Sept. 5, 1939. W. E. REXFORD ET AL 2,171,634

TRACK AND VEHICLE TOY

Filed Feb. 7, 1938 4 Sheets-Sheet 1

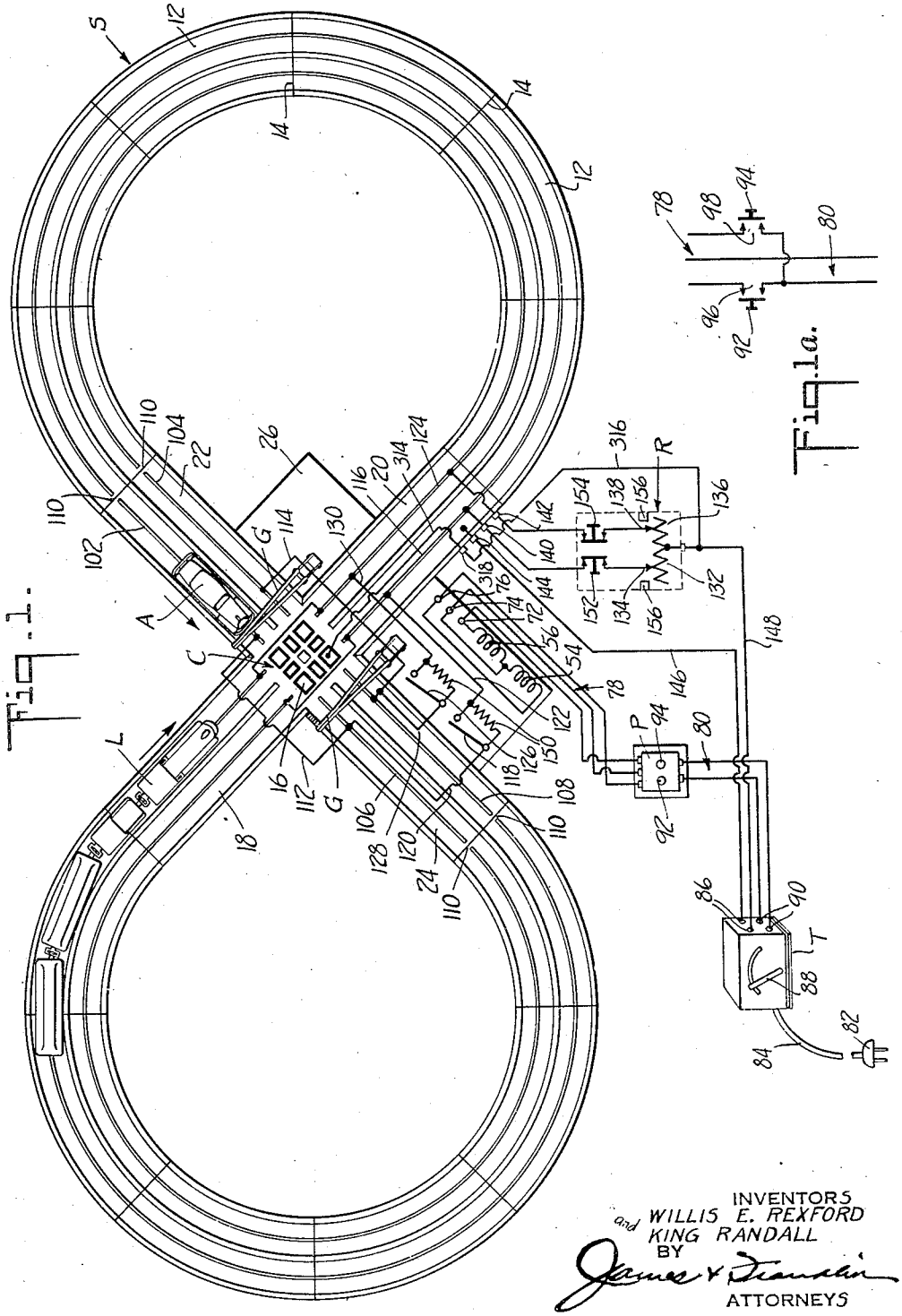


Fig. 1.

Fig. 1a.

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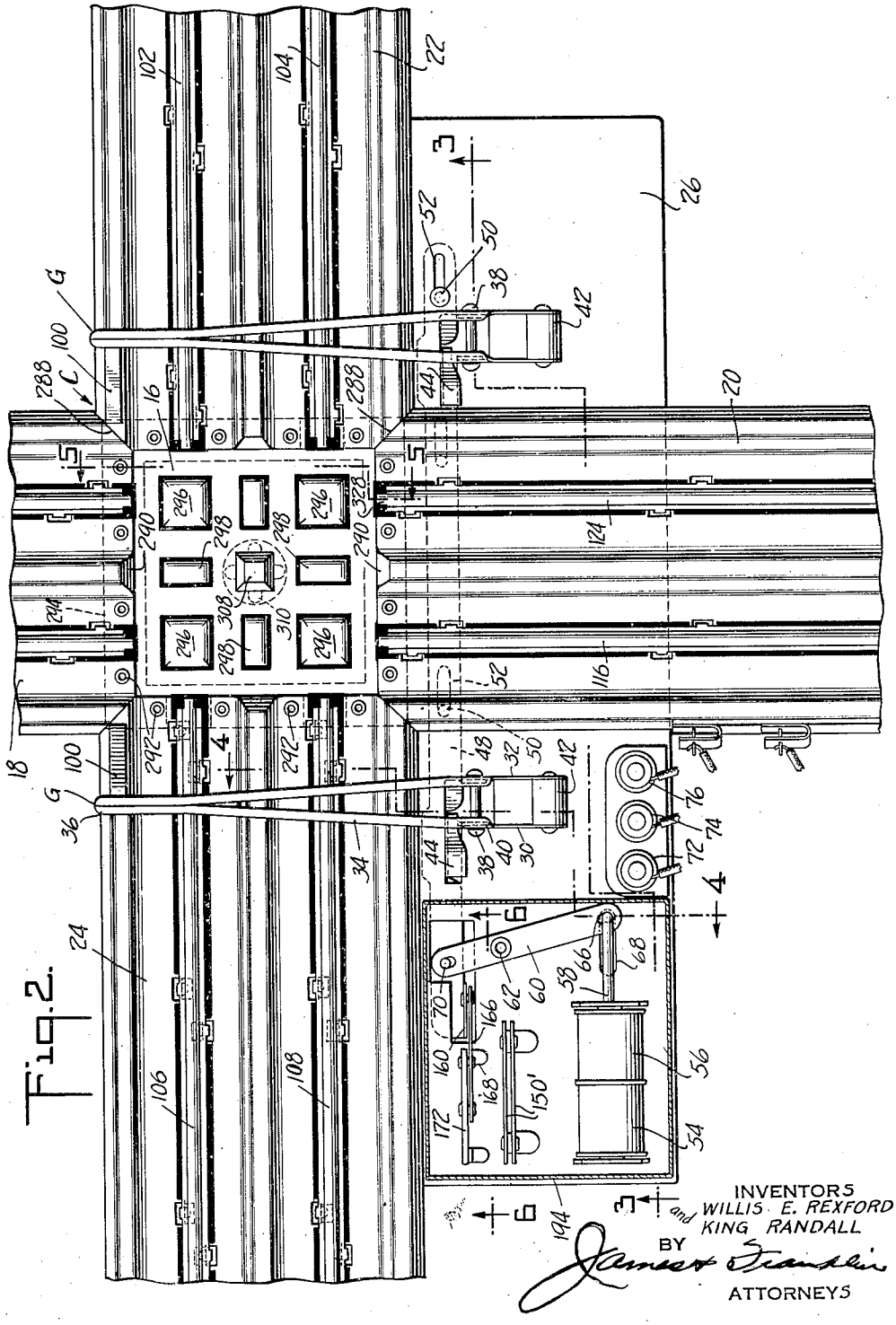


Fig. 2.

