

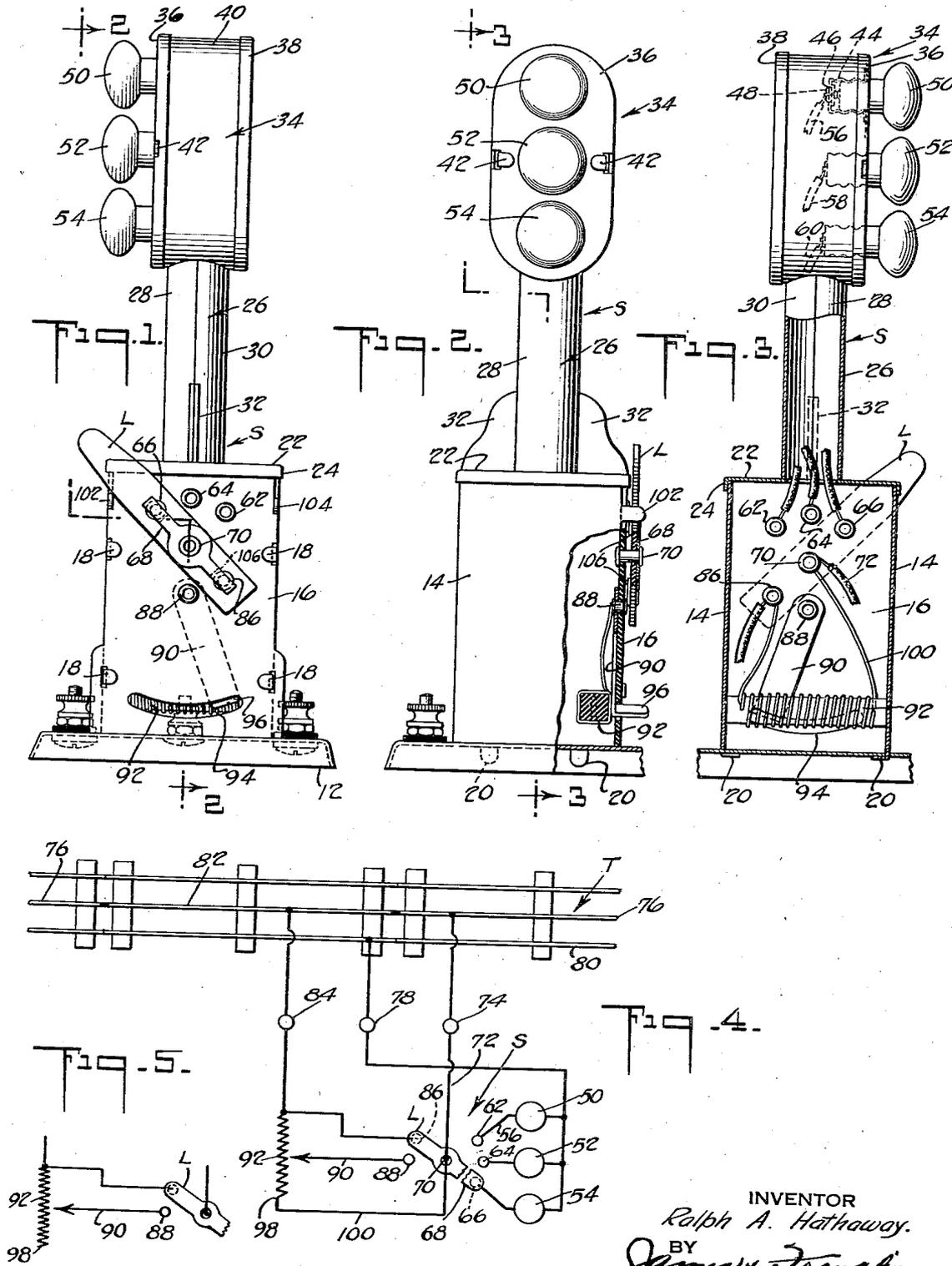
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BLOCK SIGNAL FOR TOY RAILROADS

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## BLOCK SIGNAL FOR TOY RAILROADS

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This invention relates to toy railroads, and more particularly to a block signal and train control device therefor.

The primary object of the invention is to generally improve block signals and train control devices for toy railroads. A more particular object is the provision of a block signal and train control system which is simple, inexpensive, and dependable in operation.

