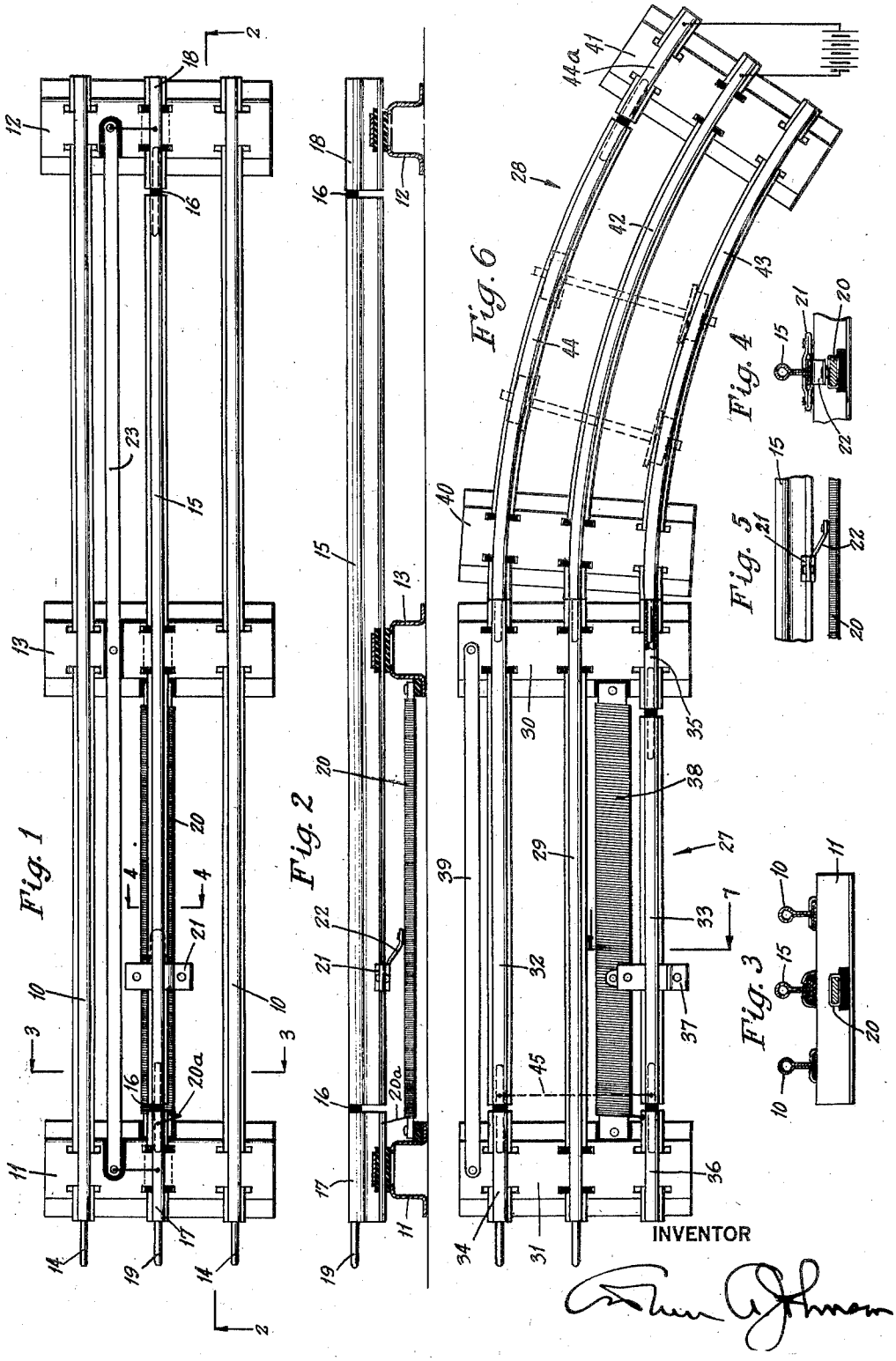
Jan. 16, 1940. A. A. JOHNSON 2,187,424

TOY RAILWAY SYSTEM

Filed Nov. 24, 1936 2 Sheets-Sheet 1



Jan. 16, 1940. A. A. JOHNSON 2,187,424

TOY RAILWAY SYSTEM

Filed Nov. 24, 1936 2 Sheets-Sheet 2