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Fig. 12.

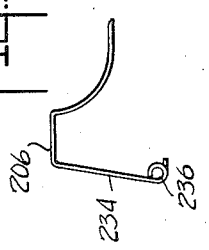


Fig. 11.

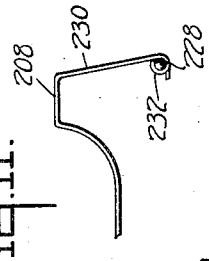
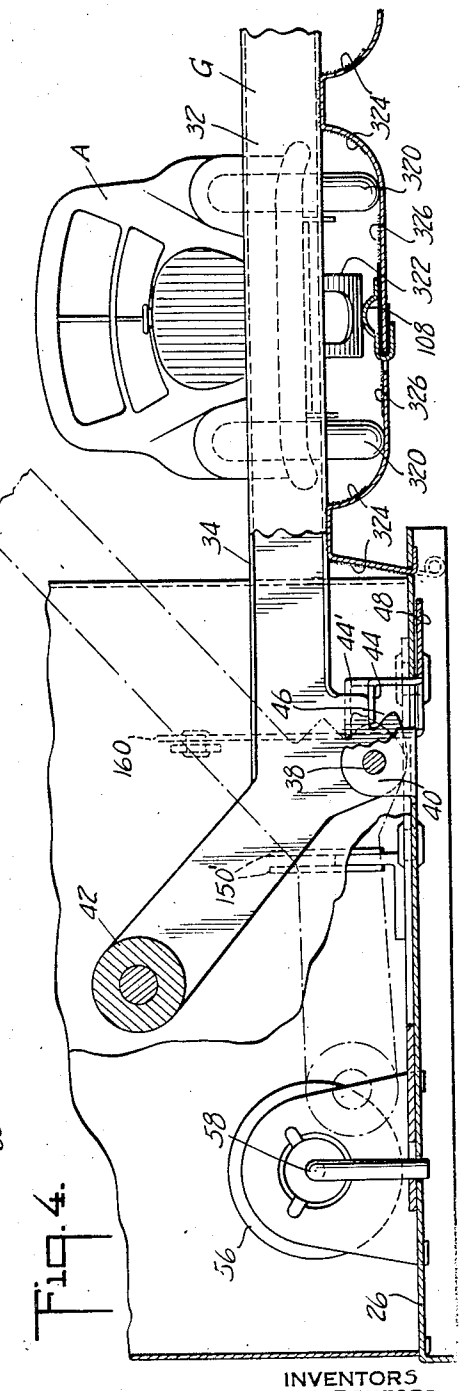


Fig. 3.

Fig. 4.

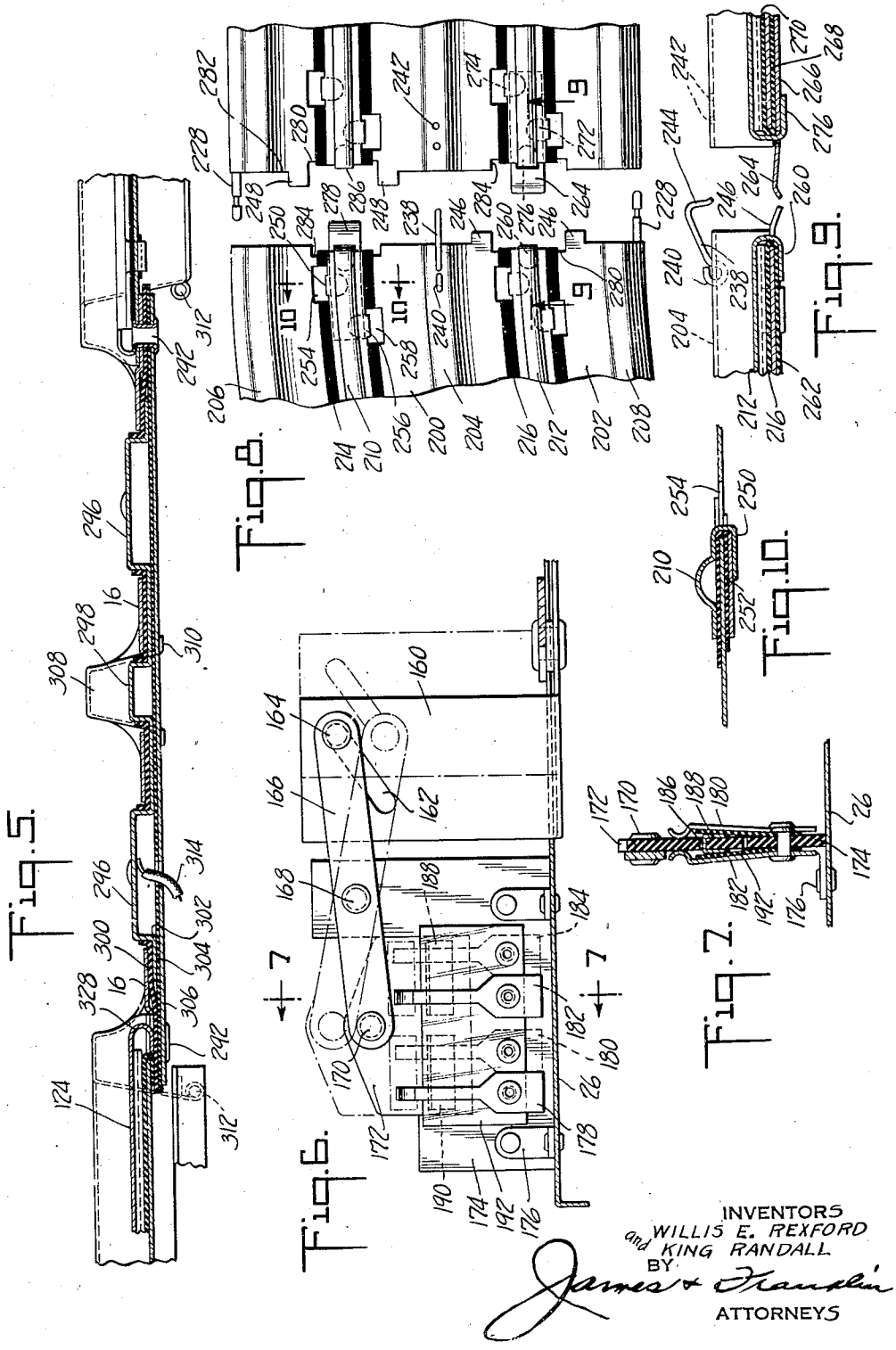


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UNITED STATES PATENT OFFICE

2,171,634

TRACK AND VEHICLE TOY

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Application February 7, 1938, Serial No. 189,126

25 Claims. (Cl. 46—216)

This invention relates to toys, and more particularly to toys simulating a track and vehicle.

