June 20, 1939. R. V. KING 2,163,430

SIDING CONTROL AND SIGNAL FOR TOY RAILROADS

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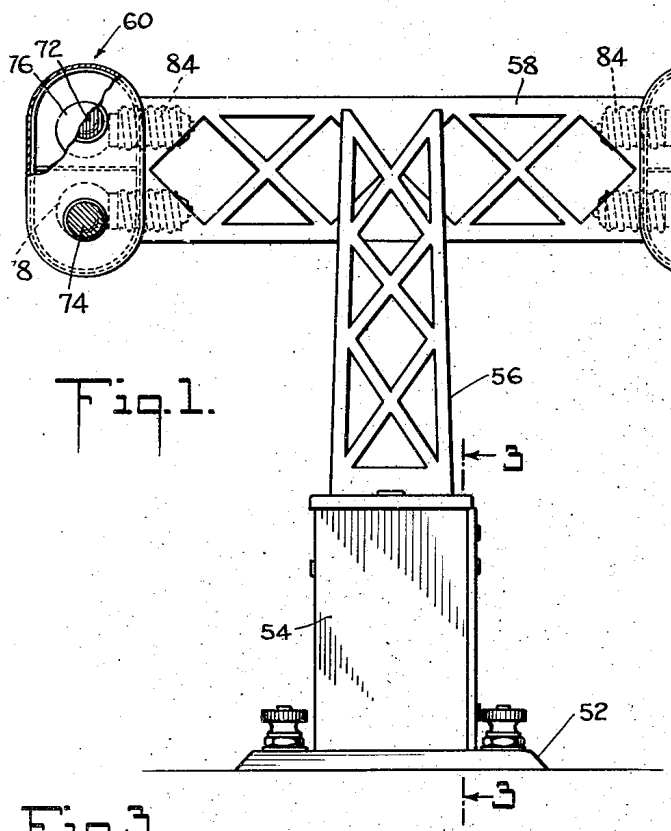

Fig. 1.

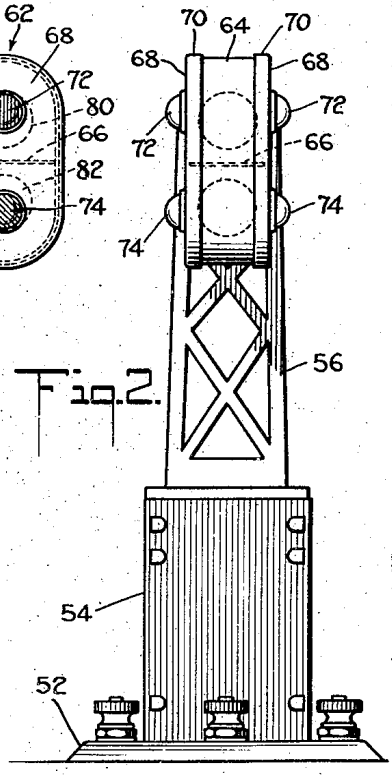

Fig. 2.

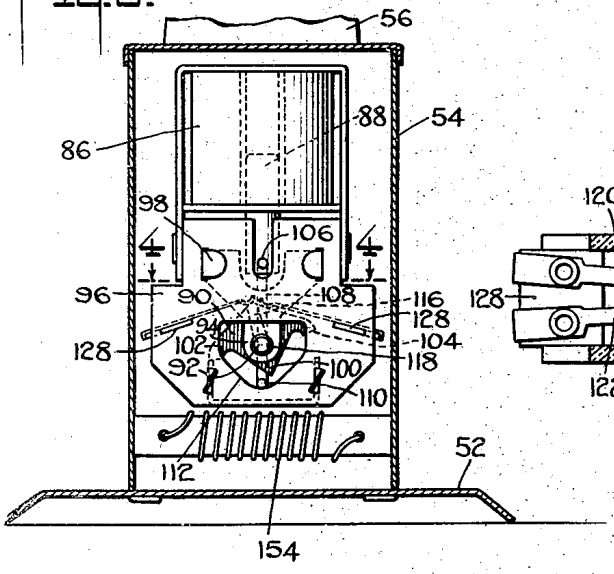

Fig. 3.

