June 6, 1939. E. E. McKEIGE ET AL 2,161,424

REMOTELY CONTROLLED SWITCH FOR TOY RAILROADS

Filed July 31, 1936 2 Sheets-Sheet 1

Fig. 1.

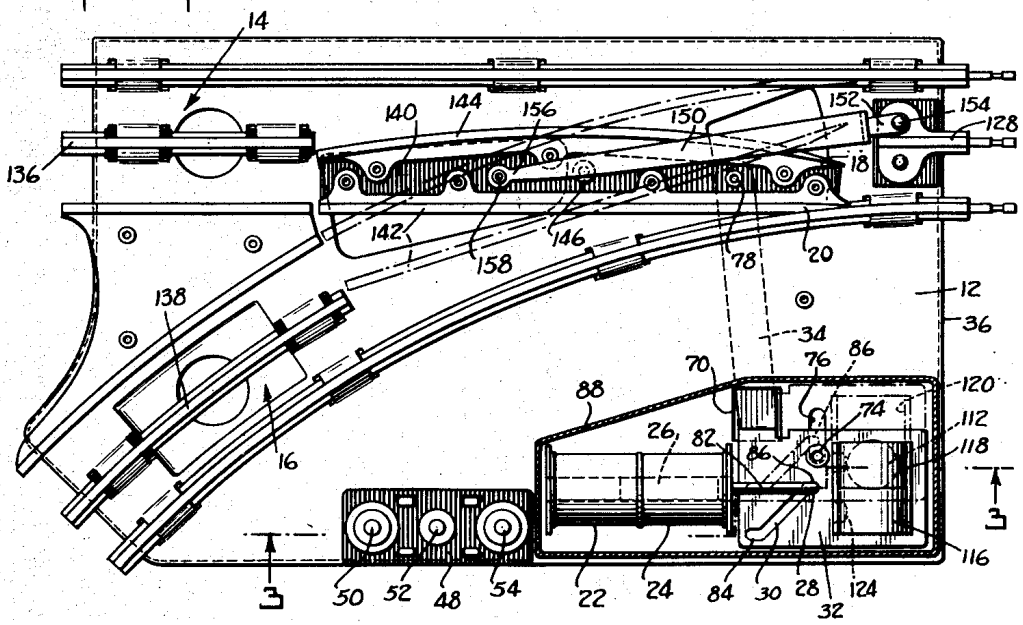

Fig. 2.

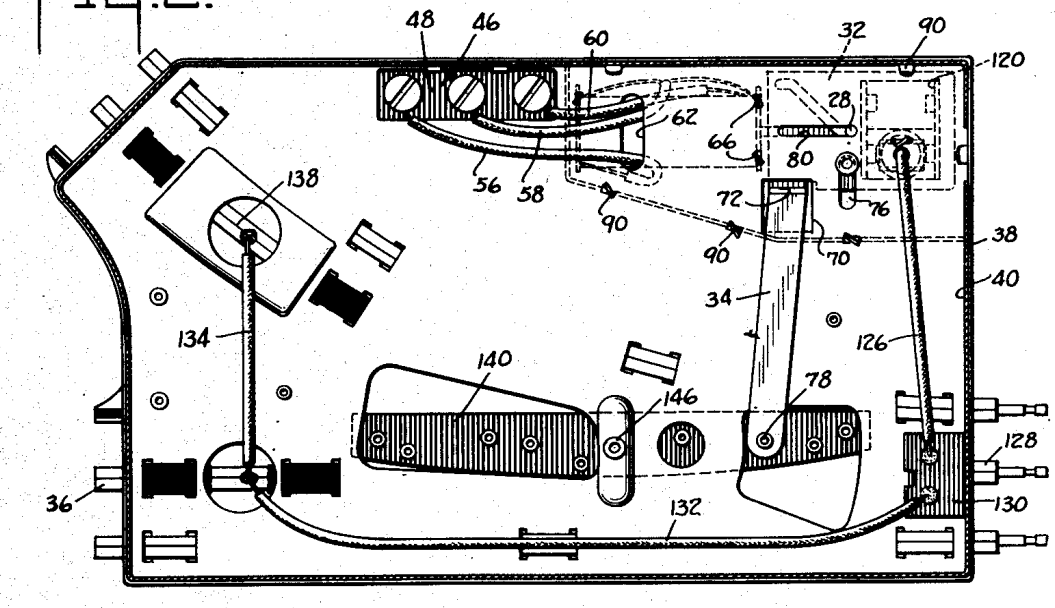

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Fig. 3.