Such toys are already known, in which the roadway is made up of sections which assemble into a figure 8 one arm of the 8 being elevated to cross over the other arm of the figure. The road sections each have two collaterally disposed trough-like depressions providing parallel roads for two automobiles. The primary object of our invention is to generally improve toys of this character, frequently referred to as "Speedway" toys.

A more particular object is to provide a level or grade crossing instead of an elevated crossing for the road. Still another object is to provide means for preventing a collision between two of the vehicles at the grade crossing. This may be done by the use of crossing gates which are lowered at opposite sides of one arm of the crossing and directly across the other arm of the crossing, thereby preventing movement of a vehicle along the latter arm. Collision may also be prevented in the case of an electrically operated toy by providing dead sections for the current supply strips at the crossing, the sections being de-energized on one arm of the crossing while a vehicle is passing on the other arm. In accordance with the present invention, both of these safety precautions are used at the same time, this having the advantage that the vehicle is slowed down or stopped without crashing forcibly into the crossing gate, while at the same time the excitement of lowering the gates and having the vehicle closely approach or even lightly strike the same, is retained.

More specific objects center about the operation and control of the crossing gates, and in accordance with some of the features of our invention, both gates are lowered or raised simultaneously by remote control means, as by the use of solenoids at the crossing and a remote push button switch panel connected to the crossing by appropriate wiring. Moreover, the current supply to the dead sections of the road is controlled by the same means and is automatically kept in proper relation to the gate position, that is, the dead sections are energized when the crossing gates are open, and are de-energized when the crossing gates are closed.

Still another object of our invention concerns the character of the vehicles operated on the road. We have found that a very attractive toy results from the use of a simulated railroad train (although operating like the automobile without wheel flanges or rails). The appeal of the toy comes from its very tiny dimension. For example, the toys commonly use a tread of only one inch. A complete and rather elaborate simulated steam locomotive has a length under four inches and a width and height of only 1¼ inches. Because of the miniature size of the train, it appears in proper proportion to the track system, while keeping the entire track system small enough to fit on an average table. If a larger track system is employed, say of the dimension of an ordinary toy railway track system, the realism of the toy is further enhanced because of the small size of the train relative to the large track system on which it operates. Moreover, the train may be run at higher speeds in proportion to its size. It may also be provided with many of the features of large conventional toy trains, such as remote control reversing switch, and spark discharge from the smoke stack.

Of course, it goes without saying that the complete toy so far described is particularly attractive when provided with vehicles of different character, one simulating an automobile and the other simulating a train, for then the child may use the remote control of the crossing to prevent collision between the automobile and the train, and ordinarily, will attempt to have the vehicles miss one another at the crossing by as close a margin as possible before deciding to use the safety gates, and this provides much of the excitement of an automobile racing a train at a crossing.

Other objects of the invention center about the constructional details of the track sections, and the manner in which pins, hooks and leveling tongues are provided for close and accurate assembly of the road sections. In the case of an electrically operated toy, further objects concern the contact strip for energizing the vehicles; the method of insulating the same; the manner in which the strip is kept comparatively flat and low on the road in order to maintain a low center of gravity for the vehicles, which in turn permits high speed operation, particularly when coupled with the guide ridges or banks forming a part of the road; the manner in which the contact strips are insulatedly secured to the road by appropriate lugs and slots; and the manner in which successive contact strips are electrically connected by appropriate contact springs. Still further objects center about the construction of the crossover, and particularly the center portion thereof, with a view to providing a maximum continuity of current supply to a vehicle running over the crossing, all at minimum manufacturing cost.

To the accomplishment of the foregoing, and such other objects as will hereinafter appear, our invention consists in the track and vehicle 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 partially a plan view of a toy embodying features of our invention, and partially a wiring diagram for the toy;

Fig. 1*a* is explanatory of the push button remote control panel;

Fig. 2 is a partially sectioned plan view of the cross-over;

Fig. 3 is a section taken in the plane of the line 3—3 of Fig. 2;

Fig. 4 is a section taken in the plane of the line 4—4 of Fig. 2;

Fig. 5 is a section taken in the plane of the line 5—5 of Fig. 2, and is explanatory of the construction of the center of the cross-over;

Fig. 6 is a section taken in the plane of the line 6—6 of Fig. 2, and is explanatory of the switch for energizing the dead sections;

Fig. 7 is a section through the switch taken in the plane of the line 7—7 of Fig. 6;

Fig. 8 is a plan view showing the manner in which the track sections are attached to one another;

Fig. 9 is a section taken in the plane of the line 9—9 of Fig. 8, through the ends of the contact strips;

Fig. 10 is a section taken in the plane of the line 10—10 of Fig. 8 across a contact strip at the contact spring;

Fig. 11 is a detail of the connection pin for the track section; and

Fig. 12 is a detail of the socket for receiving the connection pin.

Referring to the drawings, and more particularly to Fig. 1, the toy comprises a two-track speedway road S in the form of a figure 8, a toy automobile A running on one of the roads, and a railroad train drawn by a locomotive L and running on the other of the tracks. The two arms of the figure 8 cross by means of a level or grade crossing generally designated "C" this crossing preferably being provided with safety gates G which may be lowered into the path of one of the vehicles as shown, in order to prevent collision with the other. The crossing gate G may be automatically controlled, but we find that it simplifies the construction of the toy and greatly increases the play value obtained therefrom, if the crossing gates are manually controlled, for the child then must judge for himself the relative speeds of the vehicles and their distances from the crossing, with a view to deciding whether or not a collision is imminent. For convenience, particularly when dealing with an electrically operated toy, the gates are preferably controlled at a remote point, as by means of the push button panel P. The current supply for the vehicles is obtained through a conventional step-down transformer T, and the supply to each of the two roads is preferably independently controlled, as by means of a dual rheostat R, so that the speed of one vehicle may be varied relative to the speed of the other, or either stopped while the other is running.