A true block signal system in which the track is divided into a series of blocks is cumbersome and unwieldy for ordinary toy train purposes. In fact, most children have only a single train, and this makes the true block signal system useless and inoperative. In accordance with an object of the present invention, a simplified block signal system is provided which may be used with even the simplest of toy train outfits, the signal indicated by the system being manually rather than automatically controlled. More specifically, the signal preferably includes signal lamps of different color which are selectively energized by a suitable selector or switch lever, the energy being tapped from the track adjacent which the signal is positioned.

In accordance with further features and objects of the invention, the train is automatically controlled by the block signal. A section of track is insulated from the remaining track to form a control zone, and in simplest form this control zone is energized when the signal is green or indicates Clear, and is deenergized when the signal is red or indicates Danger. For greater realism, the signal is preferably made with three positions, there being a yellow or amber light to indicate Caution. The control zone may be energized or deenergized in the Caution condition, but in accordance with a feature of the present invention it is energized with a reduced potential which permits only slow speed operation of the train. The various signals indicated are thus faithfully followed by a train approaching the signal.

Opinions may differ as to what reduced speed should be produced in response to a Caution signal. More importantly, the speed produced for a given track potential may vary widely according to the load placed on the locomotive, or, more specifically, in accordance with the length of the train of cars attached thereto. In accordance with a further object of the present invention, therefore, the reduced potential applied to the control zone is made variable.

Another object of the present invention is to make the same applicable to toy train systems of

the remotely controlled reversing type disclosed and claimed in copending application of Edward E. McKeige, Serial No. 56,885, filed December 31, 1935. In this system the train reversing relay on the locomotive is made sensitive to a small holding current—so small as to be incapable of operating the locomotive motor. The train may thus be repeatedly run forwardly or repeatedly run rearwardly, and is reversed only when the current supply to the track is completely stopped. With the block signal system as so far described, the train on being stopped in response to a Danger signal would next run in reverse away from the signal, instead of passing the signal when the signal is changed from Danger to Caution. The object of the invention here under discussion is to overcome this difficulty, and in accordance therewith the control zone is supplied with a small holding potential when Danger is indicated, this potential being inadequate to operate the train. In other words, the control zone is substantially, rather than wholly, deenergized, but it will be understood that it may be deemed to be deenergized with respect to operation of the locomotive driving motor.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the block signal and train control system 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 a drawing in which:

Fig. 1 is a side elevation of a trackside block signal embodying features of the invention;

Fig. 2 is a partially sectioned front elevation of the same, the section being taken in the plane of the line 2—2 of Fig. 1;

Fig. 3 is a partially sectioned side elevation of the same, taken in the plane of the line 3—3 of Fig. 2;

Fig. 4 is a schematic wiring diagram explanatory of the invention; and

Fig. 5 is explanatory of a modification thereof.

Referring to the drawing, the block signal system comprises a toy railroad track T and a trackside block signal S. The indications of signal S are controlled by a selector or lever L which is preferably manually operated, lever L acting as a switch to energize one or another of a bank of differently colored signal lamps.

Considering the arrangement in greater detail, the trackside signal S comprises a downwardly flanged sheet metal base 12 above which is mounted a rectangular casing formed by metallic side

walls 14 at three sides and an insulation side wall 16 at the fourth side. The metallic side walls 14 are formed of a single piece of sheet metal bent to U shape when viewed in plan, and the insulation side wall 16 is held assembled with the metallic side walls by appropriate bent tongue connections 18. The casing is secured to base 12 also by tongue connections 20.

The casing is closed at the top by a cover plate 22 which is marginally flanged at 24, the flanges 24 coming outside the side walls of the casing. The signal standard further comprises a post 26 preferably formed by opposed sheet metal sides 28 and 30 which are oppositely convexed to form a hollow tubular post and which are provided near their lower ends with outwardly flaring wings 32 which extend to the edge of cover 22, as is best shown in Fig. 2. The post assembly 26 is secured to cover 22 by tongue and slot connections, these connections also serving to hold the halves of the post in edge to edge relation. Cover 22 is itself secured to the bottom casing by tongue and slot connections, and is similarly secured to a signal lamp support 34.