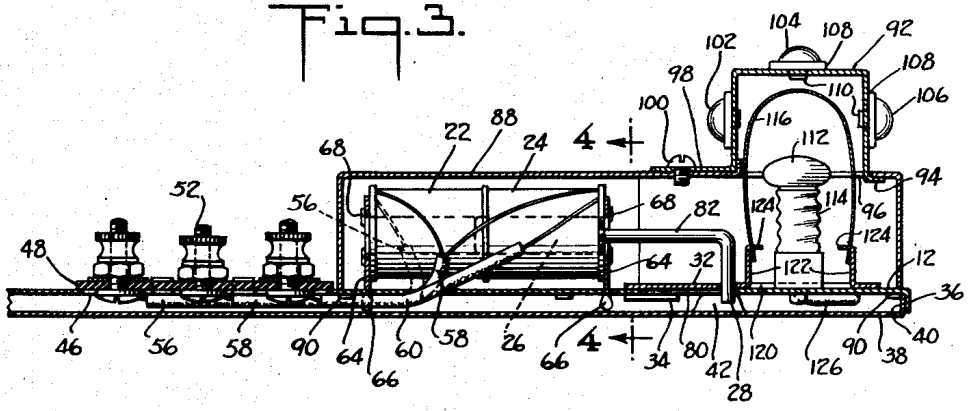
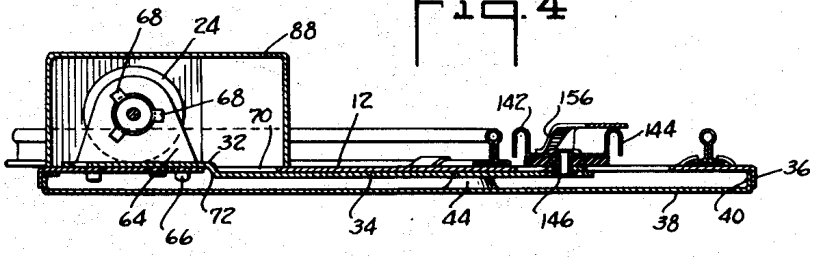


