Oct. 26, 1937. M. R. HALL 2,096,894

TOY RAILWAY

Filed March 7, 1934 2 Sheets-Sheet 1

Fig. 1.

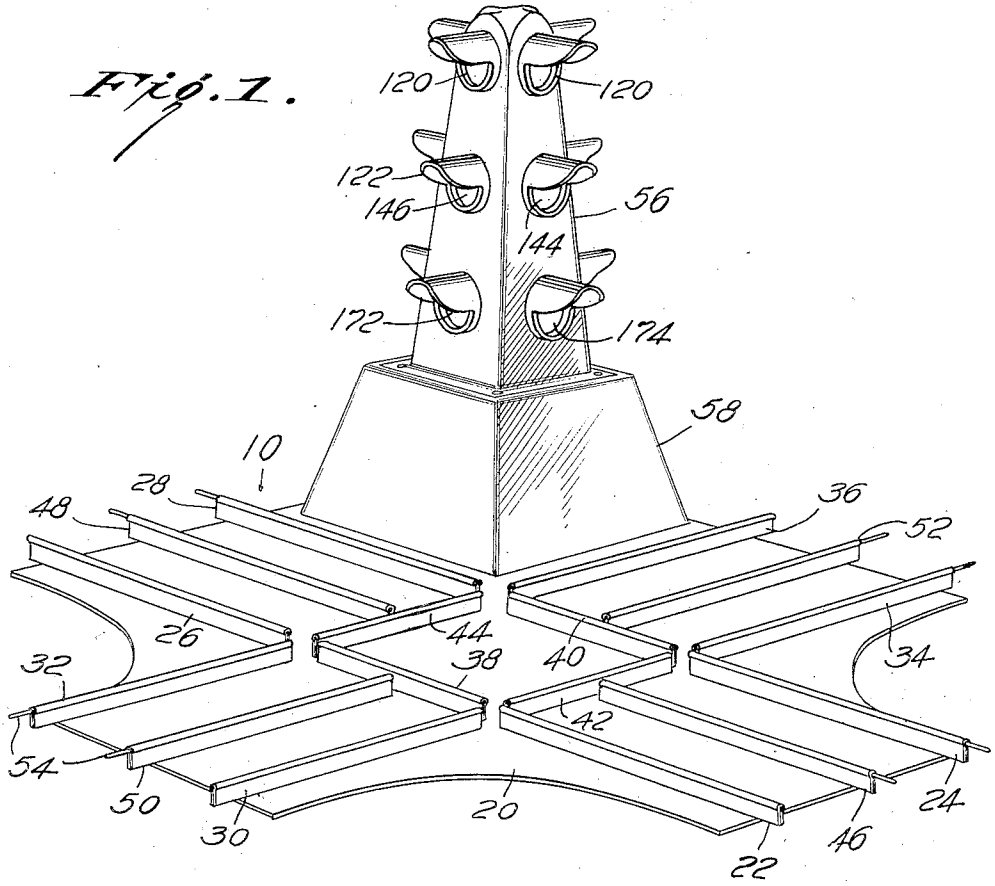
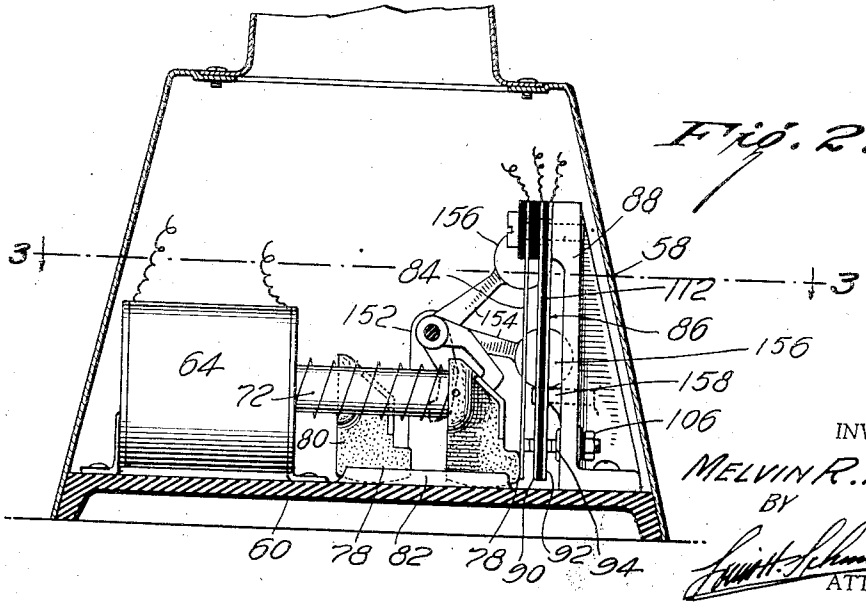


Fig. 2.