The speedway road S is made up of separable sections, and in the present case comprises a crossing C and curved sections 12 the ends of which abut at the lines 14. It will be understood that these curved sections may be combined with straight road sections, thus making much larger loops of roadway, as by using a straight section between each pair of curved sections, or longer loops, as by using the straight sections in only longitudinal direction. The cross-over C is preferably made as a permanent unit, and comprises a center part 16 with arms 18 and 20 projecting therefrom in one direction, and arms 22 and 24 projecting therefrom in another direction. These arms are themselves straight road sections, but they are for convenience permanently secured together. A base plate 26 forming a part of the cross-over carries the gates G and the operating mechanism therefor. The cross-over may be described in greater detail with reference to Figs. 2 through 7 of the drawings, to which attention is now directed.

The crossing gates G are made up of strips of sheet metal 30 and 32 flanged at 34 to stiffen the same and secured together at the movable end 36. The gates are pivoted on pins 38 which pass through bearings 40 struck upwardly from base 26. A counterweight 42 is secured between the sides 30 and 32, and acts as a spacer as well as a counterweight. The gates normally move by gravity to the closed position shown in solid lines in Fig. 4, but may be elevated to the position shown in broken lines by means of cams 44 received in a cam follower recess 46 (Fig. 4) formed on the gate. The sloping nature of the cams is best shown in Fig. 3. The end portions are preferably made horizontal so that the cam movement is irreversible, that is, when the cams move the gates to open position, the gates remain in open position until the cams are shifted to the opposite position to close the gates. It will also be understood that with cam follower recess 46 engaging both sides of the cam, the gate may be moved positively to either open or closed position without relying upon gravitational or spring movement of the gates. Counterweighting is not essential, but is used merely to lighten the load on the gate-operating solenoid. The cams project upwardly from and may be formed integrally with a cam shift bar 48 which is located beneath base 26 and is reciprocable transversely of the gates. Bar 48 is supported and guided by pins 50 slidable in slots 52 cut through base 26. Base 26 is also cut away to receive the cams 44 to permit movement thereof with the cam bar, as previously described.

The cam bar is shifted by means of solenoids 54 and 56, the plunger extension rod 58 of which is connected to the cam bar through a lever 60 pivoted at 62. The solenoid plunger rod 58 is connected to lever 60 by bending the end of the rod 58 downwardly to form a pin 64 passing through a slot 66 in lever 60 and riding in a slot 68 in the base 26 of the toy. Slot 68 guides pin 64 and prevents turning of the same about plunger 58. It will be understood that when solenoid 54 is energized, the plunger is drawn to the left (as viewed in Fig. 2), thereby oscillating lever 60 and causing its other end, which is connected to cam bar 48 by means of pin 70, to move to the right, thereby elevating the gates to the open position. Conversely, when solenoid 56 is energized the parts are shifted to the position shown in the drawings, and the gates are closed.

The energization of the solenoids is preferably controlled from a remote point, and referring to Fig. 1, it will be seen that the solenoids 54 and 56 are connected to terminals 72, 74 and 76, the terminal 74 being common. These terminals are

connected through a three-wire lead 78 of any desired length, extending from the cross-over to control panel P. The latter is also connected through a two-wire lead 80 to an appropriate source of energy, in this case the step-down transformer T. Transformer T is energized from an ordinary house wiring outlet through plug 82 and lead 84. The transformer may be conventional in character, and in the present case is provided with a pair of terminals 86, the potential at which may be varied by an appropriate control arm 88, and a pair of terminals 90 having a constant potential intended for the energization of various accessories, signals or the like. In the present case these terminals 90 are connected through lead 80 to the control panel "P". Either side of the three-wire lead 78 may be energized by depressing either of the push buttons 92 or 94. The wiring within the control panel P is simple in character, and will be understood from inspection of Fig. 1a, in which it will be seen that one of the wires of lead 80 is connected to the common wire of lead 78, while the other wire is connected to the switches 96 and 98, which are normally open but which may be closed by push buttons 92 and 94. As here illustrated, the button 92 energizes solenoid 54 and causes opening of the gates, while the button 94 energizes solenoid 56 and causes closing of the gates. The energization of the solenoid need only be momentary, for the gates remain in position.

As so far described, the movement of one of the vehicles is prevented by directed obstruction. This causes impact of the vehicle against the gate, and to withstand the impact and to prevent damage to the hinge and cam mechanism of the gate, we preferably support the gates by stops 100 best shown in Figs. 2 and 3. When the gates are lowered, the ends 36 come alongside the stops, and these support the gates against the impact of the vehicle. To lessen the impact or to completely stop the vehicle, we prefer to de-energize the vehicle approaching the gate. This, of course, lessens the necessity for stops 100, but they are here used as an extra precaution. The manner in which the vehicle approaching the gate is de-energized, is next explained.

Referring to Fig. 1, the contact strips 102 and 104 of crossing arm 22, and the contact strips 106 and 108 of the crossing arm 24, are disconnected from the contact strips of the regular road sections, the points of disconnection being indicated at 110. Strips 102 and 106 are connected to one another by conductor 112, and strips 104 and 108 are similarly connected to one another by conductor 114. This and the additional wiring next described is, of course, located under the base of the cross-over. Strip 106 may be connected to the constantly energized strip 116 of crossing arm 20 by means of a switch 118, this being connected to the contact strips by conductors 120 and 122. Similarly, contact strip 108 may be connected to the constantly energized contact strip 124 by means of switch 126, this being connected to the contact strip by conductors 128 and 130. Switches 118 and 126 are closed whenever the gates are open, and in this way each road is energized throughout its length, the two roads being energized independently of one another at potentials depending upon manipulation of the rheostat R. This is a dual rheostat comprising a resistor 132 varied by control arm 134, and a resistor 136 varied by control arm 138. The arm 134 is connected through terminal 140 to one of the contact strips, in this case 116, while the arm 138 is connected through terminal 142 to the other contact strip 124. The grounded return for the current is taken through terminal 144 and conductor 146, which, together with conductor 148 from the dual rheostat, is connected to the supply terminals 86 on transformer T. It may be explained that in practice the rheostat arms 134, 138 are moved to maximum speed or minimum resistance position, whereupon the transformer arm 88 is moved until the desired maximum speed of movement of the vehicles is obtained. The arms 134, 138 may thereafter be adjusted to control the actual running speed of the vehicles, the transformer arm 88 being left fixed in adjusted position.

When the gates are closed, the switches 118, 126 are opened, thereby de-energizing a vehicle approaching the gates. It will be noted in Fig. 1 that the switches are shunted by resistances 150. These are so high in value that the vehicle is substantially de-energized and comes to a stop. The resistances are not at all essential, but are used merely in the special case where either or both of the vehicles is provided with remote control reversing means of the character in which the direction of operation is reversed upon total interruption of the current supply, but is not reversed if the current instead of being totally interrupted is maintained at a slight value inadequate to propel the toy, but enough to hold the reversing switch against operation. This small current is referred to as a "holding current", and the resistors 150 are therefore termed "holding resistors".