Fig. 4



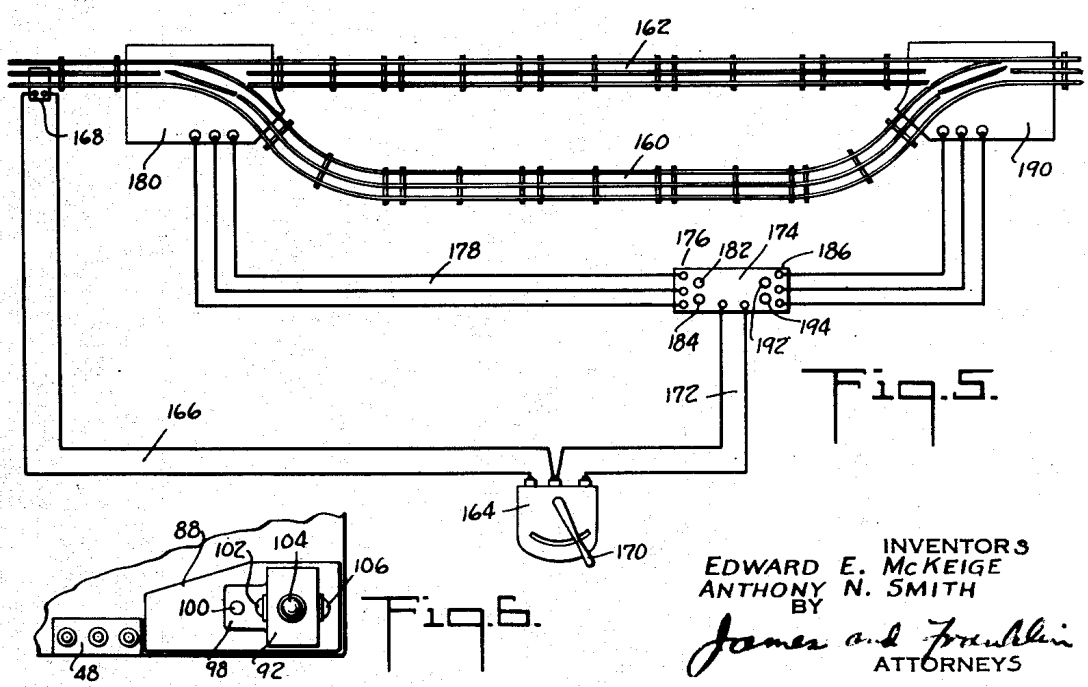


Fig. 5.

Fig. 6.

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REMOTELY CONTROLLED SWITCH FOR TOY RAILROADS

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Application July 31, 1936, Serial No. 93,540

9 Claims. (Cl. 246—220)

This invention relates to track switches, and more particularly to remotely controlled track switches for toy railroads of the electrically operated type.

The primary object of the present invention is to generally improve toy track switches. A more particular object resides in the provision of greatly simplified mechanism for remote control of such switches. Still another object is to positively lock the switch in either extreme position by locking means which in no way complicates or adds to the expense of the switch operating mechanism.

Other objects of our invention center about the provision of a trackside signal for indicating which way the switch is set, and are to provide a top signal as well as the normal side or vertical signals which face the train, the top signal being more readily observed by a child playing with the train; to provide a plurality of differently colored signals while using only a single lamp; and to produce the color change or signal change without necessitating the rotation of a signal or semaphore. A single lamp is employed which is fixedly mounted. A single housing is provided which is stationarily mounted around the lamp and which carries fixed apertures or lenses, but the light transmitted from the housing is varied by means controlled by the switch operating mechanism in a most simple and direct manner.

Still further objects of the invention concern the movable switch points and the manner in which smooth continuous energization of the contact shoe of the train is obtained while the train is passing over the switch. In accordance with our invention, each movable rail of the switch is insulatedly mounted and may act as either a wheel bearing rail or as a current carrying third rail. A transfer strip is pivotally mounted in such manner that when the insulated rail acts as a third rail it is contacted by the transfer strip and thereby energized, but when the said insulated rail acts as a wheel bearing rail it is disengaged from the transfer strip. The transfer strip also provides a smooth mechanical movement or transition of the third rail contact shoe of the train over the parts of the switch.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, our invention consists in the toy railroad switch elements and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings in which:

Fig. 1 is a partially sectioned plan view of a switch embodying features of our invention;

Fig. 2 is a horizontal section through the base with the switch inverted;

Fig. 3 is a section taken in elevation in the plane of the line 3—3 of Fig. 1;

Fig. 4 is a section taken in the plane of the line 4—4 of Fig. 3;

Fig. 5 is a schematic diagram showing one manner in which a pair of switches constructed in accordane with my invention may be used and remotely controlled in a toy railroad system; and

Fig. 6 is a plan view of the housing for the signal and switch operating means.

Referring to the drawings and more particularly to Figs. 1 through 4, the track switch there shown comprises a base 12 on which are mounted rails comprising a main track 14 and a branch track 16. Movable switch points 18 and 20 function to guide a train over either the main line 14 or the branch line 16. The switch points 18 and 20 are moved by remotely controllable mechanism including a pair of solenoids 22 and 24 which move a suitable core 26 to either extreme position. Core 26 carries an operating finger 28 (Fig. 3) which is received in a sloping cam slot 30 formed in a transversely movable shift plate 32. Shift plate 32 is connected to the movable parts of the switch by an appropriate link 34.