INVENTOR.
MELVIN R. HALL,
BY
ATTORNEY.

Oct. 26, 1937. M. R. HALL 2,096,894

TOY RAILWAY

Filed March 7, 1934 2 Sheets-Sheet 2

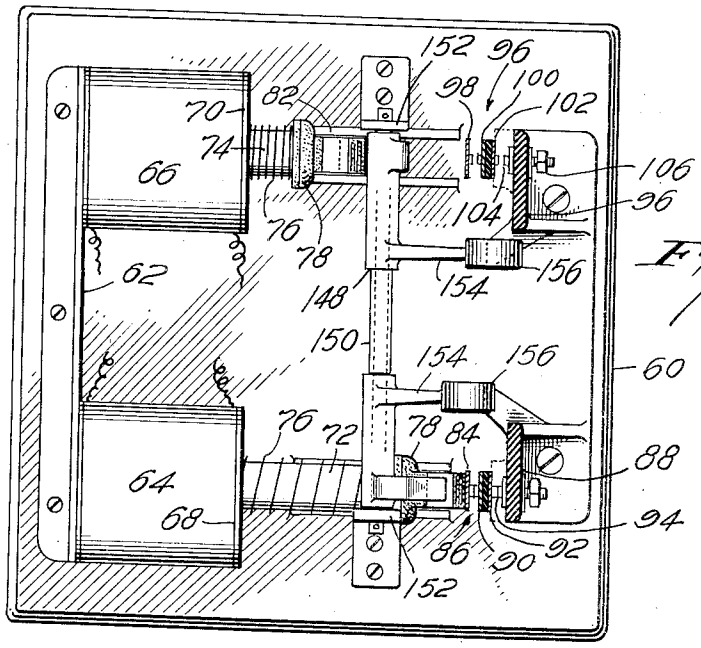


Fig. 3.

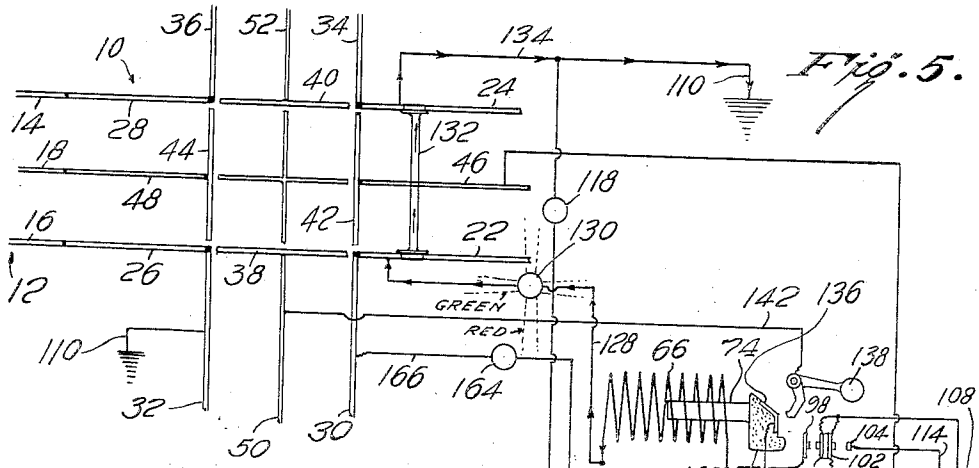
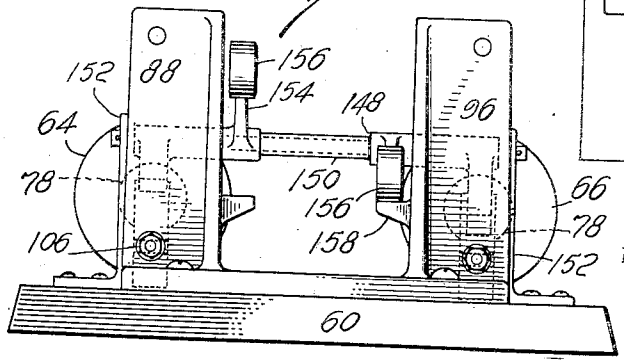


Fig. 5.