Support 34 is made up of a rearwardly flanged front wall 36, a forwardly flanged rear wall 38, and a side wall 40 made of a single piece of sheet metal bent to follow the contour of and to fit within the flanges of front and rear walls 36 and 38. The parts are secured together by appropriate tongue and slot connections some of which are indicated at 42. Front wall 36 is cut away to form three vertically aligned apertures in each of which a small threaded socket 44 is secured, the metal wall of the socket being grounded to the signal casing. As is usual, the inner end of the socket carries an insulation washer 46 through which a center contact or eyelet 48 passes.

Three such sockets are provided, these receiving a red signal lamp 50, a yellow or amber signal lamp 52, and a green signal lamp 54, the said lamps respectively indicating Danger, Caution, and Clear. The center contacts are separately connected by wires 56, 58, and 60 extending downwardly through post 26 to eyelets or switch contacts 62, 64, and 66. The switch contacts are adapted to be selectively engaged by a metallic switch arm 68 (Figs. 1 and 4) pivoted on eyelet 70 which is connected by a conductor 72 to a terminal 74 which is one of three terminals mounted on the base 12 of the signal. Terminal 74 is connected to a suitable source of energy, in this case the third rail 76 of the main or continuously energized track T. In such case a second terminal on the signal, terminal 78 which is grounded to the signal base, is connected to the outside rails 80 of the track, thereby completing the lamp circuit, as will be evident from inspection of the wiring diagram of Fig. 4. By moving switch lever 68 over contacts 62, 64, and 66, any one of the lamps may be energized with current taken from the track adjacent the signal.

The means for automatically controlling the operation of the train are next described. Referring to Fig. 4, a portion 82 of the third rail of the track is insulated from the remaining third rail 76, this being most simply accomplished by removing the conventional connection pins inserted in the ends of the track sections. This establishes a disconnected length of track or control zone. In Fig. 4, the control zone has been shown short in length, but in practice it is preferably made a number of track sections in length, say three to five sections, the length being selected to insure stoppage of the train before it reaches the

signal, the signal being placed so as to face the direction of traffic and at the remote end of the control zone. Only the connection pins at the ends of the control zone are removed, the control zone itself acting as a continuous connected section. The pins of the outside or service rails 80 need not be removed, and a continuous return or ground is provided thereby.

The third rail 82 of the control zone is connected to a terminal 84 mounted on signal base 12, and this terminal is connected to a contact 86 mounted diametrically opposite contact 66. No switch contact is provided diametrically opposite the contact 62, or, if a switch contact be provided, it is left unconnected. It will be evident that when the selector or control lever L is moved over contact 66, thus indicating green or Clear, energy is supplied from a suitable source, in this case and most conveniently the third rail 76, to the third rail 82 of the control zone, thus permitting the train to run past the signal. On the other hand, when the control lever is swung to engage contact 62, thereby indicating red or Danger, the third rail 82 is disconnected from third rail 76 and the control zone is deenergized, thereby preventing movement of the train past the signal.

Another contact 88 is provided opposite contact 64. This contact is connected by a member 90 to a resistor 92 the opposite end of which is connected to terminal 84 and thence to the control zone. It will be apparent that when the selector is moved to engage contact 64, thereby energizing the amber or Caution signal, the control zone is energized but at reduced potential, thus permitting the train to proceed but only at slow speed.

In order to permit adjustment of the speed produced in response to the Caution signal, the resistor 92 is preferably made variable. Referring to Figs. 1 through 3, it will be seen that the connector 90 between contact 88 and the resistor is itself a control arm pivoted at contact 88 and movable at its lower end along the resistor 92. The free end of member 90 is bent outwardly through an arcuate slot 94 cut through the insulation plate 16, and acts as a finger piece or handle 96 by means of which the effective length of resistor 92 may be varied. This is desirable because the speed of a toy train depends largely on the load attached to the locomotive, that is, upon the length of the train of cars coupled thereto.

As so far described, the end 98 of resistor 92 may be left free or disconnected, and such an arrangement is shown in Fig. 5. However, in order to prevent undesired reversal of the direction of operation of a remotely controlled reversing locomotive operating in accordance with the system disclosed in copending application of Edward E. McKeige, Serial No. 56,885, previously referred to, it is desirable to substantially, but not wholly, deenergize the control zone for the Stop or Danger indication. This result is obtained by connecting the control zone 82 to the source of energy 76 through a resistor which reduces the track potential to a minimum or holding potential, instead of completely cutting-off the same. In the present case the resistor 92 is itself employed for this purpose, and a conductor 100 is connected from the pivot 70 of the switch lever to the free end 98 of the resistor.