Considering the switch mechanism in greater detail, the base 12 includes a sheet metal base plate which is downwardly flanged around its periphery, as is indicated at 36. The base is preferably enclosed by a bottom plate 38 which is upwardly flanged at 40, the flange 40 being dimensioned to be received within flange 36. The resulting upper and lower sides of the base are secured together by one or more fastening means such as rivets or eyelets, the parts of the base being indented and brought in face to face contact at such fastening means, this being indicated at 42 in Fig. 3 and 44 in Fig. 4.

The solenoids 22 and 24 are preferably mounted coaxially in end to end relation, as by moving the coils over a single central tube within which core 26 is slidable. It will be understood that only one of coils 22 and 24 is energized at any one time, thereby pulling the preferably short iron core 26 to a position within that coil.

Base 12 is cut away to form an elongated opening 46 over which is mounted a strip of insulation 48 which in turn carries three binding posts 50, 52, and 54. As will be evident from examination of Figs. 2 and 3, a conductor 56 leads from binding post 50 to one terminal of coil 22. A

conductor 58 leads from binding post 52 to the other terminal of coil 22 and also to one terminal of coil 24. A third conductor 60 extends from binding post 54 to the other terminal of coil 24. The conductors pass upwardly from the base to the coils through an appropriate slot or window 62. It will be evident that when control energy is applied between binding post 50 and the center binding post 52, the coil 22 is energized, thus attracting the solenoid core 26 to the left, as viewed in Figs. 1 and 3, whereas when control energy is applied between binding post 54 and the center post 52 the coil 24 is energized, thereby moving the solenoid core 26 to the right.

The coil assembly 22, 24 is supported by a pair of end plates 64 having downwardly projecting tongues 66 which are passed through base plate 12 and twisted to hold the coils in place. The coils are themselves secured to end plates 64 by forming tongues 68 on the ends of the center tube of the coil assembly, these tongues being bent outwardly against plates 64, as is best shown in Figs. 3 and 4.

Shift plate 32 and the connecting link 34 are preferably formed of a single piece of sheet metal. Shift plate 32 lies above base 12, while link 34 is disposed within the base and underlies the upper plate 12. A suitable opening 70 is cut through base 12 in order to receive link 34, the link being stepped or bent downwardly at 72 to bring the same from a position above base plate 12 to a position therebelow. The opening 70 is, of course, made long enough to accommodate the desired movement of link 34. Shift plate 36 is guided for transverse movement by means of an eyelet 74 mounted on plate 32 and slidable in a slot 76 extending transversely of the switch. Only one such guide means is necessary because the path of movement of link 34 is determined by its pivotal connection 78 to the movable part of the switch. Because of the connection 78 and the guide slot 76, the shift plate 32 is constrained to move transversely of the switch.

Base plate 12 is also provided with a longitudinal slot 80, best shown in Figs. 2 and 3. This slot receives the lower end of finger 28 and constrains the finger to move longitudinally of the switch, that is, in the direction of the axis of the solenoid assembly. Finger 28 is bent downwardly from a rod 82 which extends to and is secured to solenoid core 26. Finger 28 also passes through the sloping or camming slot 30 previously referred to, the said slot 30 being formed in shift plate 32.

It is important to note that the ends of slot 30 are prolonged in a direction parallel to the solenoid system, as is indicated at 84 and 86, for these ends act as locking means to prevent unintentional movement or opening of the switch points. For example, in the position shown in Fig. 1 the solenoid core 26 has been moved to the right, thereby moving shift plate 32 downwardly and so bringing switch point 20 to the straight or "through" position shown. The switch point is locked in this position because the last part of the movement of the solenoid core causes finger 28 to pass into the locking part 86 of the cam slot, and this movement is irreversible.

