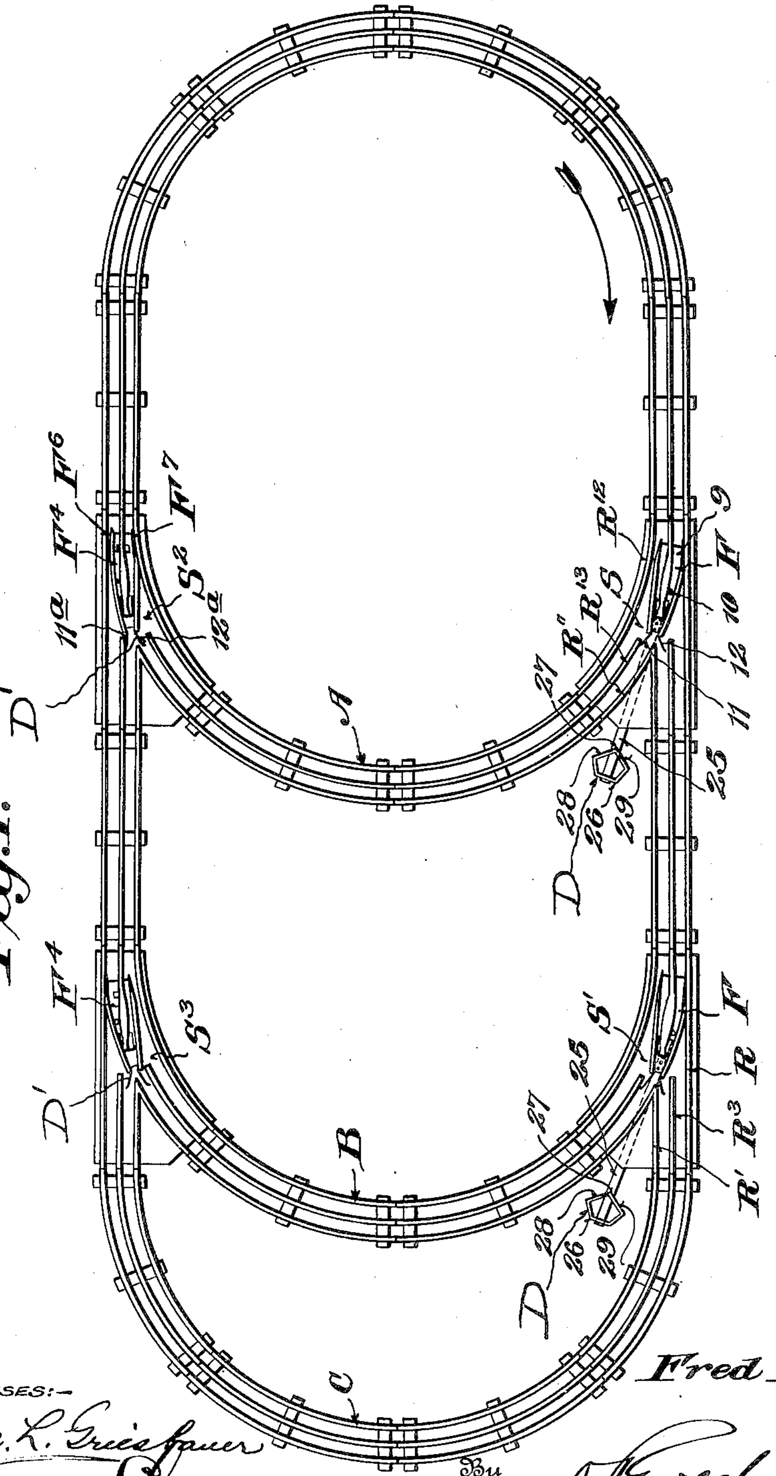
July 27, 1926. F. MIZE 1,593,807

SWITCH FOR TOY RAILWAYS

Filed May 1, 1925 4 Sheets-Sheet 1

Fig.1.