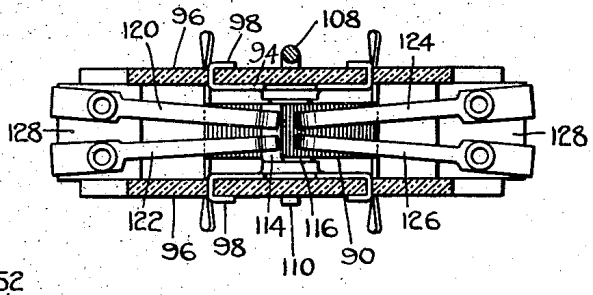

Fig. 4.

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Fig. 5.

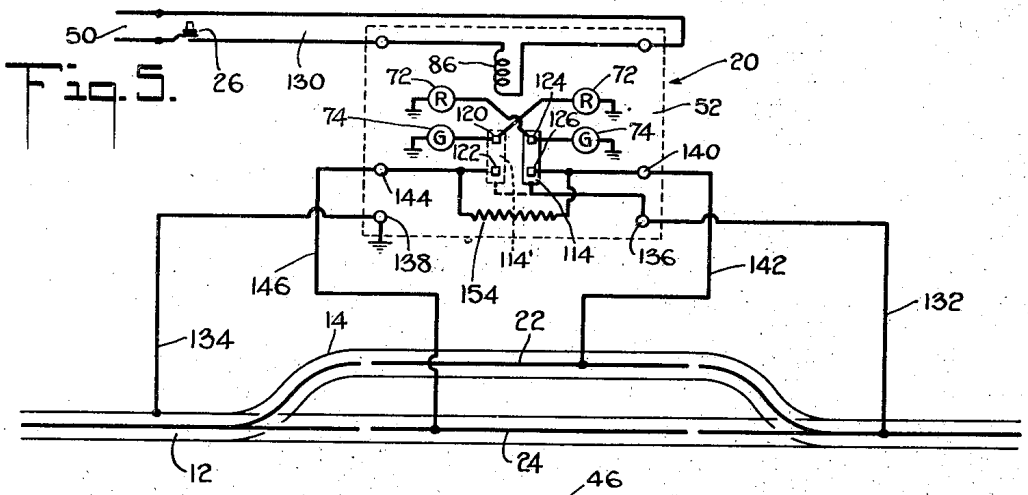


Fig. 6.