Fig. 4.



INVENTOR.
MELVIN R. HALL,
BY
ATTORNEY.

Patented Oct. 26, 1937 2,096,894

UNITED STATES PATENT OFFICE

2,096,894

TOY RAILWAY

Melvin R. Hall, Atlantic City, N. J.

Application March 7, 1934, Serial No. 714,399

7 Claims. (Cl. 246—115)

This invention relates to toy railways.

The invention is intended for specific application to toy electric railways, and especially where the tracks may be arranged to provide a crossover, and on which are operated simultaneously more than one train. As a result of such operation, two trains may simultaneously arrive at a meeting point, such, for instance, as a crossover. Unless properly controlled, one train may be moving across the crossover when another train will be propelled onto that crossover. Possible damage from the ensuing crash, as well as disruption of operation, would follow.

It is an object of the invention to control automatically the movement of such trains for preventing such interference between two trains upon the same section of track at the same time, as, for instance, to prevent one train from operating upon a crossover when upon that crossover there is present another train. In the case of a crossover or similar track section, it is insulated from the other sections of track comprising the railroad. Conductors leading away from the crossover are connected to a proper central point. Such conductors may take part in effecting control of the power input for each of the several track elements of that crossover. Thus, when one train enters upon a certain track section of the crossover, automatically the other section or sections are deenergized. Such a train may then, in assured safety, continue onto, and then travel beyond, the crossover, no other train being capable of moving, under its own power, onto the crossover at that time.

Apparatus embodying certain details of the invention has been designed for operation upon that type of toy railroad in which remotely controlled locomotives are intended to be operated. In certain of such types, cutting off power for a particular locomotive causes a relay to re-set a switch in that locomotive so that thereafter, when power is again supplied to the locomotive, it will operate in a direction the reverse of that which it followed in the first instance. Where it is preferred that such locomotive should move progressively in the same direction, as in the case of perfect simulation of operation at a railroad crossover, it is an object of the invention so to operate means in conjunction with such crossover that, even with such remotely controlled apparatus, the locomotive will be caused to continue in the same, rather than in a reverse, direction.

It is an object of the invention to provide, for assembly with toy railroads of the character indicated, a crossover which, within itself, constitutes a unitary structure, capable, merely by a simple act of assembly with the ordinary trackage of such system, to function, and requiring no technical ability on the part of the user for such assembly or its subsequent operation. For such purpose, such crossover may include, in itself, all mechanism and electrical elements requisite for properly operating trains at the crossover. Such an apparatus may include, for instance, a signal-tower, simulating a properly controlled railroad. In such case, the signal-tower may carry certain signalling devices, cooperating with the crossover controls, which will indicate properly whether the tracks are clear, or which of the tracks are not passable, at a particular point in the operation of the apparatus. Such tower may function as a casing for the different mechanism and elements of the control apparatus.

Other objects of this invention will hereinafter be set forth, or will be apparent from the description and the drawings, in which is illustrated an embodiment of apparatus for carrying out the invention.

The invention, however, is not intended to be restricted to any particular construction or arrangement of parts, or to any particular application of such construction, or to any specific manner of use, or to any of various details thereof, herein shown and described, as the same may be modified in various particulars or be applied in many varied relations without departing from the spirit and scope of the claimed invention, the practical embodiment herein illustrated and described merely being one of various forms and modifications in which the invention might be embodied.

On the drawings, in which the same reference characters refer to the same parts throughout, and in which is disclosed such embodiment:

Fig. 1 is a perspective view of an embodiment of the invention, specifically a unitary crossover and signal tower;

Fig. 2 is a vertical cross-sectional view, transversely through the signal tower, and here showing only the base of the tower, certain of the parts being in elevation;

Fig. 3 is a plan view of the apparatus shown in Fig. 2, appearing as if the casing were removed from the base, and parts appearing in section;

Fig. 4 is an elevational view of the apparatus shown in Fig. 3, as it appears from the right side thereof; and

Fig. 5 is a wiring diagram for the apparatus.