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SWITCH FOR TOY RAILWAYS

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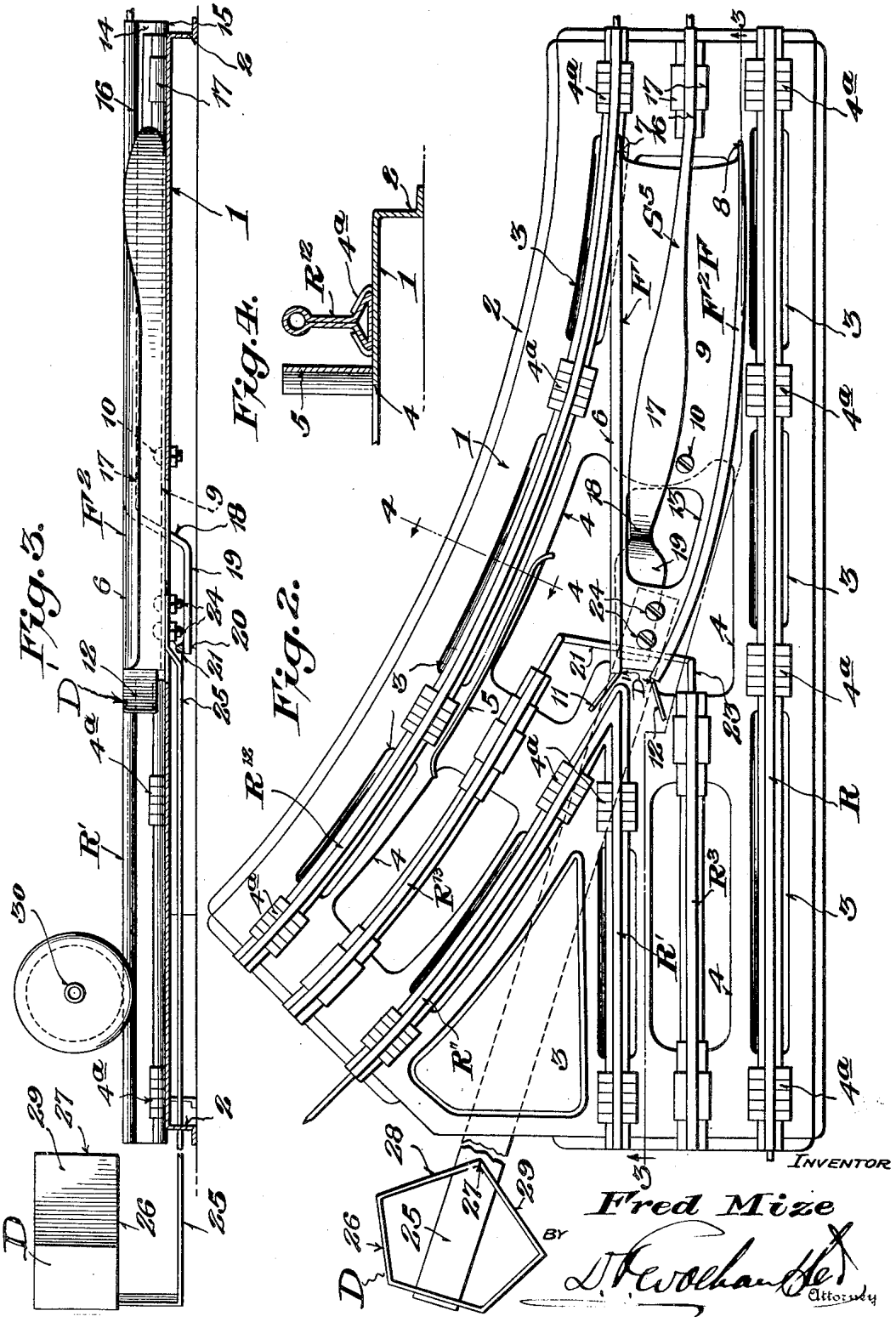

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SWITCH FOR TOY RAILWAYS

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Fig.5.