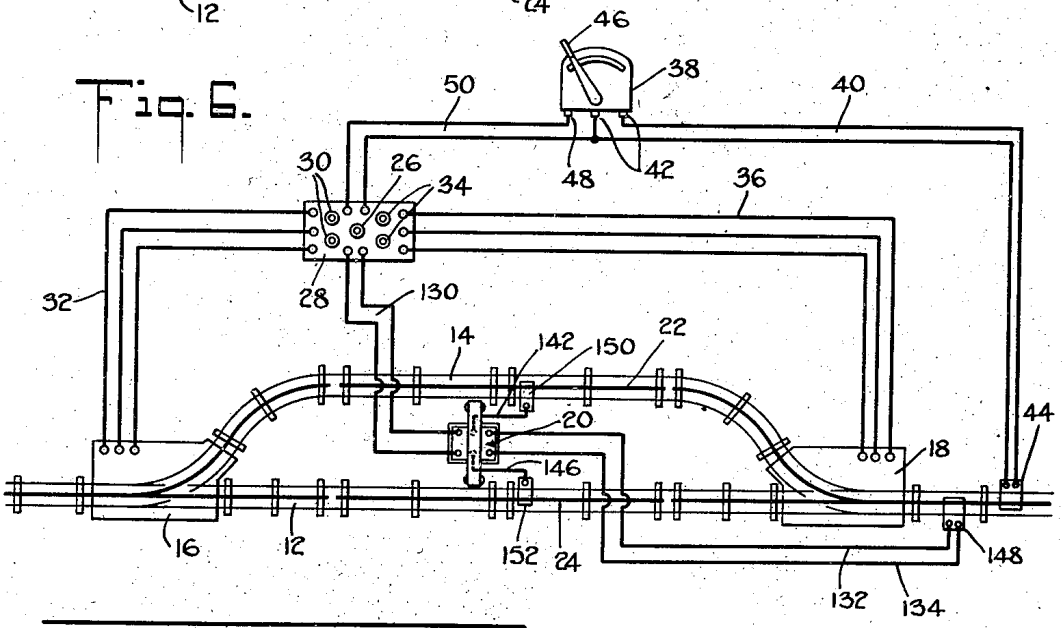
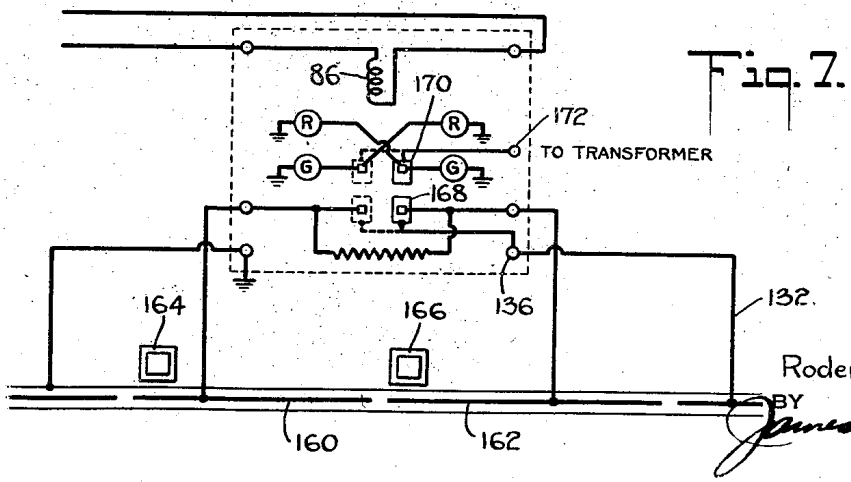


Fig. 7.



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2,163,430

SIDING CONTROL AND SIGNAL FOR TOY RAILROADS

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Application August 14, 1936, Serial No. 95,980

9 Claims. (Cl. 246—22)

This invention relates to toy railroads, and more particularly to a combined control and signal mechanism therefor.

The primary object of the invention is to generally improve control mechanism and signal mechanism for toy railroads, and to provide a combination of both mechanisms interconnected and related in an advantageous manner.

A more particular object resides in the provision of a double block signal or semaphore which may be used wherever two lines of track come near one another, as for example at a crossover, or at a switch, or, as here illustrated in detail, at a siding. The lamps are so interconnected that when danger is indicated for one track, clear is indicated for the other, and vice versa. Another object is to provide control means for trains on the aforesaid track system, and with this object in view the third rail sections of the track are insulated to form control sections, and these are energized through a switch so arranged that when one section is energized the other is deenergized, and vice versa.

In accordance with still another object of my invention, the signals and the track sections are controlled through a single switch mechanism which automatically relates the signal indication and track energization in proper manner. Still another object of my invention centers about the provision of remote control means, preferably of simple push-button type, for causing movement or changeover of the aforesaid switch mechanism from one position to the other. In the preferred form here disclosed, only a single circuit and single push-button are required for complete control of the signals and track sections, and the said push-button need be only momentarily depressed.

Many toy trains are equipped with remotely controllable reversing mechanism arranged to reverse the direction of operation of the train when the current supply thereto has been completely cut off. Such an arrangement is disclosed in copending application of Edward E. McKeige, Serial No. 56,885, filed Dec. 31, 1935. Still another object of the present invention is to avoid undesired reversal of a train on that track section which is deenergized by the control means above referred to, and for this purpose the track section even when deenergized to prevent movement of a train thereon, is nevertheless provided with a low voltage holding current sufficient to prevent operation of the remotely controlled reversing mechanism on the train, although insufficient to drive the train.