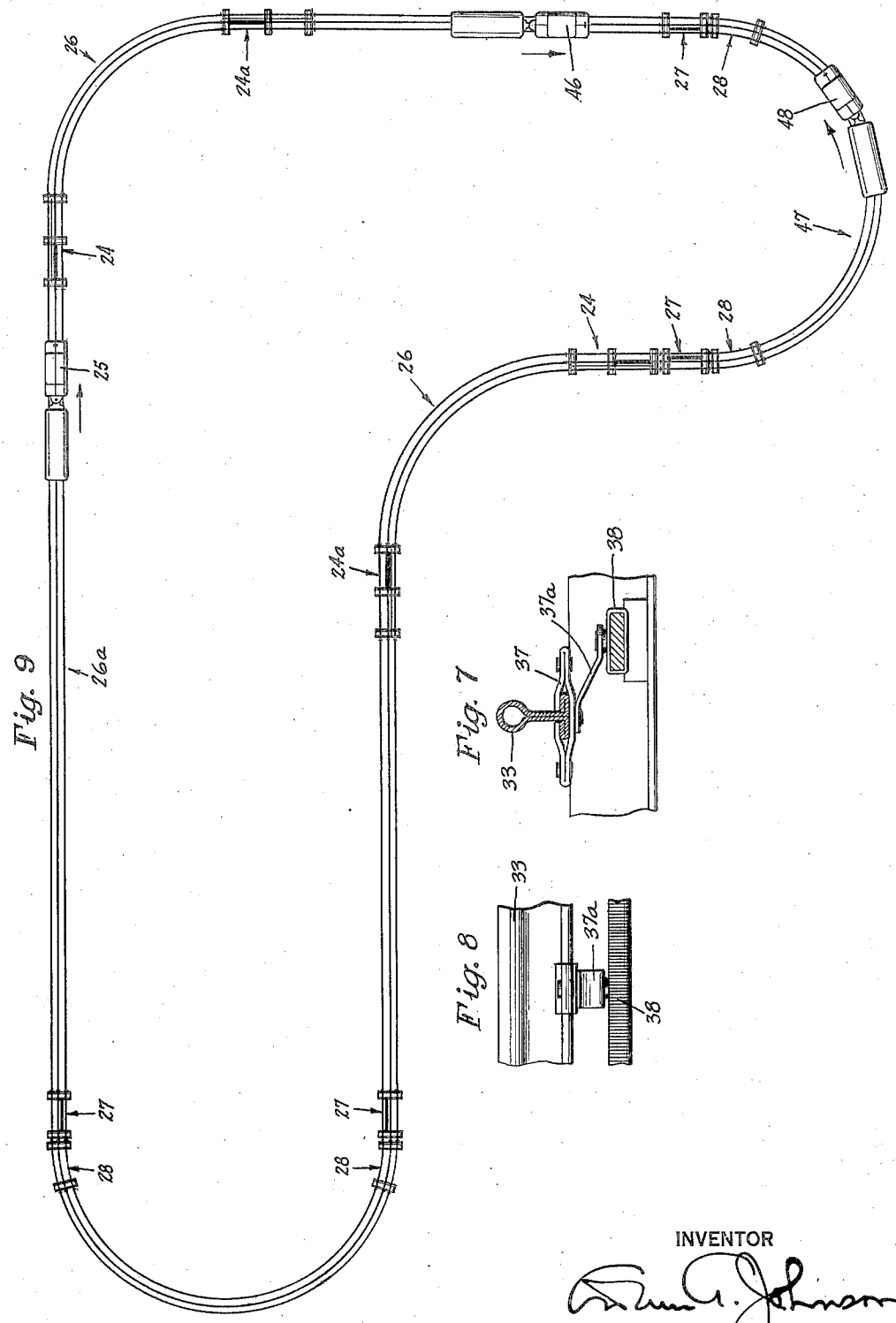


Fig. 9

Fig. 7

Fig. 8

INVENTOR

Arthur A. Johnson

Patented Jan. 16, 1940 2,187,424

UNITED STATES PATENT OFFICE

2,187,424

TOY RAILWAY SYSTEM

Arthur A. Johnson, Bridgeport, Conn.