In the apparatus on the drawings, the invention has been shown embodied in the form of a crossover 10 intended for association with a trackage system 12, the latter being capable of taking any form desired, according to the whim of the user. In such a system, two wheel-carrying rails 14 and 16 are provided together with a third rail 18, from which, by means of a roller, the locomotive (not shown) takes its power, to be returned to a suitable ground through either or both of rails 14 and 16. The crossover here shown is in the form of a unit, mounted upon a base plate 20 of insulating material. Upon such plate may be mounted wheel-carrying rails 22 and 24, 26 and 28, 30 and 32, 34 and 36. Rails 22 and 24 are aligned, respectively, with rails 26 and 28, but are broken at the points at which otherwise they would intersect with rails 30 and 32, and rails 34 and 36. Rails 30 and 32 likewise are aligned with rails 34 and 36, but are broken in the same manner as the other rails. Rail sections 38, 40, 42, and 44 may, if desired, be of insulating material so that no current may pass from them to associated rails or rail sections. However, the sections and the rails are positioned in close enough association so that the wheels of a train, as they pass from rail to section, and so forth, will not, in any way be in danger of derailment.

In association with rails 22, and so forth, are provided third rail sections 46, 48, 50 and 52. Preferably, no current-carrying third rail sections are associated with sections 38, 40, 42, and 44, as momentum may be depended upon for propulsion of locomotives over such crossovers. In this manner, there is associated a number of track sections and third rail sections, preferably all insulated from each other. Also, by the manner of association of the crossover with the other track sections, there is comprised a unit arrangement for such a trackage system with which it is simply united in the manner of any other section, by means of extending pins 54, which may be of insulating material for the purposes of insulating the crossover from the rest of the system. The insulation between the crossover and the other rail sections may, if desired, be constituted in any other preferred manner.

Either as an integral part of plate 20, or, if desired, as a separate unit, there may be provided a signal-tower 56, including a housing 58, base 60 of which may be of insulating material. In spaced apart relationship upon such base, by means of a bracket 62, are supported a pair of solenoids 64 and 66. The front ends of these solenoids may be provided with supporting guideway plates 68 and 70, through which pass, respectively, cores 72 and 74, for the solenoids. Springs 76 are positioned upon each core and are engaged between the respective guideway plate and an enlarged head 78 upon the core, tending normally to propel the core out of the solenoid. The head may be of insulating material, here shown as taking the form of a depending foot 80. Such foot may be received in and cooperate with guides 82, formed or otherwise provided in base 60.

When the core is projected by the action of its spring, its head is brought into contact with a prong of a jack. In the case of core 72, it is prong 84 of jack 86. A suitably insulated supporting bracket 88 may be provided for the jack, which here is shown to include the prongs 84, 90, and 92, and a terminal post 94. Jack 96, similarly supported and constructed, for cooperation with the other core 74 has prongs 98, 100, and 102, and a terminal post 104. Terminal posts 94 and 104 may be carried by respective brackets 88, and may take the form of set-screws 106, permitting adjustment to vary the tensional relationships of the several prongs, and being capable of being locked in that position.

Considering the circuit of the apparatus, power is derived from any usual source, such as the transformer generally utilized in connection with such toy railways. Here such power source is indicated by two leads 108 and 110. When no train is carried by the crossover, both cores will have been propelled against their respective jacks, closing the prongs together, as will be further discussed. Also, third rail sections 46, 48, 50, and 52 all will be energized. Also, the circuits for the solenoids will be broken as will appear further.

However, lead 108 is connected to both prongs 100 and 102, which are separated by a flexible insulating member 112. Prong 102, by the pressure of the core, is in contact with terminal post 104, which, by a lead 114, is connected to terminal post 94. Against terminal post 94, by the pressure of its core, is brought prong 92, which, through a lead 116, is connected to signal-light 118. From this light the circuit may be completed through a proper ground, as, for instance, by lead 110. Signal-light 118 may be the top light of tower 56, which may extend from housing 58 to be provided with suitable directive openings. Each of the signal-lights may have openings such as openings 120; in the case of signal-light 118, these openings are directed in four directions. The openings may have coloring screens; in the case of light 118, the screens may be made effective to direct green light in all directions, thus to indicate all tracks to be clear. The shades 122 for the signal light are here made to simulate the shades in customary railway practice, and may be made in any desired manner.

Now, considering that a train has moved onto the crossover wheel-carrying rails 22 and 24, a circuit will now be completed in the following manner. From lead 108, power will pass through a lead 124 to prong 90. Since prong 90, by the action of its core spring, is in contact with prong 84, current is, therefore, transmitted through a lead 126, to the winding of solenoid 66. Then, by a lead 128, connected to signal-light 130, it is conducted to rail 22, across axle 132 bridging the rails, to rail 24, then through lead 134 to lead 110, and the ground.