The switch operating mechanism and the signal means are housed within a housing 88 consisting of top and side walls, the side walls being secured to base plate 12 by suitable tongue and slot connections 90. Superposed on housing 88 is an auxiliary signal casing 92. This casing extends with its long dimension transversely of the switch, as is best shown in Fig. 6. It is shown in section in Fig. 3, and it will be noted that it is a sheet metal casing open at the bottom and secured to housing 88 by means of a flange 94 disposed within opening 96, and a flange 98 which is secured to the top of housing 88 by a suitable screw 100. Opening 96 is a rectangular opening substantially coextensive with the bottom of signal casing 92. The signal casing is apertured or windowed at its opposite sides and preferably also at the top, and these windows are preferably provided with glass lenses 102, 104, and 106. The lenses are made of clear glass and therefore function for the display of a signal of any desired color. Each lens is held in place by a small metal frame 108 having tongues 110 which pass through the windows and are bent sidewardly to hold the frame and lens in place.

A signal lamp 112 is threadedly received in a suitable base or socket 114 mounted on base plate 12 at a point at the center of signal casing 92. Lamp 112 is thus disposed to directly illuminate the lenses 102, 104, and 106.

The light is colored by interposing a strip of Celluloid or like translucent colored material between the lamp and the lenses. Specifically, we employ an inverted U-shaped strip of Celluloid 116 which may be of one color, say red, and another similar inverted U-shaped strip of Celluloid 118 of a different color, say green. These strips are arranged edge to edge, as is best shown in Fig. 1, and form a continuous tunnel having a shape best shown in Fig. 3. These strips of Celluloid are secured to shift plate 32 and consequently slide back and forth relative to the lamp when the shift plate is moved. For example, in Fig. 1 strip 118, that is, the green strip, is interposed between the lamp 112 and the lenses, producing a green signal indicating that the switch is set in the straight or through position. When, however, shift plate 32 is moved to opposite position, thus setting the switch to the branch track, the red Celluloid strip 116 is moved to the position now occupied by the green Celluloid strip 118, and a red signal is produced in the lenses.

Strips 116 and 118 are detachably secured to shift plate 32 by appropriate tongue and slot connections. The shift plate 32 is cut away at 120, thereby clearing the lamp socket 114 during movement of the shift plate. The material cut away to form the comparatively large rectangular opening 120 is bent upwardly to form upstanding walls 122, best shown in Fig. 3, the edges of which are in turn bent inwardly to form tongues 124. The lower ends of Celluloid strip 116 are slotted to fit over the tongues 124, and the natural resilience of the Celluloid, causing the same to expand outwardly, holds the strips in place on tongues 124.

Access to lamp 112 in order to change the same when burned-out, is obtained by removing screw 100, elevating signal casing 92, and temporarily removing one or another of the transparent colored strips 116, 118.

Lamp 112 is energized through an insulated conductor 126 extending from the center of socket 114 to a piece of third rail 128, as is best shown in Fig. 2. The third rail 128 is, of course, itself insulatedly mounted on the base, as by means of a strip of insulation 130. While discussing the wiring in the switch base, it may further be observed that insulated conductors 132 and 134 interconnect third rail sections 128, 136, and 138. Each of these sections is, of course, insulatedly mounted on the base, and all are constantly ener-

gized and in continuous connection with the remainder of the track system.

The movable part of the track switch comprises an insulation plate 140, along one edge of which is insulatedly carried a straight rail section 142, and along the other edge of which is insulatedly carried a curved rail section 144. At one end rails 142 and 144 are cut away to form the switch points 18 and 20 previously referred to. Insulation plate 140 is movably mounted, preferably by means of a fixed pivot 146. The arrangement is such that in one position, that shown in solid lines in Fig. 1, the straight rail 142 acts as a wheel bearing rail, while the other rail 144 acts as a center or third rail. When the switch is moved to opposite position, that shown in broken lines in Fig. 1, the curved rail 144 acts as a wheel bearing rail, while the straight rail 142 acts as a center or third rail. The link 34 is connected to insulation plate 140 at the point 78 as previously described, thereby oscillating the insulation plate between the solid and broken line positions shown in Fig. 1.