To the accomplishment of the foregoing and other objects which will hereinafter appear, my invention consists in the toy railroad signal and track control 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 front elevation of a double block signal or semaphore embodying features of my invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is a section through the base or pedestal of the tower, taken in the plane of the line 3—3 of Fig. 1;

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

Fig. 5 is a schematic wiring diagram showing one form of the invention applied to the control of a siding;

Fig. 6 is another diagram of the siding, showing the toy railroad accessories in place; and

Fig. 7 is a schematic wiring diagram generally similar to that shown in Fig. 5, but showing the application of the invention to track sections disposed end to end rather than side by side.

Referring to the drawings and more particularly to Fig. 6, the invention is shown applied to a track system including a main line 12 and a branch line or siding 14, the siding being connected to the main line by track switches 16 and 18. Between the main line 12 and siding 14 there is disposed a double block signal or double semaphore 20. The signal 20 is provided with appropriate banks of signal lamps near the main line 12 and the siding 14. The third rail 22 of siding 14 is insulated to form a control section, and similarly a part of main line 12 opposite siding 14 has its third rail 24 disconnected or insulated from the remainder of the third rail, thus forming another control section. The energization of these control sections, as well as the energization of the signal lamps, are all controlled by switch mechanism preferably housed in the base of signal 20. The switch mechanism is so arranged that green or clear is indicated at the main line whenever the main line is energized and at the same time the siding is deenergized, the signal at the siding indicating red or stop. Conversely, the main line control section 24 is deenergized when the siding control section 22 is energized, the signal lamps at such time being appropriately changed. The switch mechanism is itself preferably arranged for remote

control, it being operated by a single push-button 26.

The track switches 16 and 18 are also preferably remotely controlled, as by the use of a control panel 28 having a pair of push-buttons 30 for controlling switch 16 through conductors 32, and a pair of push-buttons 34 for controlling the switch 18 through conductors 36. The switches may be of a type disclosed in copending application of Edward E. McKeige and Anthony N. Smith, Serial No. 93,540, filed July 31, 1936. When a control panel such as the panel 28 is employed, it is convenient, though not necessary, to mount the siding control push-button 26 thereon. To complete a brief description of the diagram in Fig. 6, I may point out that the entire toy railroad system is energized through an appropriate step-down transformer 38 the primary of which is connected to an ordinary household lighting system, while the secondary is connected to the track system through conductors 40 leading from binding posts 42 to a suitable track connector 44. The voltage impressed on binding posts 42 is controlled by a suitable controller or speed control handle 46 which may be moved to vary the train speed or to stop the train. In order to supply the trackside accessories with current at constant voltage regardless of the position of the speed control handle 46, the transformer 38 may be provided with a special tap leading to binding post 48, and energy may be supplied from binding post 48 and a common binding post 42 to the switch panel 28 through conductors 50. This energy is employed to operate the solenoids in track switches 16 and 18, as well as the solenoid in the double semaphore 20 hereinafter described.

Referring now to Figs. 1 and 2 of the drawings, the signal preferably comprises a base 52 including a pedestal 54 surmounted by a suitable tower 56 having an overhanging cross arm 58. The tower 56 and cross arm 58 may be formed from sheet metal cut away to simulate the latticed construction frequently employed. Housings 60 and 62 for sets of signal lamps are provided at each end of the cross arm 58. These housings are formed by an elliptically bent strip of sheet metal 64, forming an elongated compartment the upper and lower parts of which are separated by an opaque partition 66. The front and back of each housing are closed by plates 68, flanged at 70 to fit over the wall 64. Plates 68 are provided with suitable glass lenses 72 and 74, the lenses 72 being red, and the lenses 74 being green, or vice versa. Within housings 60 and 62 are disposed signal lamps 76, 78, 80, and 82. These lamps may be of the conventional flashlight battery type and are threadedly received in sockets 84 secured to the inner wall of the lamp housings. It will be understood that the threaded shells of the sockets 84 are grounded, thus grounding one terminal of the lamps, while the inner ends of the sockets carry insulated contacts to which are connected wires, not shown in Figs. 1 and 2, which wires extend along cross arm 58 and down tower 56 to the pedestal or enclosure 54.