Application November 24, 1936, Serial No. 112,473

7 Claims. (Cl. 246—31)

This invention relates to toy railroad systems and track units thereof.

In the operation of toy electric trains which traverse curved sections of track there occurs at times mishap and derailment due to excessive speed of the train when beginning the curve. Whereas a certain train speed along the straightaway might be safe, the same speed on a curved section would be excessive to such an extent that centrifugal force would cause derailment of the train. Various methods have been employed for preventing this derailment, a common one being the manual regulation of train speed by insertion of a rheostat or a current control device in the energy supply to the rails. However, this necessitated constant attention, since the speed of the train had to be reduced manually when a curved section of track was being approached, and the speed again stepped up after the danger of derailment had been passed.

According to the present invention the speed of a train is automatically reduced as it approaches a curve, so that the disadvantage of constant attention, as brought out above, is obviated, and yet high speed on the straightaways may be had.

The invention is carried out by providing a special section of track to be placed directly before a curve, which section has current-reducing means associated therewith so that the speed of the train is automatically reduced when traversing said section, and in the embodiments shown this section of track is provided with an adjustable resistor, and certain of the current-carrying rails are isolated from the track circuit and connected with said resistor so that only reduced current can be transmitted to the engine by said isolated rail or rails. One embodiment shows the center or third rail and another embodiment shows the two outer rails so isolated and connected.

If a current-limiting section of track, as provided by the invention, is inserted before a curve, it will cause deceleration of an approaching train before the curve is reached, and after the train is safely on the curve it will again receive full normal power so as to round the curve without undesirably slowing down or stalling.

If the train travels in a direction, so as to traverse the curve before meeting with the decelerating section of track, difficulty might be experienced in hauling a long train of cars around the curve as the engine enters the decelerating track section. Besides, slowing down at such times is not desired.

The present invention also provides means for obviating this difficulty which might exist for reverse travel of the train. In an embodiment shown this means comprises a pair of connected track sections, one of which is a decelerating section as above mentioned, the other being a cooperating section, such as that constituting the beginning of a curve. These sections are so constituted and organized that if the engine and cars traverse the curved section before traversing the decelerating section, the resistor of said latter section will be short-circuited and rendered inoperative so that no decelerating action will take place. This organization makes use of the short-circuiting effect of the train wheels to connect isolated outer rails in such a manner that such connection short-circuits the resistor of the decelerating rail section.

All the decelerating rail sections are preferably provided with adjustable means for varying the amount of resistance included in the circuit so that various conditions of train load, speed, and energy available can be considered in securing satisfactory operation.

In the broader aspects of the invention, the section of the track having a resistance to reduce the electrical energy reaching the locomotive or other driver on the tracks may be used anywhere desired for the purpose of slowing down the train, even to the point where it might be stalled, if desired.

The embodiment of the invention disclosed herein wherein the speed of the train is reduced without opening the current-supply circuit of the locomotive, is particularly advantageous in such toy railroad systems wherein the stopping, starting and reversing of the direction of the locomotive is accomplished by impulses resulting from the opening and closing of the circuit supplying the tracks with current.

Other features and advantages will hereinafter appear.

The following description is of toy track sections embodying the invention, and the protection contemplated is not to be limited by the specific structure shown and described, but is to be taken properly in connection with the appended claims. It should be understood that the term "track section" as used herein means a portion of the total track system, and might designate a single track unit or a number of single track units joined together.

In the accompanying drawings:

Figure 1 is a top plan view of a straight decelerating section of track according to the invention,

wherein the center or third rail is isolated from the rest of the circuit and is fed current through a resistor.

Fig. 2 is a longitudinal section taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary transverse section taken on the line 4—4 of Fig. 1, and showing a detail of the slider carried by the third rail.

Fig. 5 is a fragmentary side elevation of the slider, rail, and resistor of Fig. 4.

Fig. 6 is a top plan view of another embodiment, there being shown a pair of track sections organized to short-circuit the resistor of the decelerating section when a train approaches said latter section in leaving a curve.

Fig. 7 is an enlarged fragmentary section taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary side elevation of the track, slider, and resistor of Fig. 7.

Fig. 9 shows the improved track sections of the invention as incorporated in a railway system.