In addition to the parts so far described, we provide a relatively thin flexible transfer strip 150 one end of which is bent downwardly at 152 and pivotally connected to third rail section 128 at rivet 154, while the other end 156 is bent downwardly and pivotally connected to insulation plate 140 by an eyelet 158. The center portion of strip 150 just overlies either of rails 142 and 144. In the position shown in Fig. 1 it overlies rail 144 and operates to feed current to rail 144. At this time strip 150 in no way contacts rail 142. The contact shoe of the train is continuously energized as it passes over the switch, and its movement is made smooth and silent because of the transition between the fixed and movable parts of the switch provided by strip 150. The contact shoe of the train is preferably made of substantial length and is adequate to continuously energize the train even though it would not be adequate to bridge the entire movable part of the switch were the transfer strip 150 not employed.

When the switch is set to the position shown in broken lines in Fig. 1, the transfer strip 150 is moved well out of contact with the curved track 144 but instead overlies and engages the straight rail 142, for it is the latter which then acts as a center or third rail for the switch.

In Fig. 5 we show a pair of switches connected in a track system to provide a siding 160 offset from the main line 162. It will be understood that the switches may be used in various other ways, and that the present illustration is merely by way of example. A step-down transformer 164 may be energized from a household lighting circuit and supplies a reduced voltage through conductors 166 to the track system by means of a connector 168. The voltage supplied to the track system, and consequently the speed of the train, may be varied by means of a suitable control lever or handle 170. The transformer is preferably provided with separate binding posts for energizing the trackside accessories, although this refinement is not essential. In the present case such binding posts are connected by means of wiring 172 to a suitable remote control switch panel 174. This switch panel is provided with a set of three binding posts 176 which are connected by wires 178 to the three binding posts on switch 180. Panel 174 is provided with two push-buttons 182 and 184. The wiring within the panel is such that on depressing button 182 energy is supplied to the center and upper one of binding posts 176, while on depressing button 184 energy is supplied to the center and lower one of binding posts 176. This, of course, moves the switch to either position and only momentary depression of the control button is needed, for the switch is thereafter locked in place until the opposite control button is depressed. The signal lamp is, of course, constantly energized, and the color of the signal indicates in which position the switch is set.

The control panel 174 is preferably provided with parts duplicate to those already referred to in order to control the other switch 190. Specifically, there is a set of three binding posts 186 corresponding to the binding posts 176, and a pair of push-buttons 192, 194 corresponding to the push-buttons 182, 184 previously referred to. By simultaneously depressing push-buttons 182 and 192, the switches may be simultaneously set in one position, and, conversely, by simultaneously depressing push-buttons 184 and 192 the switches may be simultaneously moved to opposite position.

It is believed that the construction and operation, as well as the many advantages of our improved remotely controlled switch for toy railroads, will be apparent from the foregoing detailed description thereof. The switch tongues are shifted by mechanism of extraordinary simplicity, yet this mechanism functions to positively lock the switch tongues in either position. The switch carries an electrically lighted signal which is attractive and somewhat mystifying in operation because the color change is produced in a single set of lenses, yet only one continuously energized lamp is required, thus dispensing with switching or the like for lamp circuits. The movable parts of the switch function as either a wheel bearing rail or a current carrying third rail, and current is supplied to whichever rail acts as a third rail, by a suitable transfer strip which also functions to provide a smooth movement of the locomotive contact shoe over the switch.

While we have shown an operating finger moved by the solenoid core which cooperates with a shift plate having a suitable cam slot, said shift plate being connected to the switch points, it will be understood that this cam mechanism with its automatic locking feature may equally well be embodied by mounting a cam slot plate for movement by the solenoid core, said cam slot plate cooperating with a finger connected to the switch points. For convenience, in the claims we refer to the operating finger being mounted on the core, but the cam arrangements referred to are interchangeable. Because of this and other changes, it will be apparent that while we have shown and described my invention in a preferred form, many changes and modifications may be made in the structure disclosed, without departing from the spirit of the invention, defined in the following claims.