In one aspect, it may be said that the control zone is connected through a resistor 92 but that a part of resistor 92 is bypassed when Caution is indicated, and all of the resistor is bypassed when

Clear is indicated. The amount that is bypassed when Caution is indicated is variable by means of the movable arm 90.

The selector or control lever L is preferably made of a strip of insulation. Its movement is limited by stops 102 and 104, (Figs. 1 and 2) these stops being extensions of the side walls 14. The switch lever 68 previously referred to comprises a strip of metal secured at the outside of insulation lever L, the ends of the strip of metal being bent through slots in the insulation and then turned inwardly to form contact plates 106 which ride over the various contacts on insulation side wall 16.

It is believed that the construction and operation as well as the many advantages of my improved block signal system, will be apparent from the foregoing detailed description thereof. The signal is set to a desired indication. When set to Danger, a red lamp is lighted, and the control zone is substantially deenergized, thereby bringing a train approaching the signal to a stop. If the signal is set to indicate Caution, an amber lamp is lighted, and the speed of the train is reduced as it passes over the control zone. If the signal is set to indicate Clear, a green lamp is lighted and the train passes the block signal at full speed. After a train has been stopped in the control zone by the Danger signal, the selector or control lever on the signal may be shifted to Caution, thus permitting the train to proceed slowly. The train speed resulting from a Caution indication may itself be adjusted.

The control zone may be substantially, rather than wholly, deenergized when the signal is applied to a remotely controlled reversing train requiring the use of a small holding current. This refinement is, of course, unnecessary when dealing with ordinary toy trains.

In the specific form illustrated, the selector is moved under manual control, as I believe this is preferable if the child has only a single train.

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. A block signal system for electrically operated toy railroads, comprising a track having an insulated third rail, a section of said third rail being insulated from the remainder of the third rail and forming a control zone, a block signal alongside the track, signal means thereon indicating Clear, Caution, and Danger, respectively, electric wiring connecting the control zone to the signal, a resistor in said signal permanently connected in series between the third rail of the insulated control zone and source of energy, a shiftable selector, switch means moved by said selector for bypassing the resistor when Clear is indicated, and for bypassing a part only of said resistor when Caution is indicated, and an adjustable control member for varying the amount of the resistor that is by-passed when Caution is indicated.

2. A block signal system for electrically operated toy railroads, comprising a track having an insulated third rail, a section of said third rail being insulated from the remainder of the third rail and forming a control zone, a block signal alongside the track, green, amber and red signal lamps thereon indicating Clear, Caution and Danger, respectively, electric wiring connecting

the control zone to the signal, a resistor in said signal permanently connected in series between the third rail of the insulated control zone and source of energy, a shiftable selector, and switch means moved by said selector for selectively energizing either the red, amber, or green lamp, and for bypassing the resistor when Clear is indicated, and for bypassing a part only of said resistor when Caution is indicated, a small holding potential being supplied through the resistor to the control zone when Danger is indicated.

3. A block signal system for electrically operated toy railroads, comprising a track having an insulated third rail, a section of said third rail being insulated from the remainder of the third rail and forming a control zone, a block signal alongside the track, three signal lamps thereon colored red, amber, and green, respectively, electric wiring connecting the track and the control zone to the signal, a resistor in said signal permanently connected in series between the main third rail and the third rail of the insulated control zone, a shiftable selector, and switch means moved by said selector for selectively energizing either the red, amber, or green lamp, and for bypassing the resistor when the green lamp is lighted, and for bypassing a part only of said resistor when the amber lamp is lighted, a small holding potential being supplied through the resistor to the control zone when Danger is indicated.

4. A block signal system for electrically operated toy railroads, comprising a track having an insulated third rail, a section of said third rail being insulated from the remainder of the third rail and forming a control zone, a block signal alongside the track, three signal lamps thereon colored red, amber, and green, respectively, electric wiring connecting the control zone to the signal, a resistor in said signal permanently connected in series between the third rail of the insulated control zone and a source of energy, a shiftable selector, switch means moved by said selector for selectively energizing either the red, amber, or green lamp, and for bypassing the resistor when the green lamp is lighted, and for bypassing a part only of said resistor when the amber lamp is lighted, the resistor not being bypassed when the red lamp is lighted, and an adjustable control member for varying the amount of the resistor that is bypassed when the amber lamp is lighted.