When this circuit is completed, core 74 of solenoid 66 is retracted, breaking the electric connection between a contact 136 carried by head 80 of core 74 and a pivoted arm 138, breaking the circuit of third rail 50, normally traced from lead 108, through lead 140, contact 136, arm 138, lead 142, rail 50, the locomotive, and either of the wheel-carrying rails to the ground. Now, if any train should enter the section of the crossover defined by rails 30 and 32, it would be unable to proceed further. Signal-light 130 in the tower, through suitably arranged openings 144 and 146, directs signals along the tracks, openings 144 directing a green light along the track including rails 22 and 24, and openings 146, a red light along the track defined by rails 30 and 32. At the same time, since core 74 has been retracted, the electrical connection between prong 102 and terminal post 104 will be broken, thus extinguish-

ing signal-light 118. This condition will continue until the last truck of the train has passed over rails 22 and 24, whereupon solenoid 66 will be deenergized, its spring will drive its core out of the solenoid, and contact will be established between contact 136 and arm 138, prongs 98 and 100, and prong 102, and terminal post 104.

On the instant of such energization, the circuit is completed from lead 108, as above described, to third rail 50. Immediately the locomotive becomes energized, and its motor operates. In the case of locomotives having reversing mechanism caused to operate by any such shut-down, the entrance of the locomotive into the deenergized area will have caused the reversing mechanism to operate. However, by reason of its presence in that deenergized area, such reversed operation will not ensue, until contact 136 and arm 138 engage. Then, for an instant, the reversed motor will be energized. But the inertia impact between arm 138 and its head 78 is sufficient to cause that arm to fly away from head, thus again breaking the circuit connection between the contact and the arm, and causing another reversal of the reversing mechanism.

The arm is formed in the manner of a bell-crank, having a bearing portion 148 mounted upon a spindle 150 which in turn is carried in suitable bearing brackets 152. Extending from each bearing is an arm 154, carrying a weight 156 at its end. Thus, when the inertia impact has caused arm 138 to leave contact 136, sufficient inertia will be imparted to weight 156 so that it will continue its rise. However, the apparatus is balanced in a manner such that the inertia will not be sufficient to throw the weight completely around, or suitable stops may be arranged to prevent any such result. When the weight has reached the limit of its movement, it will return arm 138 into contact with contact 136, thus again reconstituting the circuit, and almost instantaneously causing the locomotive to move forwardly. Brackets 88 may be provided with seats 158 to act as stops and rests for weights 156 when the cores are retracted by their respective solenoids.

When, on the other hand, a train proceeds into the area defined by rails 30 and 32, before one arrives in the area defined by rails 22 and 24, a circuit is completed from lead 108, through prongs 100 and 98, lead 160, solenoid 64, lead 162, signal-light 164, lead 166, rail 30, the axle of the truck, rail 32, to lead 110, or a suitable ground. Now core 72 is retracted, breaking the circuit between post 94 and prong 92, and thus extinguishing signal-light 118, whereas signal-light 130 has been extinguished at the time the circuit of solenoid 66 was broken. Also, the circuit between arm 168 and contact 170 associated with core 72 is broken, deenergizing third rail 46.

Signal-light 164 operates reversely of signal light 130, indicating, through its openings 172 and 174, the track to be clear along rails 30 and 32, but in danger along rails 22 and 24. In the same manner, the train then operates across the crossing from rails 30 and 32 until the last car has passed, when the circuit of solenoid 64 is broken, and the apparatus permitted to return to its normal position in which signal-light 118 will be made operative, and the other two extinguished. The trains will have sufficient momentum, in passing from the different sections defined by rails 22 and 24, and by rails 30 and 32, to pass over the unenergized sections 38, 40, 42, and 44.

Many other changes could be effected in the particular apparatus designed, and in the methods of operation and use set forth, and in specific details thereof, without substantially departing from the invention intended to be defined in the claims, the specific description herein being of an illustrative operative embodiment capable of carrying out the spirit of the invention.

What is claimed as new and useful is:—

1. In a toy electric railroad system, comprising a plurality of rails defining a track system, the rails being disposed to intersect so that trains passing along one pair of rails will interfere with movement along another intersecting pair of rails, said train including an electric locomotive of the remote-control reversible type, and means at the intersection for automatically deenergizing certain of the trains to prevent movement of trains along more than one of the pairs of rails at the intersection at any one time, the deenergizing means, on completion of movement of a train over the intersection, along one pair of rails, energizing a train on another pair of rails for movement over the intersection, the last energization being effected by twice in rapid succession closing the electric circuit for the train to be energized.