Referring to Fig. 1, there is shown a decelerating rail section comprising a pair of outer rails 10 connected near their ends by cross ties 11 and 12, and at their mid-points by a cross tie 13. The rails are electrically connected together by said ties in the conventional manner, and are of the usual type having connecting pins 14 at one end and sockets at the other end for joining with adjacent rail sections.

As is well known, the outer rails of track systems are connected with a source of electrical energy and conduct current from said source of the electric locomotive through the driving wheels thereof riding on said rails. These small electric locomotives usually have shoes or rollers which engage the third rail for completing the circuit through the motor, said third rail being also connected to the source of energy.

According to the present invention an isolated third rail is provided in the track section shown, and a resistor is provided for connecting said rail to the remainder of the third rail circuit in such a manner that the current supplied to the locomotive by the isolated rail will be reduced in value, so as to decelerate the train. The center or third rail 15 is insulatedly carried by the central tie 13 in the conventional manner, said rail being shorter than the outer rails 10 and being insulatedly connected by insulating pins 16 to small extension rails 17 and 18 which are insulatedly carried, also in the conventional manner, by the ties 11 and 12 respectively. The rail extension 17 is provided with the usual connection pin 19, and the rail 18 has the usual type of socket, all for connection to the third rails of adjacent track sections. Thus the center rail 15 is insulated and isolated from the remainder of the third rail circuit so that no direct connection exists between these.

The invention provides means for connecting said isolated rail to the remainder of the third rail circuit so that a reduced current is carried by said rail, and in exemplification of this there is provided a wire wound resistor 20 attached to the ties 11 and 13 directly beneath the third rail 15, said resistor being traversed by a slider 21 sliding on said rail. The resistor 20 consists of a strip of insulating material connected to the ties by pins as shown and wound with resistant wire. The end 20a of the resistor wire is connected to the rail extension 17. Referring to Fig. 4, the slider 21 is made of a single metal stamping, and comprises a resilient contact arm 22 extending from a body having two wings, each bent back on itself so as to engage for sliding motion the flat base of the rail, the doubled-over portions of said wings being apertured and pinned for strength. The slider 21 may be readily moved at will so that the arm thereof engages different portions of the resistor 20, thereby varying the amount of resistance inserted in series with the rail 15.

For the purpose of connecting the rail extensions 17 and 18 together so that the electrical transmission losses in the third rail system are reduced to a minimum there is provided a jumper bus bar 23 insulatedly carried by each of the ties 11, 12, 13 the ends of said jumper being connected to the rail extensions as shown.

When the engine traverses the section of track as just described its speed will be reduced because of the resistance in series with the third rail 15, the extent of said reduction being dependent upon the position of the slider 21 governing the amount of resistance in the circuit.

Referring to Fig. 9, there is shown a railway track system having quarter-round curves 26 the approaches to which are provided with track sections 24 and 24a as pictured in Figs. 1 and 2 and just described. When a train 25 approaches a track section 24 preliminary to rounding the curve 26 it will have a speed normal for the straight length of track 26a which it has just traversed, and which speed might be too great to permit the train to safely traverse the curve. As the engine enters the track section 24 the power supplied to it will be diminished due to the resistance in the third rail circuit of said section, and a deceleration will result the extent of which depends on the adjusted value of the resistance. This deceleration can be made sufficient to enable the train to round the curve without being thrown off. The deceleration is thus effected automatically without attention from an operator.

Although the track section 24 is shown as relatively short, it can be made as long as desired to produce proper amount of deceleration, without departing from the spirit of the invention, the construction being followed out in a similar manner.

It will be noted that after the train has decelerated, and as the locomotive enters the curved stretch, full power will again be supplied to enable the train which now has increased load due to the curve, to easily proceed.

Upon completing the curve 26 the engine will traverse a decelerating track section 24a provided for trains approaching the curve in the opposite direction. However, the deceleration will not be so great as to alter the progress of the train materially or cause it to become stalled.

At times it might be found undesirable to have the train decelerated a second time (after completing a curve) and yet it is desired to have a decelerated track section at each approach to a curve.

The invention provides, in another embodiment, another decelerating track section which accomplishes this result, said track section being directional and selective in its operation so that a train will be decelerated only when traversing said section in one direction.