5. A block signal system for electrically operated toy railroads, comprising a track having an insulated third rail, a section of said third rail being insulated from the remainder of the third rail and forming a control zone, a block signal alongside the track, three signal lamps thereon colored red, amber, and green, respectively, electric wiring connecting the track and the control zone to the signal, a resistor in said signal permanently connected in series between the main third rail and the third rail of the insulated control zone, a shiftable selector, switch means moved by said selector for selectively energizing either the red, amber, or green lamp, and for bypassing the resistor when the green lamp is lighted, and for bypassing a part only of said resistor when the amber lamp is lighted, the resistor not being bypassed when the red lamp is lighted, and an adjustable control member for varying the amount of the resistor that is bypassed when the amber lamp is lighted.

6. A block signal for electrically operated toy railroads, said signal comprising a generally upright support, three lamp sockets near the top of

said support whereby three differently colored signal lamps may be mounted on said support, an oscillatable switch arm pivoted near the bottom of said support and extending on opposite sides of said pivot, three binding posts on said support, means connecting the switch arm to one of said binding posts, three spaced contacts on one side of the pivot of said switch arm and adapted for selective engagement by the switch arm, one of said contacts being connected to each of the aforesaid lamp sockets, the opposite terminals of said lamp sockets being connected in common to another of the binding posts, two contacts on the opposite side of the switch pivot and adapted for selective engagement by the switch arm, one of said contacts being connected to the third binding post and the other of said contacts being connected to a resistor and thence through the resistor to the third binding post.

7. A block signal for electrically operated toy railroads, said signal comprising a generally upright support, three differently colored signal lamps mounted on said support, an oscillatable switch arm mounted on said support, three binding posts on said support, means connecting the switch arm to one of said binding posts, three spaced contacts adapted for selective engagement by the switch arm, one of said contacts being connected to each of the aforesaid lamps, the opposite terminals of said lamps being connected in common to another of the binding posts, two additional contacts adapted for selective engagement by the switch arm, one of said contacts being connected to the third binding post, a track voltage reducing resistor having one end connected to said last named contact and to the third binding post, and means to connect the other of said two additional contacts to the resistor and to vary said resistor, said means including a contact arm having one end pivotally mounted on the last mentioned contact and having the other end slidable over the surface of the resistor.

8. A block signal for electrically operated toy railroads, said signal comprising a base, a pedestal mounted on said base, one side of said pedestal being made of a sheet of insulating material, an upright support mounted on said pedestal, three differently colored signal lamps on said support, a switch arm pivotally mounted on the insulation plate with the handle of said switch arm projecting beyond said plate, three binding posts mounted on said signal, means connecting the switch arm to one of the binding posts, three spaced contacts mounted on said insulation plate for contact by said switch arm, one of said contacts being connected to each of the signal lamps, the opposite terminals of the signal lamps being connected in common to another of the binding posts, a resistor mounted within said pedestal, two additional contacts disposed for contact by the switch arm, one of said contacts being connected to one end of the resistor and to the third binding post, the other of said contacts being connected to the aforesaid resistor by means of a movable contact arm having one end connected to the contact and having its other end slidable on the resistor, a part of said contact arm projecting outside the pedestal for manual adjustment.

9. A block signal for electrically operated toy railroads, said signal comprising a base, a pedestal mounted on said base, one side of said pedestal being made of a sheet of insulating material, an upright support mounted at the top of said pedes-

tal, three differently colored signal lamps on said support, a switch arm pivotally mounted on the insulation plate with the handle of said switch arm projecting beyond said plate, three binding posts mounted on said signal, means connecting the switch arm to one of the binding posts, three spaced contacts mounted on said insulation plate above the fulcrum of said switch arm and adapted for selective engagement by the switch arm, one of said contacts being connected to each of the signal lamps, the opposite terminals of the signal lamps being connected in common to another of the binding posts, a resistor mounted within said pedestal, two contacts disposed beneath the fulcrum of the switch arm and adapted for selective engagement by the switch arm, one of said contacts being connected to one end of the resistor and to the third binding post, the other of said contacts being connected to the aforesaid resistor by means of a movable contact arm having one end pivoted on the contact and having its other end slidable on the resistor, a part of said contact arm projecting outside the pedestal for manual adjustment.