When it is desired to reverse a vehicle, the current supply thereto may be completely interrupted by depressing either of the push buttons 152 or 154, thereby opening either of the associate switches, as will be clear from the wiring diagram. The vehicles may be slowed down to a stop without reversing the same by movement of arms 134, 138 outwardly to maximum resistance position. Movement off the resistors with consequent accidental open-circuiting and reversal of the vehicles, is prevented by appropriate stops 156 which limit the movement of the control arms.

The manner in which switches 118 and 126 are controlled is next explained with reference to Figs. 2, 3, 6 and 7 of the drawings. The end of cam shift bar 48 carries an upwardly extending plate 160 having a biased slot 162 cut therethrough. This is connected by means of a pin 164 to one end of a lever 166, said lever being pivoted at 168 and having its other end connected at 170 to a vertically movable slider 172. The slider 172 is the movable part of a double switch mechanism. More specifically, there is an insulation frame 174 secured on base 26 by angle pieces 176. This frame is projected upwardly at one end to hold the pivot 168 of lever 166. It is cut away between its ends to receive the slider 172. Near the bottom of frame 174 are mounted spring contacts 178, 180, 182 and 184, contacts 178 and 182 being on one side, and contacts 180 and 184 being on the opposite side. These contacts are all insulated from one another. Slider 172 is slotted at 186 to receive the connecting part of a channel-shaped contact bar 188. This bar is of sufficient length to connect the contacts 182 and 184. A similar bar 190 is provided in slider 172 adapted to connect the contacts 178 and 180. By reference to Fig. 7, it will be seen that with slider 172 in its lowered position, contact bar 188 is below the inwardly bent upper

ends of contact fingers 180 and 182, and the switch is therefore open-circuited. When, however, slider 172 is elevated, the bar 188 is moved upwardly to a position directly between the tips of the spring contact fingers, and a circuit is established therethrough. Thin sheets of insulation 192 may be provided within the contact fingers, as shown in the drawing, in order to guard against accidental contact between the fingers and the bars when the slider is in lowered position. It will be understood that bar 190 corresponds to switch 118 shown in Fig. 1, and that bar 188 corresponds to switch 126 shown in Fig. 1.

It will be recollected that in connection with Fig. 1 mention was made of the holding resistors 150 which shunt the switches 118, 126. The structural location of these holding resistors is not very important, but a convenient place near the switches is indicated in Fig. 2, the holding resistors being wound on strips of insulation 150' which are supported on appropriate supports secured to or struck upwardly from the base. It may be mentioned at this point that the solenoid and switch mechanism is all housed within a simulated building or shanty, the side wall of which is indicated at 194 in Fig. 2, and the roof of which is indicated at 196 in Fig. 3. This shanty is secured to the base by appropriate tongue and slot connections and simulates a shanty for the imaginary gate attendant.

Referring to Fig. 1, the detachable track sections 12 are all curved sections, but this is merely because a track layout of minimum size is being used. It will be understood that straight sections may also be employed, and in describing the characteristics of the detachable sections, it will be understood that these features are equally applicable to curved and straight sections. Referring to Fig. 8, each section comprises a main single piece of sheet metal which is bent to form a first trough-like road 200, and a second trough-like road 202. These roads are separated by a center ridge 204 and are bordered at the outer sides by side ridges 206 and 208. Relatively flat contact strips 210 and 212 are insulatedly mounted at the center of each of the roads, they being superimposed on thin strips of insulation 214 and 216. The cross-sectional relation of the parts will be readily understood from inspection of Fig. 3 showing depressed or trough-like roads 218 and 220 defined by center ridge 222 and side ridges 224 and 226. The contact strips 116 and 124 are shown in section, and it will be noted that they are slightly ridged or channeled at the center in order to facilitate smooth riding contact with the sliding shoe of the vehicle. It will be observed, however, that the strips are kept relatively flat compared, for example, to a real "third rail" of the railway type, and this is desirable in order to make it possible to give the vehicle a low center of gravity, and that in turn makes it possible to operate the vehicles around the track at high speed. The cross-section of Fig. 3 is not through an ordinary track section, but instead is through one of the arms of the cross-over, but it will be understood that the configuration of a cross-section through the track sections is similar to that shown in Fig. 3.

The sections are assembled together with the aid of connection pins and sockets. In Fig. 8 the connection pins 228 are clearly shown, these being located at the bottom outer edges of the sections. Referring to Fig. 11, it will be seen that the metal outside the ridge 208 is bent downwardly at 230 and is then curled inwardly at 232, thus forming a socket which receives connection pin 228, the metal at 232 being clenched firmly about pin 228 in order to permanently secure the pin in place. At the opposite side of the section, the metal outside ridge 206 (Fig. 12) is turned downwardly as indicated at 234, and is then curled inwardly as indicated at 236 to form a socket dimensioned to detachably receive one of the connection pins. In this way the desired connection pins and sockets are provided without any important complication of the track sections other than the addition of the pins, for the sockets which permanently and also removably receive the pins are formed directly from the main piece of sheet metal of the track section.

To help additionally hold the sections in assembled relation with the edge of one section closely abutting the edge of the next section, we provide hooks, one of which is shown at 238 in Figs. 8 and 9. This hook has one end curled at 240 to form a pivot received in the top of ridge 204. The top of the adjacent ridge is perforated as shown at 242 to receive the end 244 of the hook, this end being bent as shown so that it snaps into place with a spring action. It will be understood that one end of each section is provided with a hook, while the other end of each section is provided with a hole to receive the hook of the adjacent section, and in this manner the entire track assembly may be locked together against accidental separation.

We provide additional means to help keep the road-bed surface of the adjacent sections in perfectly aligned or level relation, that is, to prevent upward displacement of one section relative to the other. For this purpose we provide leveling tongues, and referring to Fig. 8, it will be seen that there are leveling tongues 246 on one section for the road 202, while tongues 248 are provided on the other section for the other road. These tongues are bent downwardly somewhat so as to slide just beneath the edge of the adjacent section, and inasmuch as some of the tongues are on one section while others are on the other section, the sections are held in level relation for neither section can rise relative to the other, each being restrained from rising by its own tongues.

The contact strips are held in place by a series of lugs, and referring to Figs. 8 and 10, it will be seen that strip 210 has formed integrally therewith a lug 250. The insulation strip 214 has formed integrally therewith a lug 252. The road 200 is slotted at 254. The lug 250 passes downwardly through slot 254 and is bent around to anchor the contact strip in place while insulation lug 252 is bent around beneath lug 250 in order to prevent grounding of the contact strip. It will be understood that these lugs are provided at intervals along the strip, and two such lugs are preferably provided close together. In Fig. 8 the adjacent lug is indicated at 256, while the slot receiving the same is indicated at 258. It will be observed that the slots 254 and 258 are substantially over-sized in dimension, this being an additional precaution to prevent grounding of the contact strip. In Fig. 2 the distribution of the pairs of attaching lugs for the contact strips is clearly shown, and a generally similar distribution is employed for the ordinary detachable track sections.

