in contact with the power rail contact, a current consuming device carried by the operating unit and connected to said contacts; and tongue shifting mechanism.

4. In a toy railroad track switch; a trackage unit comprising a base, fixed main and branch line wheel bearing and power supply rails, carried by the base, a portion of one of the wheel bearing rails of each line being insulated, fixedly carried contacts connected with each insulated rail, a downwardly extended contact carried by the power rail, and a shiftable switch tongue; a switch tongue operating unit having a base; and means to secure the two bases together so that the operating unit extends laterally to either side of the trackage unit, the operating unit having a reciprocable switch tongue operator, an armature connected to the switch tongue operator, a pair of solenoid coils for operating the armature, a fixed contact connected with each coil and co-operable with the power connected contact to supply current to the coils, two pairs of fixed contacts, one contact of each pair being connected with the other side of one of the coils, the other of said fixed contacts being engageable by the fixed contacts carried by the trackage unit and connected with the respective insulated wheel bearing rails, the particular pairs of contacts being brought into engagement depending upon the direction in which the operating unit extends, and movable contact means operable with said operator adapted to connect one or the other of said pairs of fixed contacts.

5. A track switch for toy railroads having fixed main and branch line wheel bearing and power supply rails, a portion of the wheel bearing rails of each line being insulated, a shiftable switch tongue, switch tongue shifting mechanism including a reciprocable tongue shifter carrying a pair of movable contacts, pairs of fixed contacts, one pair of which is bridged by one of the movable contacts when the shifter is in position, while the other pair is bridged by the other movable contact when the shifter is in the other position, two solenoid coils each having a terminal connected to the power rail, each coil having a terminal connected to one of the fixed contacts of each pair, an armature for operating the shifter, two lamps each connected with one of the other fixed contacts and to the uninsulated wheel bearing rails so that one lamp is in series with the coil whose coil circuit is established by the bridging contact and concurrently lighted, and a short circuiting switch for shunting the lighted lamp so that sufficient current may flow through the corresponding coil to actuate the shifter.

6. A track switch operating unit comprising a flat elongated base, a coil supporting plate secured to the rear end of the base plate, solenoid coils carried between the two plates and having a common connection, binding posts carried by the second plate, an armature, a reciprocatory, armature-operated switch tongue shifter spaced above the front end of the base, guides for the shifter, insulating plates between the base and the shifter, two pairs of contacts secured to the upper insulating plate and insulated from the base by the other insulating plate, two shifter carried contacts each adapted to bridge one pair of fixed contacts when the other is out of contact with its associated pair, a wire from the exposed terminal of each coil to the one of the contacts of each pair, a wire from each of the other contacts of each pair, to a binding post, and an insulated contact carried by the insulating plates and connected to the common connection of the coils.

7. A track switch operating unit such as claimed in claim 6 having a remote controller having two lamps each connected to one of the binding posts, connections from the opposite sides of the lamps to the base, and a lamp short circuiting switch.

8. A toy railroad track switch having a trackage unit comprising a base, fixed main and branch line rails and a switch tongue carried by the base, and a switch tongue operating unit comprising a base, tongue shifting mechanism carried thereby and including a reciprocable member having a quick detachable pin and slot connection with the switch tongue, and means to connect the bases of the units together so that the base of the operating unit extends completely across the base of the trackage unit and so that the free end of the operating unit may extend laterally at either side of the trackage unit, the bottom of the trackage unit base and the bottom of the tongue operating unit base being in the same plane.

9. A toy railroad track switch having electromagnetically operated switch tongue shifting mechanism provided with two operating coils each connected to a power rail and to a tongue actuated disconnecting switch therefor, a signal mechanically set coincidentally with the operation of the tongue, and a remote controller for the shifting mechanism including two signal lamps each connected to ground and adapted to be in series with only one coil of the shifting mechanism and a switch having one side grounded and adapted to short circuit either

lamp to increase the flow of current through the corresponding coil so that the tongue is shifted to show the other mechanical signal and a circuit is established through the other signal lamp.

10. A toy railroad track switch as claimed in claim 9, having supplemental pairs of contacts, each pair closing a circuit through the corresponding coil whereby the coil is energized without operating the remote controlled.

11. The combination with a toy railroad track switch including main and branch tracks having electromagnetically operated switch tongue shifting mechanism having coils interconnected with self-disconnecting switches and a remote control switch, and auxiliary controls for the tongue shifting mechanism including current controlling means in each branch track whereby the tongue may be shifted into a position to receive a car truck approaching from one branch, of signal means corresponding with each coil and in circuit therewith, the signal means for the coil which has been reconnected into the circuit by the operation of the other coil in shifting the switch tongue being energized whereby the position of the switch tongue will be indicated irrespective of which control is used.

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