In the embodiment shown, see Fig. 6, this track section comprises a straight section 27 connected with a curved section 28, the straight section being provided with an adjustable resistor, and

the curved section being so organized that when the wheels of a truck traverse it the resistor of the straight section will be short-circuited and rendered inoperable. The straight section 27 has a center or third rail 29 of the conventional type insulatedly supported at its ends on cross ties 30 and 31, and said track section is provided with outer rails 32 and 33, each outer rail being insulated from the ties 30 and 31. The rail 32 is insulatedly mounted at one end on the tie 30, and is insulatedly supported at its other end by a rail extension 34 carried by the tie 31, said extension being electrically connected to the tie. The outer rail 33 is insulatedly supported at its ends by rail extensions 35 and 36 carried by the ties 30 and 31 respectively, said rail extensions being also electrically connected with the ties.

The outer rail 33 carries a slider 37, see Figs. 6, 7 and 8, which is adjustable longitudinally thereon, said slider having an arm 37*a* riding on a wire wound resistor 38 attached to the ties 30 and 31. The left end of the resistor 38 is electrically connected to the rail extension 36, so that the outer rail 33 is connected through the resistor to the outer rail circuit of the system. A jumper strip 39 is provided for electrically connecting the ties 30 and 31 together.

The curved track section 28 has a pair of cross ties 40 and 41 carrying a conventional third rail 42 and wheel rail 43. The other and outside wheel rail 44 is insulatedly carried at one end by the tie 40, and is insulatedly supported by a rail extension 44*a* at its other end, said extension being carried by the tie 41.

It will be noted that the third rails 29 and 42 of this embodiment are the same as with ordinary track sections, but that the outer rails of the straight track section have been insulated from the ties carrying them, as well as one of the outer rails of the curved track section.

In order that these track sections function properly the cars of the train following the locomotive must have insulated trucks so that the wheels thereof do not electrically connect with the car frames. For such arrangement each wheel and axle assembly constitutes an electrical unit, and two of these assemblies are shown in broken lines on the track section 28 of Fig. 6. However, these assemblies should be insulated from each other and from the car frame, and this can be accomplished by means of fibre side plates in which the axles are journaled.

Operation is as follows: When the train approaches the curve and passes first over the straight section it will receive reduced power since the outer rail 33 of the straight section is fed through the resistor 38, and since the other outer rail is not connected at all with the outer rail circuit. As the locomotive reaches the curved section 28 it will again receive full power through the rails 42 and 43 which are connected in the usual manner to the track system. Therefore a train approaching a curve and passing first over the straight section 27 will be decelerated. If, however, the train is approaching from the opposite direction, so as to traverse the curved section 28 before reaching the straight section 27 it will not be decelerated at all. This is because, as the locomotive goes over the straight section 27 the tender following the locomotive, or the first passenger car of the train if no tender is included, will electrically connect the outer rails 43 and 44 of the curved section together, and since the rail 44 is connected with the outer rail 32 of the straight section, this latter rail will receive full energy from the outer rail circuit of the track system. Thus the rails 29 and 32 of the straight track section will be fully energized and no deceleration will ensue. The pair of track wheels shown in broken lines in Fig. 6 illustrate the connection which will exist between the rails 43 and 44 as effected by a coach traversing said rails.

It will be noted that, since the wheel and axle assemblies of the cars following the locomotive are separate electrical units, these will function properly to connect the rails 43 and 44 when the train travels from right to left on the track sections 28 and 27' so that no deceleration will be effected, yet when the train is traveling in the opposite direction—that is, from left to right—the wheels of the cars following the locomotive will not effect direct connection between the rails 34, 36 and the rails 32, 33 because of the insulating fibre plates in which the axles are journaled, which plates isolate each wheel and axle assembly from each other and from the car frames.

If desired, a connection such as that shown at 45 may be provided between the outer rails 32 and 33 of the straight track section 27, in which case the presence of coach wheels on the curved track section 28 will effect a short-circuiting of the resistor 38 automatically. This short-circuit is effected through the rail extension 36 and the outer rails of the remainder of the track system (not shown), and through the rail 43, wheels of the coach, rail 44, rail 32, and connector 45. Of course, if the connector 45 is not employed the wheels of the locomotive, when on the straight track section 27 will serve to electrically connect the rails 32 and 33, and thus the resistor will be short-circuited in a similar manner.