Referring now to Figs. 3 and 4, the pedestal 54 houses a suitable relay or remotely controllable switch. In the present case the switch comprises a solenoid 86 within which is vertically reciprocable an iron core 88. An insulation block or tumbler 90 is provided with trunnions 92 received in metal arms 94, the said arms being themselves mounted on the inner sides of insulation plates 96 by means of bent tongue connections 98. The tumbler 90 is so shaped at the bottom as to form a wedge 100 terminated by downwardly projecting arms 102 and 104. The solenoid core 88 is operatively connected to tumbler 90 by means of a sidewardly disposed U-shaped link of brass wire including a horizontal arm 106 passing freely through a mating hole in the lower end of the solenoid core, a vertical arm or connecting bar 108 lying outside one of the insulation plates 96, as is best shown in Fig. 4, and a horizontal lower arm 110 which underlies tumbler 90, as is best shown in Fig. 3. The insulation plates 96 are cut away to form windows 112 through which the bottom arm 110 passes and in which it is freely movable toward one side or the other.

This arrangement is such that successive energizations of the solenoid 86 cause the core 88 to move the tumbler 90 alternately to either extreme position. In Fig. 3 the tumbler is shown turned counter-clockwise. When solenoid 86 is next energized, core 88 is drawn upwardly, and inasmuch as arm 110 is disposed at the left side of the tumbler, the resulting upward movement causes arm 110 to slide upwardly and outwardly as far as the stop 102, whereupon the tumbler is turned in a clockwise direction to its other extreme position. The solenoid need be energized only momentarily, for when deenergized the core drops to the position shown in Fig. 3 and is ready to again turn the tumbler to a position opposite that last assumed.

The top surface of tumbler 90 is employed as the movable element or commutator of the switch mechanism. For this purpose, the drum carries a metallic contact segment 114 an extension 116 of which is bent downwardly along the side wall of the tumbler and is extruded outwardly to form a metallic sleeve 118 (Fig. 3) surrounding trunnion 92. Metallic sleeve 118 engages the metallic support arm or bearing 94 and thus provides means for connecting the switch segment 114 to an external circuit.

Cooperating with segment 114 are light spring fingers or wipers 120, 122, 124, and 126 (Fig. 4). The fingers are eyeletted on insulation supports 128 which are secured between side plates 96 by appropriate tongue and slot connections, best shown in Fig. 3. It will be understood from inspection of the drawings that when the tumbler is moved to the position shown in Figs. 3 and 4, switch segment 114 contacts the fingers 120 and 122, and, conversely, when the tumbler is turned in clockwise direction to opposite position, the switch segment 114 engages fingers 124 and 126.

The operation of the mechanism thus far described may be explained by reference to Figs. 5 and 6 of the drawings. In Fig. 5 the coil 86 corresponds to solenoid 86 in Fig. 3; the lamps 72 marked "R" for red, correspond to the lamps 72 in Fig. 1; and the lamps 74, marked "G" for green, correspond to the lamps 74 in Fig. 1. Similarly the stationary contacts 120 through 126 and the movable switch segment 114 correspond to the fingers 120 through 126 and switch segment 114 of Fig. 4. In Fig. 5, as in Figs. 1, 2, and 6, the base 52 is provided with six binding posts. Solenoid 86 is connected to two of these binding posts and by them is connected through leads 130 to the manually controllable push-button 26. As is indicated in Fig. 5, the push-button 26 is in series with wires 50 leading to the transformer. Whenever the push-button is depressed, the solenoid is energized. This shifts the switch seg-

ment 114 from the solid-line position to the broken-line position 114', or vice versa.