The ends or tips of the contact strips are shaped to form lugs which are reversely bent

ound the edge of the track section, as is indited at 260 in Figs. 8 and 9. The end of the sulation strip 216 is also bent around into the ction, as is indicated at 262, thus preventing ounding of lug 260.

As so far described, no special means has been ovided for ensuring good contact between the ıccessive contact strips. Referring to Figs. 8 ıd 9, we provide a special contact spring 264 ıe outer end of which is adapted to bear upardly against the lug 260 of the next section, ıd the inner end 266 of which underlies the inardly turned end 268 of the insulation strip 270. he spring part 266 is held in place by the regur lugs 272, 274 of the contact strip, and is aditionally held in place by the end lug 276 which asses through a slot in the spring contact and ; clenched therebeneath. It will be understood hat a contact spring of this character is proided at one end of each road section and not t the other end, the latter end cooperating with he contact spring of the next section. With louble track road sections as here illustrated, he contact spring of one road may be located ıt one end while the contact spring of the other oad is located at the other end, thus additionally ıelping to keep the road sections in leveled conlition when assembled together. Thus, in Fig. 8, he contact spring 264 for road 202 is on the right-hand section, while the contact spring 278 for road 200 is on the left-hand section.

These contact springs are provided throughout the track sections and on the cross-over, but are omitted when dead sections of contact strip are to be provided. For example, reverting to Fig. 1, it was explained that the contact strips of arms 22 and 24 may be de-energized, that is, there are dead sections, and this result is obtained by points of insulation or separation at 110. The primary significance of these points is the omission of the contact springs. However, inasmuch as some contact may result from abutment of the ends of the contact strips, the additional precaution is taken of recessing the ends somewhat. Thus, reverting to Fig. 8, the end edge 282 of the section is recessed at 280 and 284, and the ends of the contact strips are bent around the end of the section within these recesses, as is indicated at 286. The recesses 280 and 284 are made sufficient in depth to prevent the folded over end 286 from bearing against the correspondingly folded over end of the adjacent track section, if the contact strip is omitted. An additional advantage of this construction is that the edge 282 of the section can come into direct abutment with the edge of the next section, instead of being held somewhat apart by the folded over ends of the contact strips.

Coming now to the structural features of the cross-over itself, it may be explained that the arms 18 through 24 closely resemble ordinary straight track sections in that each comprises a single piece of sheet metal bent to form roads defined by ridges, and each is slotted to receive the anchoring lugs of the contact strips, and each is provided at its outer ends with connection pins and sockets and leveling lugs. These arms differ at their inner ends in a manner which will be clear from inspection of Fig. 2, for the inner ends join a center part 16, and are mitered at 288 so that they fit closely together and closely over the center part 16. The ends of the outer ridges are closed by the mitered connections, while the ends of the center ridges may be closed by downwardly bent parts 290. The flat or bottom parts of the inner ends are permanently secured to the center part by a series of rivets or eyelets 292. These eyelets pass through plate 16 the edges of which underlie the inner ends of the arms, as indicated by dotted lines 294 in Fig. 2. The plate 16 is grounded and is intended for contact with the wheels of the vehicle. In order to supply current to the vehicle, a series of contacts 296 are provided, these contacts being insulatedly mounted and being aligned with the regular contact strips. Moreover, we prefer to provide four additional contacts 298 in order to help fill in the space between the contacts 296. These contacts project upwardly through appropriate windows or apertures cut through the grounded plate 16.

For simplicity and economy of structure, the contacts 296 and 298 are preferably all formed from a single piece of sheet metal, and to explain this construction, reference may be had to Fig. 5 in which it will be seen that the center part of the cross-over is a laminated structure made up of a top plate 16, a top piece of insulation 300, a contact plate 302, a bottom piece of insulation 304, and a metallic bottom plate 306. The top plate 16 is cut away to form apertures, and the insulation plate 300 is similarly cut away to form registering apertures, and these apertures are made smaller than the apertures in plate 16. The contact plate 302 is embossed upwardly to form all eight of the contacts 296 and 298. These project upwardly through the apertures in insulation plate 300. The contact plate is held in position by bottom plate 306, and is insulated from the bottom plate by the bottom piece of insulation 304. The rivets securing the arms of the cross-over to the center part of the cross-over are indicated at 292, and it will be seen that they pass through both the top plate 16 and the bottom plate 306. A center guide projection 308 is provided at the center of top plate 16, and this may be secured in place by tongues 310 which preferably pass through all of the plates as shown in Fig. 5, thereby helping additionally lock the laminations together at the center of the cross-over. The curled edges of the arms are indicated at 312, these corresponding to the sockets at the outer ends for connection pins previously referred to. An electrical connection to contact plate 302 is indicated at 314, and this is preferably made a separate connection for the following reason. The potential applied to the contacts 296 and 298 should theoretically equal that applied to the contact strips with which it is aligned, but this is not possible as a practical matter because the contacts are aligned with strips extending in two different directions, and the potentials may vary according to the operation of the dual rheostat R and may also vary depending upon the energization or de-energization of the dead sections. To solve this complication in a simple way, we make all of the center contacts on a single contact plate as above described, and separately energize this plate at full potential. Thus, referring to the wiring diagram of Fig. 1, it will be seen that there is a separate lead 316 which is taken from lead 148 at a point ahead of the dual rheostat R and which extends to a connection 318 on the cross-over. The cross-over itself has a conductor 314 previously referred to, which extends from terminal 318 to the contact plate.

The inner ends of the contact strips of the cross-over terminate short of the grounded plate 16, and the latter is recessed at each of these contact strips to prevent accidental grounding of

any of the contact strips. (See termination **328** of contact strip **124** in Fig. 5, the inturned end **328** bearing solely against insulation.) Moreover, the center contact plate **302** is, of course, insulated from the contact strip because of the manner in which it is mounted between upper and lower pieces of insulation, as is clearly shown in Fig. 5.

This arrangement has the incidental advantage of applying a full potential at the time when the potential is being fed to the vehicle only in intermittent impulses. The extra energy thus provided helps ensure successful passage of the vehicle over the cross-over, and does not accelerate the vehicle, for it merely compensates for a deceleration which might otherwise take place.

Referring to Fig. 4, it may be pointed out that the vehicle A has metal wheels **320** for gounded return of the current picked up by contact shoe **322** running over the contact strip **108**. The shoe is long enough to bridge the gaps in the power rail at the cross-over. It may also be explained that the road sections may be painted or lithographed to improve the appearance thereof, but this lithography is interrupted at the wheels in order not to interfere with proper grounding of the wheels. Specifically, it will be observed that painting has been applied at the areas **324** outside the wheels and at the areas **326** outside the contact strip and inside the wheels. There is thus left a space of generous width in which the metal is bare for grounded return of current, and this space allows for some movement from side to side of the vehicle, such as may take place as it runs along the track or around curves on the track. Similar considerations apply to the railway locomotive or train or any other vehicle simulation run upon the track.