10. A block signal for electrically operated toy railroads, said signal comprising a base, a pedestal mounted on said base, one side of said pedestal being made of a sheet of insulating material, an upright support mounted on said pedestal, three differently colored signal lamps on said support, a switch arm pivotally mounted on the insulation plate with the handle of said switch arm projecting beyond the plate, three binding posts mounted on said signal, means connecting the switch arm to one of the binding posts, three spaced contacts mounted on said insulation plate for contact by said switch arm, one of said contacts being connected to each of the signal lamps, the opposite terminals of the signal lamps being connected in common to another of the binding posts, a resistor mounted within said pedestal, two additional contacts disposed for contact by the switch arm, one of said contacts being connected to one end of the resistor and to the third binding post, the other of said contacts being connected to the aforesaid resistor by means of a movable contact arm having one end connected to the contact and having its other end slidable on the resistor, a part of said contact arm projecting outside the pedestal for manual adjustment, the opposite end of said resistor being connected to the switch arm and to the first named binding post.

11. A block signal and train control device for electrically operated toy railroads, said signal comprising a generally upright support, three lamp sockets near the top of said support, whereby three differently colored signal lamps may be mounted on said support, a movable switch element, three binding posts on said support, means connecting the switch element to one of said binding posts, three spaced signal contacts adapted for selective engagement by the switch element, one of said contacts being connected to each of the aforesaid lamp sockets, the opposite terminals of said lamp sockets being connected in common to another of the binding posts, two additional train control contacts adapted for selective engagement by the movable switch element, one of said contacts being connected to the third binding post, and the other of said contacts being connected to a resistor and thence through the resistor to the third binding post and manually movable means to vary the resistance value of the resistor, said signal and train con-

trol contacts being arranged for simultaneous and appropriately related selection upon movement of the switch element.

5 12. A block signal and train control device for an electrically operated toy railroad including service rails and a third rail having an insulated control section, said signal comprising a generally upright support, three lamp sockets near the top of said support, whereby three differently colored  
10 signal lamps may be mounted on said support, a movable switch element, means connecting the switch element to the third rail, three spaced contacts adapted for selective engagement by the switch element, one of said contacts being connected to each of the aforesaid lamp sockets, the  
15 opposite terminals of said lamp sockets being connected in common to the service rails, two additional contacts adapted for selective engagement by the movable switch element, one of said contacts being connected to the control section, and  
20 the other of said contacts being connected to a resistor and thence through the resistor to the control section, and manually movable means to vary the resistance value of the resistor, said signal and train control contacts being arranged for  
25 simultaneous and appropriately related selection upon movement of the switch element.

13. A block signal and train control device for electrically operated toy railroads, said signal  
30 comprising an upright support, three differently colored signal lamps on said support, a movably mounted selector, three binding posts mounted on said signal, means connecting the selector to one of said binding posts, three spaced contacts arranged for selective contact by said selector, one  
35 of said contacts being connected to each of the signal lamps, the opposite terminals of the signal

lamps being connected in common to another of the binding posts, a resistor mounted within said pedestal, two additional contacts disposed for selective contact by the selector, one of said contacts being connected to one end of the resistor  
5 and to the third binding post, the other of said contacts being connected to the aforesaid resistor by means of a manually adjustable contact arm having one end connected to the contact  
10 and having its other end slidable on the resistor, the opposite end of said resistor being connected to the selector and to the first-named binding post.

14. A block signal and train control device for an electrically operated toy railroad including  
15 service rails and a third rail with an insulated control section, said signal comprising an upright support, three differently colored signal lamps on said support, a movably mounted selector, means connecting the selector to the third rail, three  
20 spaced contacts arranged for selective contact by said selector, one of said contacts being connected to each of the signal lamps, the opposite terminals of the signal lamps being connected in common to the service rails, a resistor mounted  
25 within said pedestal, two additional contacts disposed for selective contact by the selector, one of said contacts being connected to one end of the resistor and to the control section, the other of said contacts being connected to the aforesaid  
30 resistor by means of a manually adjustable contact arm having one end connected to the contact and having its other end slidable on the resistor, the opposite end of said resistor being connected to the selector and to the third rail.  
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