Energy is supplied to the signal tower 20 by conductors 132 and 134 leading from the third rail and one of the outer rails, respectively, of the main line of track 12 to binding posts 136 and 138. Binding post 136 is connected to the switch segment 114 (through metallic support arm 94 and metallic sleeve 18 shown in Fig. 3). Binding post 138 is grounded. With the switch segment 114 in the position shown in solid lines in Fig. 5, energy is supplied to the track control section 22, this energy flowing from switch segment 114 through stationary contact finger 126, binding post 140, and thence through conductor 142 to the control section. At the same time, the green signal adjacent the siding and the red signal adjacent the main line are energized, this being through contact finger 124 and wiring leading therefrom to the lamps, said wiring being concealed within the tower and cross arm of the signal structure. Conversely, when switch segment 114 is moved to the broken-line position 114', the siding 22 is deenergized and the control section 24 of the main line is energized, this being through contact finger 122, binding post 144, and conductor 146. At the same time, the green signal adjacent the main line and the red signal adjacent the siding are energized through contact finger 120.

It will be understood from inspection of Fig. 6 that the conductors 132 and 134 may be paired and lead to a track connector 148, while conductors 142 and 146 lead to track connectors 150 and 152, respectively. These connectors are applied to the third or center rail only.

To summarize in a general way, it will be understood that with the signal set against the siding, a train may be held on the siding and another operated in the usual manner on the main line. With the signal set against the main line, a train may be held on the main line near the siding, and a train may be operated around it on the siding. With a train on the main line and another train on the siding, either train may be operated without moving the other. When using a single train, the train may be switched to run on either the main line or the siding, but will be stopped if the signal is set against it.

In referring to deenergization of either the main line or the siding, I do not necessarily mean complete deenergization, for it is possible to supply a low voltage holding current which is inadequate to operate a train. This precaution is desirable when dealing with remotely controlled reversing locomotives, in order to prevent reversal of the direction of operation of the locomotive after it has been stopped on the main line or siding. The transformer or controller of such a train system is arranged to supply a low voltage holding current even when the control handle is moved to the stop or off position, and this fact is taken advantage of in the arrangement of Fig. 5, in that the signal lamps 72 and 74 are energized even when the control handle of the transformer is moved to off position.

To supply the desired small holding current to the control sections 22 and 24, I connect the same by a suitable fixed resistor 154 which extends across the base of the signal tower, as is best shown in Fig. 3, and which is connected between the binding posts 140 and 142, as is clearly indicated in Fig. 5. It will be appreciated from examination of Fig. 5, that when one of the control sections is energized, the other is not completely deenergized but is instead adapted to be supplied with a small holding current at low voltage by reason of the connection through the fixed resistor 154.

The particular double signal tower described above may be used with a variety of track arrangements other than the siding shown in Figs. 5 and 6. It may, for example, be used at a crossover, or between any two nearby lines of track, or at a switch as where an elliptical track is provided with a diagonal line thereacross or a circular line near one end, etc. In each case it is desirable to form an insulated control section in each line or branch of track, to be controlled by the signal mechanism above described. Where the signal tower is disposed between the two lines leading from a track switch, it may be referred to as being disposed between a main line and a "siding", the latter term being used in the present specification for convenience to refer to the branch line in these various track arrangements.

The remote control arrangement may also be employed with signal lamps mounted on separate structures or towers. Reference may be made to Fig. 7 in which the remote control arrangement is substantially like that previously described but is shown connected to insulated track sections 160 and 162 which are arranged end to end. Control section 160 is provided with a tower 164, while control section 162 is provided with a tower 166. One of these towers carries one set of signal lamps and the switch mechanism, while the other carries merely the second set of signal lamps. The construction and operation of the electrical switching mechanism may be substantially like that previously described.