It is believed that the construction and operation, as well as the many advantages of our improved toy, will be apparent from the foregoing detailed description thereof.

Two vehicles may be run on the parallel tracks, and there is no danger of collision between these vehicles when they are run at the same speed, and particularly when run side by side as though racing. The speeds may be varied during any such simulated race. The vehicles may also be run at widely different speeds, and in such case they may approach one another at the crossing with danger of collision. At this time the child must attempt to properly estimate the speeds and distances and decide whether or not to use the safety gates to prevent a collision. The gates when closed may be left down indefinitely, in which case the vehicle having the right of way finally reaches the gate and stops alongside the previously stopped vehicle. Then both may be simultaneously re-started by opening the gate, or the gate may be opened immediately after the vehicle having the right of way passes the crossing, whereupon both vehicles again run at different speeds on the roadway. The above operations may be further varied, depending upon whether the vehicles are run in the same direction along the track or are run in opposite directions on the track.

It will also be apparent that while we have shown and described our invention in a preferred form, many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention defined in the following claims.

We claim:

1. A toy comprising road sections and a grade crossover, said sections and crossover being tachable to form an endless figure with two laterally disposed trough-like roads for receiv and guiding vehicle toys, a vehicle toy in road, another vehicle toy in the other road, means to prevent collision of one vehicle with the other at the crossover, said means cluding crossing gates at opposite sides of crossover, said crossing gates extending para to one pair of roads and across the other pair roads to block the passage of a vehicle on latter pair of roads, and means to open or cl said crossing gates.

2. A toy comprising road sections and a gra crossover, said sections and crossover being tachable to form two collaterally disposed troug like roads for receiving and guiding vehicle to and means to prevent collision of one vehicle t with the other at the crossover, said means i cluding crossing gates at opposite sides of t crossover, said crossing gates extending parall to one pair of roads and across the other pair roads to block the passage of a vehicle on t latter pair of roads, and means to simultan ously open or close said crossing gates includin a cam bar extending between the crossing gat beneath the crossover, cams on said cam ba there being one cam at the pivoted end of eac gate, and means to shift said cam bar betwee positions causing opening or closing of the gate

3. A toy comprising road sections which ma be assembled to form a trough-like road for guid ing a vehicle, said road including a grade cross over, and means to prevent collision of one ve hicle with another at the crossover, said mean including a pair of gates extending parallel t one road and across the other, and stops on sai crossover to support the free ends of the lowere gates against the impact of a vehicle approach ing and striking the same, said stops being lo cated between the ends of the gates and the road to which the gates are parallel.

4. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form an endless figure with two collaterally disposed trough-like roads for receiving and guiding vehicle toys, a vehicle toy in one road, another vehicle toy in the other road, and means to prevent collision of one vehicle toy with the other at the crossover, said means including crossing gates at opposite sides of the crossover, said crossing gates extending parallel to one pair of roads and across the other pair of roads to block the passage of a vehicle on the latter pair of roads, means to open or close said crossing gates, and stops on said crossover to support the free ends of the lowered gates against the impact of a vehicle approaching and striking the same.

5. A toy comprising a source of electric current, road sections which may be assembled to form a trough-like road for guiding an electrically operated vehicle, said road including a grade crossover, a contact strip insulatedly mounted on said road sections for supplying current from the source to the vehicle, and means to prevent collision of one vehicle with another at the crossover, said means including a pair of gates extending parallel to one road and across the other, electrically operated means to raise or lower the gates, and manually operable remote control switch means for connecting said source to said electrically operated means and thereby controlling the opening or closing of the gates.

6. A toy comprising a source of electricity, oad sections and a grade crossover, said sections and crossover being attachable to form an ndless figure with two collaterally disposed rough-like roads for receiving and guiding electrically operated vehicle toys, a contact strip nsulatedly mounted in each of said roads for supplying energy from the source to the vehicles, a vehicle toy in one road, another vehicle toy in the other road, and means to prevent collision of one vehicle toy with the other at the crossover, said means including crossing gates at opposite sides of the crossover, said crossing gates extending parallel to one pair of roads and across the other pair of roads to block the passage of a vehicle on the latter pair of roads, electrical solenoid means to open or close said crossing gates, and means to connect said source to said solenoid means including a conductor system extending to a remote control switch panel.

7. A toy comprising a grade crossover, crossing gates at opposite sides of the crossover, means to simultaneously open or close said crossing gates, said means including a cam bar extending between the crossing gates beneath the crossover, cams on said cam bar, there being one cam at the pivoted end of each gate, a double solenoid and plunger to shift said cam bar between positions causing opening or closing of the gates, and means to energize said solenoid including a three-wire conductor system extending to a remote control panel having two push-button switches for momentarily energizing either solenoid.

8. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form an endless figure with two collaterally disposed trough-like roads for receiving and guiding vehicle toys, a vehicle toy in one road, another vehicle toy in the other road, a contact strip insulatedly mounted in each of said roads for supplying energy to the vehicles, and means to prevent collision of one vehicle toy with the other at the crossover, said means including dead contact strips in the roads of the crossover, and switch means for controlling the energization of said dead contact strips.

9. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form a trough-like road for receiving and guiding vehicle toys, a contact strip insulatedly mounted in said road for supplying energy to the vehicles, and means to prevent collision of one vehicle toy with the other at the crossover, said means including crossing gates and dead contact strips in the road at the crossover, and solenoid operated means at the crossover operated by manually controllable remote switch means for controlling the crossing gates and the energization of said dead contact strips.

10. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form an endless figure with two collaterally disposed trough-like roads for receiving and guiding vehicle toys, a vehicle toy in one road, another vehicle toy in the other road, a contact strip insulatedly mounted in each of said roads for supplying energy to the vehicles, and means to prevent collision of one vehicle toy with the other at the crossover, said means including dead contact strips in those roads of the crossover extending in one direction but not in the transverse roads, a solenoid-operated switch at said crossover for controlling the energization of said dead contact strips, and remote control push-button switch means with wiring extending from said solenoid to said remote switch means for manually controlling the energization of the dead sections.

11. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form a trough-like road for receiving and guiding electrically operated vehicle toys, a contact strip insulatedly mounted in said road for supplying energy to the vehicles, and means to prevent collision of one vehicle toy with the other at the clossover, said means including a dead contact strip and crossing gates at the crossover, said crossing gates extending parallel to one road and across the other road to block the passage of a vehicle on the latter road, said latter road having the dead contact strip, manually operable control means to open or close said clossing gates, and switch means also controlled by said control means for energizing the dead contact strip when the gates are open and for deenergizing the same when the gates are closed.

12. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form two collaterally disposed trough-like roads for receiving and guiding electrically operated vehicle toys, a contact strip insulatedly mounted in each of said roads for supplying energy to the vehicles, and means to prevent collision of one vehicle toy with the other at the crossover, said means including dead contact strips and crossing gates at the crossover, said crossing gates extending parallel to one pair of roads and across the other pair of roads to block the passage of a vehicle on the latter pair of roads, said latter pair of roads having the dead contact strips, solenoid means to open or close said crossing gates, switch means also controlled by said solenoid means for energizing the dead contact strips when the gates are open and for deenergizing the same when the gates are closed, and means to energize said solenoid including a conductor system extending to a remote control switch panel.

13. A toy comprising road sections and a grade crossover, said sections and crossover being attachable to form two collaterally disposed trough-like roads for receiving and guiding electrically operated vehicle toys, a contact strip insulatedly mounted in each of said roads for supplying energy to the vehicles, and means to prevent collision of one vehicle toy with the other at the crossover, said means including dead contact strips and crossing gates at the crossover, said crossing gates extending parallel to one pair of roads and across the other pair of roads to block the passage of a vehicle on the latter pair of roads, said latter pair of roads having the dead contact strips, means of simultaneously open or close said crossing gates, said means including a cam bar extending between the crossing gates beneath the crossover, cams on said cam bar, there being one cam at the pivoted end of each gate, means to shift said cam bar between positions causing opening or closing of the gates, and switch means also controlled by said cam bar for energizing the dead contact strips when the gates are open and for deenergizing the same when the gates are closed.

14. A track and vehicle toy comprising road sections and a crossover each having a pair of collaterally disposed trough-like roads, said sections being attachable to form an enclosed track for continuous operation of a vehicle on either

of said roads and over said crossover, and two vehicles having flangeless wheels for running in either of said roads, one of said vehicles simulating a vehicle which normally runs on a roadway and the other of said vericles simulating a vehicle which normally runs on rails, whereby conditions somewhat simulating a railway grade crossing are readily reproduced.

15. A track and vehicle toy comprising a road section having a pair of collateral trough-like roads, a contact strip insulatedly mounted on each of said roads, and electrically operated vehicles adapted to run in either road, one of said vehicles simulating an automobile and the other of said vehicles simulating a locomotive or train, a step-down transformer for supplying energy to said roads for energization of the vehicles, and means to control the potential applied to said roads in order to vary the speed of operation of the vehicles.

16. A track and vehicle toy comprising a road section having a pair of collateral trough-like roads, a contact strip insulatedly mounted on each of said roads, and electrically operated vehicles adapted to run in either road, one of said vehicles simulating an automobile and the other of said vehicles simulating a locomotive or train, a step-down transformer for supplying energy to said roads for energization of the vehicles, and means to independently control the potential applied to each of said roads in order to independently vary the speed of operation of the vehicles.

17. A grade crossover for an electric speedway toy, said crossover including a center and four arms, each arm including a single piece of sheet metal ridged to form center and outside guides with two collateral trough-like roads therebetween, a contact strip insulatedly mounted on each of said roads, and said center comprising a top plate with apertures aligned with each contact strip, a plurality of insulated contacts projecting upwardly through said apertures, and independent connections for current supply to the contact strips of each road of the crossover, and an additional independent connection to all of said contacts in common.

18. A grade crossover for an electric speedway toy, said crossover including a center and four arms, each arm including two collateral trough-like roads, a contact strip insulatedly mounted on each of said roads, and said center comprising a top plate with apertures aligned with each contact strip, a top insulator beneath said top plate having apertures registering with the aforesaid apertures, but slightly smaller, a contact plate embossed upwardly to form contact areas projecting upwardly through the aforesaid apertures, a bottom insulator beneath said contact plate, and a bottom plate beneath said bottom insulator, wiring connecting the two aligned contact strips at opposite sides of the center, and connections for current supply to each aligned pair of contact strips and to said center contact plate.

19. A grade crossover for an electric speedway toy, said crossover including a center and four arms, each arm including a single piece of sheet metal ridged to form center and outside guides with two collateral trough-like roads therebetween, a contact strip insulatedly mounted on each of said roads, and said center comprising a top plate with eight apertures three of which are aligned with each contact strip, a top insulator beneath said top plate having eight apertures registering with the aforesaid apertures b slightly smaller, a contact plate embossed u wardly to form eight contact areas projecti upwardly through the aforesaid apertures, a bc tom insulator beneath said contact plate, and bottom plate beneath said bottom insulator, wi ing connecting the two aligned contact strips opposite sides of the center, and connections f current supply to each aligned pair of conta strips and to said center contact plate.

20. A road section for a speedway toy, sai section comprising a piece of sheet metal bent t form a trough-like road, said metal being ridge upwardly at the sides, connection pins and sock ets at the ends of the section for connection t an adjacent section, and a leveling tongue forme integrally with said section.

21. A road section for a speedway toy, sai section comprising a piece of sheet metal ben to form two parallel trough-like roads, said meta being ridged upwardly between said roads, an being ridged upwardly at the outer sides of sai roads, the side edges then being bent downwardl and inwardly, connection sockets formed by the edges of said metal at the end of the section, a connection pin permanently secured in one o the sockets, the other socket being adapted to slidably receive a similar pin, and leveling tongues formed integrally with said section.

22. A road section for an electrically operated speedway toy, said section comprising a piece of sheet metal bent to form a trough-like road, a relatively flat contact strip at the center of the road, an insulation strip extending continuously between the road and contact strip, lugs formed integrally with said contact and insulation strips at opposite sides thereof, said road having slots cut therethrough at opposite sides of said strips, and said lugs being passed through said slots and bent to anchor the parts together while maintaining the contact strip in insulated relation to the road.

23. A road section for an electrically operated speedway toy, said section comprising a piece of sheet metal bent to form two parallel through-like roads, relatively flat contact strips at the center of each road, insulation strips extending continuously between the roads and contact strips, lugs formed integrally with said contact and insulation strips at opposite sides thereof, slots cut through said roads at opposite sides of said strips, said lugs being passed through said slots and bent to anchor the parts together while maintaining the contact strip in insulated relation to the road.

24. A road section for an electrically operated speedway toy, said section comprising a piece of sheet metal bent to form a trough-like road, a contact strip insulatedly mounted on said road, leveling tongues formed integrally with said section at the end of the section on opposite sides of the contact strip, and a contact spring secured to the bottom of said section in electrical contact with said strip for electrically connecting the strip to the strip of an adjacent section.

25. A road section for an electrically operated speedway toy, said section comprising a piece of sheet metal bent to form two parallel trough-like roads, said metal being ridged upwardly between said roads, and being ridged upwardly at the outer sides of said roads, contact strips at the center of each road, insulation strips between the roads and contact strips, lugs formed integrally with said contact and insulation strips at oppo-

site sides thereof, slots cut through said roads at opposite sides of said strips, said lugs being passed through said slots and bent to anchor the parts together while maintaining the contact strip in insulated relation to the road, leveling tongues formed integrally with said section at an end of said section on opposite sides of the contact strips, and a contact spring secured to the bottom of said section in electrical contact with one of said strips for electrically connecting the strip to the strip of an adjacent section.

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