We claim:

1. A remotely controllable track switch for toy railroads, comprising a base having a top plate carrying main and branch tracks, movable switch points for guiding a train along either the main or branch track, and remotely controllable means for moving said switch points, said means including a double solenoid system, a core movable from one extreme position to another by energization of one or the other of the solenoids, a vertical operating finger on said core, a slot in said top plate extending longitudinally of the core, one end of said operating finger being slid-

ably received in said slot, a shift plate movable transversely of said solenoids and connected at one end to the switch points for shifting the same to one position or the other, a slot in said top plate extending transversely of the core beneath the other end of the shift plate, a pin on said shift plate projecting into said slot, said shift plate having a cam slot therein receiving the aforesaid operating finger, said cam slot extending at an angle in its intermediate portion and extending in the direction of the solenoid axes at its ends, whereby movement of the solenoid core longitudinally of the switch causes movement of the shift plate transversely of the switch and locks the shift plate in position until the solenoid system is again energized, thereby locking the switch points in position against accidental opening.

2. A track switch for toy railroads, comprising a base carrying main and branch tracks, a movable switch point for guiding a train along either the main or branch track, horizontally movable means for moving said switch point, and an electrically lighted signal system for indicating the position of the switch point, including a stationary lamp, a housing disposed over said lamp and provided with side and top light-emitting windows at the lamp, and transparent color-changing means interposed between the lamp and the side and top windows and arranged for horizontal movement, said means including different colored portions arranged side by side and connected to the horizontally movable means for shifting the switch point, whereby one color light is emitted from all of the signal windows when the switch is in one position, and another color light is emitted from all of the signal windows when the switch is in opposite position.

3. A track switch for toy railroads, comprising a base carrying main and branch tracks, movable switch points for guiding a train along either the main or branch track, horizontally movable means for moving said switch points, and an electrically lighted signal system for indicating the position of the switch points, including a single stationary lamp, a housing disposed over said lamp and provided with light-emitting lenses at the lamp, and color-changing means interposed between the lamp and the lenses, said means including an inverted U-shaped red Celluloid strip and an inverted U-shaped green Celluloid strip arranged in side by side relation, said strips being mounted on the horizontally movable means for shifting the switch points, whereby a red light is emitted from the signal when the switch is in one position and a green light is emitted from the signal when the switch is in opposite position.

4. A track switch for toy railroads, comprising a base carrying main and branch tracks, a movable switch point for guiding a train along either the main or branch track, and means for moving said switch point including a shift plate horizontally movable transversely of said switch and connected to the switch point for shifting the same to one position or the other, and signal means for indicating the position of the switch, said means including a stationary lamp, a stationary housing mounted over said lamp, said housing having lenses at the lamp, and color-changing means including an inverted U-shaped strip of red colored translucent material and an inverted U-shaped strip of green colored translucent material arranged side by side between the lamp and housing, said strips of material being mounted on the aforesaid horizontally movable shift plate, whereby one or the other of said strips is disposed between the lamp and the lenses when the shift plate is moved to either extreme position.

5. A track switch for toy railroads, comprising a base carrying main and branch tracks, a movable switch point for guiding a train along either the main or branch track, and means for moving said switch point including an operating finger movable longitudinally of the switch, a shift plate movable transversely of said switch and connected to the switch point for shifting the same to one position or the other, said shift plate having a cam slot therein cooperating with the aforesaid finger, said cam slot extending at an angle in its intermediate portion and extending longitudinally of the switch at its ends, whereby movement of the finger longitudinally of the switch causes movement of the shift plate transversely of the switch and locks the shift plate in position until the finger is again moved, thereby locking the switch point in position against accidental opening, and signal means for indicating the position of the switch, said means including a stationary lamp, a stationary housing mounted over said lamp, said housing having windows at the lamp, and color-changing means including a piece of colored translucent material and a differently colored piece of translucent material arranged end to end between the lamp and housing, said pieces of material being mounted on the aforesaid shift plate, whereby one or the other of said colors is disposed between the lamp and the windows when the shift plate is moved to either extreme position.