However, in Fig. 7, I show a slight modification of the switching arrangement, in that the movable switch segment 114 is divided and replaced by two segments 168 and 170. The segment 168 is connected to binding post 136 which in turn is connected to the third rail of the main track, just as previously described. Segment 170 is connected to a special binding post 172 which in turn may be connected directly to the transformer 38 and more particularly to the special binding post provided for the energization of track accessories. It will be understood that the connection between segment 170 and binding post 172 is made by means of a downwardly bent arm similar to the arm 116 shown in Figs. 3 and 4 but located on the opposite side of the insulation tumbler 90. When a special connection is made to the transformer, as here shown, the signal lamps are energized at uniform potential, regardless of variation in voltage supplied to the track for the purpose of regulating the speed of the train. Moreover, this arrangement insures energization of the lamps when dealing with a train system wherein the control handle may be moved to true zero or open-circuit position, as may be the case when no remote control reversing means is employed.

It is believed that the construction and operation, as well as the many advantages of my improved track control and signal, will be apparent from the foregoing detailed description. In referring to the arrangement as a siding control, I do not mean to limit the invention to the particular track arrangement shown in Figs. 5 and 6, for, as has already been explained, the invention may be applied to a variety of track layouts. It will be apparent that while I have shown and described my invention in preferred forms, many

changes and modifications may be made in the structures disclosed, without departing from the spirit of the invention, defined in the following claims.

I claim:

1. The combination with a toy railroad track having a third rail which is divided to form two control sections, of remote control means therefor comprising a solenoid operated tumbler switch including a solenoid, a solenoid core reciprocable therein, an oscillatable tumbler, and linkage so connecting said core and tumbler that successive energizations of the solenoid cause the core to move the tumbler alternately to extreme positions, remote control means of the push-button type to energize the solenoid, electrical contact means cooperating with said tumbler in such manner as to energize one or the other of said third rail control sections, and a fixed resistor connected between the two control sections to supply a low voltage holding current to that one of the control sections which is otherwise deenergized, to thereby prevent deenergization of certain electrically operable devices, but said current being insufficient to continue operation of the propulsion motor of a train on said track.

2. Remote control means for controlling the energization of a toy railroad track, including a track switch and a siding disposed in the main line of track, the third rail of the siding and the third rail of the main line at the siding being disconnected to form control sections, remotely controlled switch means arranged in such manner as to energize either the siding or the main line while deenergizing the other, and a fixed resistor connected between the siding and main line control sections to supply a low voltage holding current to that section which is otherwise deenergized, to thereby prevent deenergization of certain electrically operable devices, but said current being insufficient to continue operation of the propulsion motor of a train on said track.

3. Remote control means for controlling the energization of a toy railroad track, including a track switch and a siding disposed in the main line of track, the third rail of the siding and the third rail of the main line at the siding being disconnected to form control sections, and a solenoid operated tumbler switch including a solenoid, a solenoid core reciprocable therein, an oscillatable tumbler, and linkage so connecting said core and tumbler that successive energizations of the solenoid cause the core to move the tumbler alternately to extreme positions, remote control means of the push-button type to energize the solenoid, electrical contact means cooperating with said tumbler in such manner as to energize either the siding or the main line while deenergizing the other, and a fixed resistor connected between the siding and main line control sections to supply a low voltage holding current to that section which is otherwise deenergized, to thereby prevent deenergization of certain electrically operable devices, but said current being insufficient to continue operation of the propulsion motor of a train on said track.

4. The combination with a toy railroad track having a main line and a siding connected to the main line by track switches, the third rail of the siding between the switches and the third rail of the main line between the switches being disconnected to form two control sections, of remote control and signal means therefor comprising two sets of widely spaced signal lamps, one set disposed immediately at each of the sections and arranged to produce a red or green signal when energized, wiring so interconnecting said lamps that a red signal is produced at one section when a green signal is produced at the other section, and vice versa, a relay arranged to control the energization of the signal lamps and the energization of the third rail sections, one of said sections being energized when the other is deenergized, and a remote control switch device of the normally open circuited push-button type for controlling the aforesaid relay means.

5. The combination with a toy railroad track having a main line and a siding connected to the main line by track switches, the third rail of the siding and the third rail of the main line at the siding being disconnected to form two control sections, of remote control and signal means therefor comprising a pedestal, a signal tower, an overhanging cross arm on said tower, and two signal lamps disposed at each end of the cross arm and arranged to produce a red or green signal when energized, wiring so interconnecting said lamps that a red signal is produced at one end of the arm when a green signal is produced at the opposite end of the arm, and vice versa, a relay mounted in said pedestal and arranged to control the energization of the signal lamps and to appropriately control the energization of the third rail sections, each of said sections being energized when the other is deenergized, and a remote control switch device for controlling the aforesaid relay means.