2. In a toy electric railroad system, comprising a plurality of rails defining a track system, the rails being disposed to intersect, the rails at the intersection forming a crossover so that trains passing along one pair of rails will interfere with passage of trains along other rails of the crossover; and means made effective by the presence of a train on one of the pairs of rails for automatically deenergizing certain of the rails of the crossover to prevent movement of trains along more than one of the pairs of rails at the crossover at any one time, the means including a pair of solenoids, each of which has a movable core, means normally to project the cores from the solenoids, the solenoids acting to withdraw the cores, a switch associated with each core and normally closed by the projection of the core, and a signal-light placed in circuit by the projection of both cores.

3. In a toy electric railroad system, comprising a plurality of rails defining a track system, the rails being disposed to intersect, the rails at the intersection forming a crossover so that trains passing along one pair of rails will interfere with passage of trains along other rails of the crossover, each pair of rails on the crossover having an individual energizing circuit for trains passing over such pair of rails; and means to deenergize the circuits of all other rails when a train is moving along one of the pairs of rails, the means including a solenoid associated with each of the energizing circuits, each solenoid having a core, means normally to project the core from the solenoid, the solenoid acting to withdraw the core, a switch associated with each core and adapted to be closed when the core is projected, a signal-light to indicate the projection of all cores, a contact carried by each core, and a pivoted arm for making electrical connection with the contact, arm and contact forming a part of an energizing circuit other than that with which the solenoid is associated.

4. In a toy electric railroad system, comprising a plurality of rails defining a track system, the rails being disposed to intersect, the rails at the intersection forming a crossover so that trains passing along one pair of rails will interfere with passage of trains along other rails of the crossover, each pair of rails on the crossover having

an individual energizing circuit for trains passing over such pair of rails, and means to deenergize all other circuits when a train is moving along one of the pairs of rails at the crossover to prevent movement of trains along more than one of the pairs of rails at the crossover at any one time, the deenergizing means including a pair of monitor circuits, the spaced apart rails of a pair constituting a break in one of the monitor circuits, so that the passage of a train will complete the particular monitor circuit associated with a particular pair of rails, and means associated with each monitor circuit for breaking the energizing circuit of other rails.

5. In a toy electric railroad system, comprising a plurality of rails defining a track system, the rails being disposed to intersect, the rails at the intersection forming a crossover so that trains passing along pairs of rails will interfere with passage of trains along other rails of the crossover, each pair of rails on the crossover having an individual energizing circuit for trains passing over such pair of rails, and means to deenergize all other circuits when a train is moving along one of the pairs of rails at the crossover to prevent movement of trains along more than one of the pairs of rails at the crossover at any one time, the deenergizing means including a pair of monitor circuits, the spaced apart rails of a pair constituting a break in one of the monitor circuits, so that the passage of a train will complete the particular monitor circuit associated with a particular pair of rails, means associated with each monitor circuit for breaking the energizing circuit of other rails, and means in each monitor circuit for signalling the availability of the sections of the track system for the passage of a train.

6. In a toy electric railroad system, including an electric locomotive of the remote-control reversible type, comprising a plurality of rails defining a track system, the rails being disposed to form a junction, and deenergizing means automatically effective upon the advent of one train upon the junction to prevent movement of trains along more than one of the pairs of rails to the junction at any one time, the deenergizing means including solenoids each of which has a movable core, means normally to project the core from the solenoid, the solenoid acting to withdraw the core, a contact carried by each core, and a pivoted contact arm for making electrical connection with the contact, the arm being weighted so that, on propulsion of the core by the projecting means, the arm will make connection with the contact, be thrown clear of the contact, and then fall into electrical connection with the contact, each arm and contact forming part of energizing means for movement of a train along one pair of rails.

7. In a toy electric railroad system, comprising a plurality of rails defining sections of a continuous track system, the rails being disposed to intersect, the rails at the intersection forming a crossover so that the trains passing along one pair of rails will interfere with passage of trains along other rails of said crossover, and deenergizing means automatically made effective upon the advent of a train upon a section to prevent movement of more than one train onto the same track section at any one time, said means comprising solenoids, each associated with a section, each of the solenoids having a movable core, means normally projecting the core from the solenoid, the solenoid acting to withdraw the core, a switch associated with each core and closed when the core is projected, a signal-light energized by the projection of all the cores, and individual signal-lights energized on the retraction of the individual cores.

MELVIN R. HALL.