6. A remotely controllable track switch for toy railroads, comprising a base carrying main and branch tracks, movable switch points for guiding a train along either the main or branch track, and remotely controllable means for moving said switch points, said means including a double solenoid system, a core movable from one extreme position to another by energization of one or the other of the solenoids, and means whereby movement of the solenoid core causes movement of the switch, and signal means for indicating the position of the switch, said means including a stationary lamp, a stationary housing mounted over said lamp, said housing having windows at the lamp, and color-changing means including red translucent material and green translucent material arranged end to end between the lamp, and housing, said materials being connected directly to the switch moving means for movement therewith, whereby one or the other of said colors is disposed between the lamp and the windows when the switch is moved to either extreme position.

7. A remotely controllable track switch for toy railroads, comprising a base carrying main and branch tracks, movable switch points for guiding a train along either the main or branch track, and remotely controllable means for moving said switch points, said means including a double solenoid system, a core movable from one extreme position to another by energization of one or the other of the solenoids, an operating finger on said core, a shift plate movable transversely of said solenoids and connected to the switch points for shifting the same to one position or the other, said shift plate having a sloping cam slot therein cooperating with the aforesaid finger, whereby movement of the solenoid core longitudinally of the switch causes movement of the

shift plate transversely of the switch, and signal means for indicating the position of the switch, said means including a stationary lamp, a stationary housing mounted over said lamp, said housing having windows at the lamp, and color-changing means including red translucent material and green translucent material arranged side by side between the lamp and housing, said colored materials being mounted on the aforesaid shift plate, whereby one or the other of said colors is disposed between the lamp and the windows when the shift plate is moved to either extreme position.

8. A remotely controllable track switch for toy railroads, comprising a base carrying main and branch tracks, movable switch points for guiding a train along either the main or branch track, and remotely controllable means for moving said switch points, said means including a double solenoid system, a core movable from one extreme position to another by energization of one or the other of the solenoids, an operating finger on said core, a shift plate movable transversely of said solenoids and connected to the switch points for shifting the same to one position or the other, said shift plate having a cam slot therein cooperating with the aforesaid finger, said cam slot extending at an angle in its intermediate portion and extending in the direction of the solenoid axis at its ends, whereby movement of the solenoid core longitudinally of the switch causes movement of the shift plate transversely of the switch and locks the shift plate in position until the solenoid system is again energized, thereby locking the switch points in position against accidental opening, and signal means for indicating the position of the switch, said means including a stationary lamp, a stationary housing mounted over said lamp, said housing having side and top lenses at the lamp, and color-changing means including an inverted U-shaped strip of red translucent material and an inverted U-shaped strip of green translucent material arranged side by side between the lamp and housing, said strips of material being mounted on the aforesaid shift plate, whereby one or the other of said strips is disposed between the lamp and the lenses when the shift plate is moved to either extreme position.

9. A track switch for toy railroads comprising a base carrying main and branch tracks, a horizontally movable switch point for guiding a train along either the main or branch track, and an electrically lighted signal system for indicating the position of the switch point including a stationary lamp, a horizontally movable member having a slot cut therethrough disposed around the lamp, a housing disposed over the lamp and said horizontally movable member and provided with light-emitting windows at the lamp, an inverted U-shaped red Celluloid strip and an inverted U-shaped green Celluloid strip arranged in side by side relation and mounted on the aforesaid horizontally movable member, said member having inwardly projecting tongues at the sides of the slot, and said Celluloid strips having slots near their ends receiving said tongues, the strips being held on said member by the resilient expansion of the legs of the strips when bent to U-shape, and means connecting said horizontally movable member to the switch point for movement thereby, whereby a red light is emitted when the switch is in one position, and a green light is emitted when the switch is in opposite position.

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