It will be noted that a through circuit is provided by this embodiment for the outer rails of the track system by the jumper 39 connecting the ties 30 and 31. Thus the rail extensions 34 and 36 carried by the tie 31 are connected through the jumper 39 to the tie 30, rail extension 35, rail 33, and tie 41 and rail extension 44*a*.

Referring to Fig. 9, there is shown a track system incorporating the track sections 27 and 28 as just described. A train 46 traveling in the direction of the arrow would therefore be decelerated before rounding the curve 47 by the track section 27, whereas a train 48 traveling as indicated by the arrow and leaving the curve 47 would not be decelerated in traversing the track section 27.

It should be understood that the present invention is also applicable to a system having two-rail tracks and a trolley wire or trolley rail above the tracks. Referring to Fig. 6, the third rail of the track section has not been altered or changed whatever, and this rail may be eliminated and a trolley wire or other means of furnishing a return circuit used instead.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. In a toy electric railway track system, a substantially straight section of track; a substantially curved section of track; a decelerating track portion intermediate said straight and curved sections, having locomotive-speed reducing means operative when the said portion is traversed by the locomotive from the straight section toward the curved section; and means rendering said speed-reducing means inoperative to reduce the locomotive-speed when the locomotive trav-

erses said decelerating portion from the curved section toward the straight section.

2. A toy railway track section having an electrically conducting rail and means for insulatedly connecting said rail with corresponding rails of a track system to which the track section is attachable; a pair of ties supporting said rail; an elongate resistor carried by the ties below the rail and substantially parallel therewith; and a sliding contact on the rail, engaging the resistor.

3. A toy railway track section having a subdivided rail providing rail segments insulated from each other; a resistor connected to one of said segments, and extending adjacent the other rail segment; and a slider carried by the other rail segment, and sliding on the resistor, so that the resistance of said resistor may be varied, and so that the rail segments are electrically connected to each other through said resistor.

4. In a toy electric railway track system, a substantially straight length of track; a substantially curved length of track; and a decelerating track section intermediate said straight and curved lengths, having means for reducing the current to the locomotive of a train when the latter is traversing said section toward the curved track length, and having means cooperating with the train wheels for rendering said current-reducing means inoperative when the locomotive is traversing said section in an opposite direction, or toward the straight track length.

5. A toy railway track section having a wheel-carrying rail comprising three current-conducting rail segments to be joined end-on, and means for insulatedly joining the adjacent ends in rail-forming relation; a second wheel-carrying rail insulated from and disposed laterally of the first, and comprising three current-conducting rail segments and means for insulatedly joining these end-on in rail-forming relation, the center segment of this second rail extending opposite two adjoining segments of the first rail, and the end segments of the second rail having means for effecting mechanical and electrical connection to the wheel-carrying rails of a track system to which the track section is attachable, said second rail being disposed relatively to the first rail so that the wheels and axles of a car traversing the track section will at some time electrically connect the center segment of the second rail with one or both of the segments of the first rail opposite it; a resistor having one terminal electrically connected to the center segment of the first rail, and the other terminal electrically connected to one of the end segments of the second rail; and means for electrically and mechanically connecting the end segments of the first-mentioned rail to the wheel-carrying rails of a track system in which the track section is insertable.

6. In a toy electric railway track system, a substantially straight section of track; a substantially curved section of track; a decelerating track portion intermediate said straight and curved sections, having locomotive-speed reducing means operative when said portion is traversed by the locomotive from the straight section toward the curved section, said means including a resistor for reducing the current through the decelerating track portion; and means rendering said speed-reducing means inoperative to reduce the locomotive-speed when the locomotive traverses said decelerating portion from the curved section toward the straight section, said means operating to short-circuit the resistor when the train traverses the tracks in said latter direction.

7. In a toy electric railway track system, a substantially straight section of track; a substantially curved section of track; a decelerating track portion intermediate said straight and curved sections, having locomotive-speed reducing means operative when said portion is traversed by the locomotive from the straight section toward the curved section, said means including a resistor for reducing the current through the decelerating track portion; and means rendering said speed-reducing means inoperative to reduce the locomotive-speed when the locomotive traverses said decelerating portion from the curved section toward the straight section, said means including track sections adapted to cooperate with the wheels of a train passing over them to short-circuit said resistor.

ARTHUR A. JOHNSON.