6. Remote control and signal means for a toy railroad track, including two track switches and a siding disposed parallel to the main line of track, the third rail of the siding between the switches and the third rail of the main line at the siding between the switches being disconnected to form control sections, a set of signal lamps disposed at one of the sections and another set of signal lamps disposed at the other section, said lamps being arranged to produce a red or green signal when energized, wiring so interconnecting said lamps that a red signal is produced at one section when a green signal is produced at the other section, and vice versa, a solenoid operated tumbler switch, said switch including a solenoid, a solenoid core reciprocable therein, an oscillatable tumbler, and linkage so connecting said core and tumbler that successive energizations of the solenoid cause the core to move the tumbler alternately to extreme positions, remote control means of the push-button type to energize the solenoid, and electrical contact means cooperating with said tumbler in such manner as to energize one pair of signal lamps and the siding in one position of the tumbler, and to energize the other pair of signal lamps and the main line in the other position of the tumbler.

7. Remote control and signal means for a toy railroad track, including a track switch and a siding disposed in the main line of track, the third rail of the siding and the third rail of the main line at the siding being disconnected to form control sections, a double block signal comprising a pedestal, a signal tower, an overhanging cross arm on said tower, and two signal lamps disposed at each end of the cross arm and arranged to produce a red or green signal when energized, wiring so interconnecting said lamps that a red signal is produced at one end of the arm when a green signal is produced at the opposite end of the arm, and vice versa, and single-control electrical switch means so arranged as to energize one pair of signal lamps and the siding in one position

and to energize the other pair of signal lamps and the main line in the other position.

8. Remote control and signal means for a toy railroad track, including track switches and a siding disposed in the main line of track, the third rail of the siding and the third rail of the main line at the siding being disconnected to form control sections, a double block signal comprising a pedestal, a signal tower, an overhanging cross arm on said tower, and two signal lamps disposed at each end of the cross arm and arranged to produce a red or green signal when energized, wiring so interconnecting said lamps that a red signal is produced at one end of the arm when a green signal is produced at the opposite end of the arm, and vice versa, a solenoid operated tumbler switch mounted in said pedestal, said switch including a solenoid, a solenoid core reciprocable therein, an oscillatable tumbler, and linkage so connecting said core and tumbler that successive energizations of the solenoid cause the core to move the tumbler alternately to extreme positions, remote control means of the push-button type to energize the solenoid, and electrical contact means cooperating with said tumbler in such manner as to energize one pair of signal lamps and the siding in one position of the tumbler, and to energize the other pair of signal lamps and the main line in the other position of the tumbler.

9. Remote control and signal means for a toy railroad track, including track switches and a siding disposed in the main line of track, the third rail of the siding and the third rail of the main line at the siding being disconnected to form control sections, a double block signal comprising a pedestal, a signal tower, an overhanging cross arm on said tower, and two signal lamps disposed at each end of the cross arm and arranged to produce a red or green signal when energized, wiring so interconnecting said lamps that a red signal is produced at one end of the arm when a green signal is produced at the opposite end of the arm, and vice versa, a solenoid operated tumbler switch mounted in said pedestal, said switch including a solenoid, a solenoid core reciprocable therein, an oscillatable tumbler, and linkage so connecting said core and tumbler that successive energizations of the solenoid cause the core to move the tumbler alternately to extreme positions, remote control means of the push-button type to energize the solenoid, electrical contact means cooperating with said tumbler in such manner as to energize one pair of signal lamps and the siding in one position of the tumbler, and to energize the other pair of signal lamps and the main line in the other position of the tumbler, and a fixed resistor so connecting the siding and main line control sections as to supply a low voltage holding current to that section which is deenergized.

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