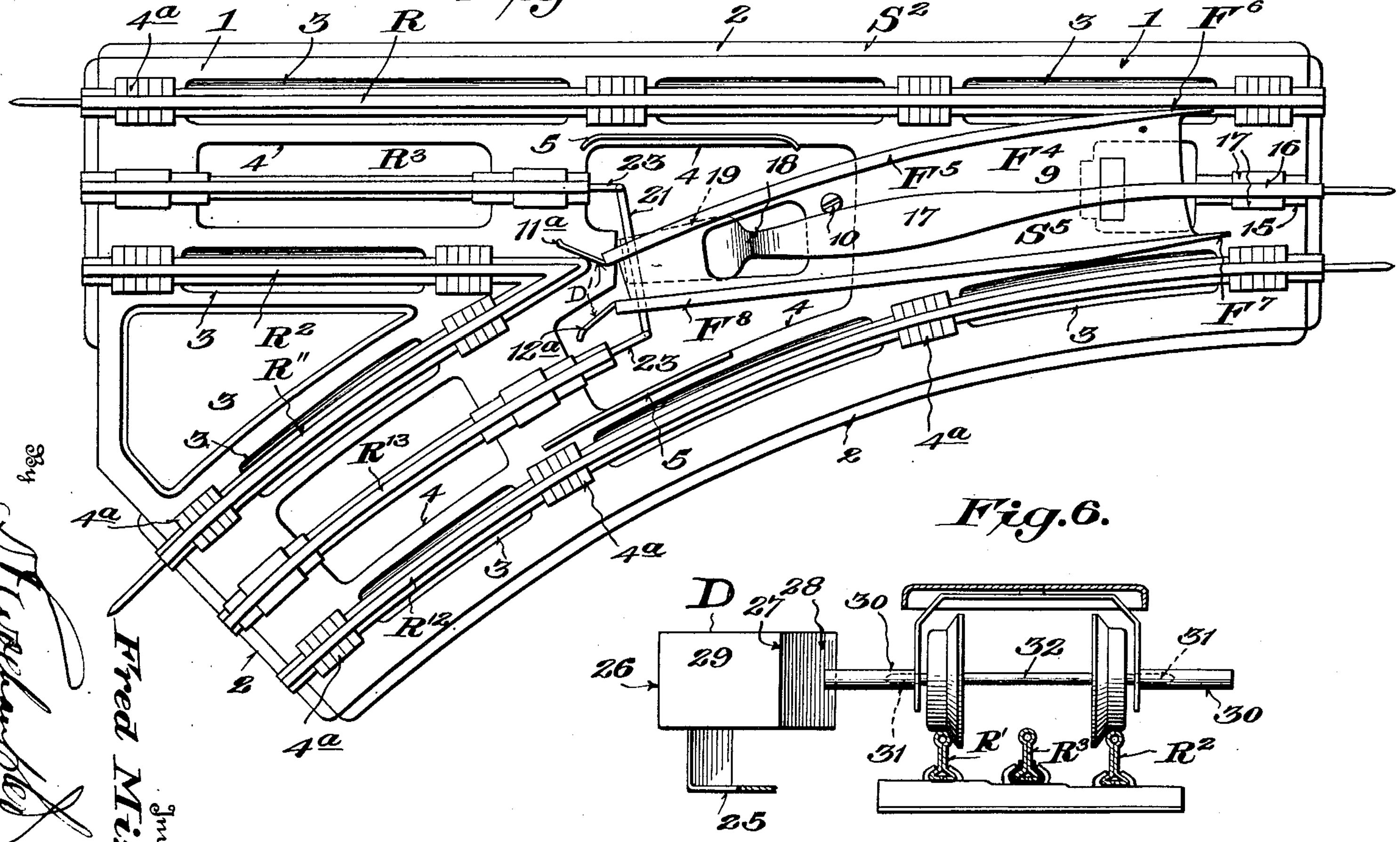

Fig.6.

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SWITCH FOR TOY RAILWAYS

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Fig. 7.

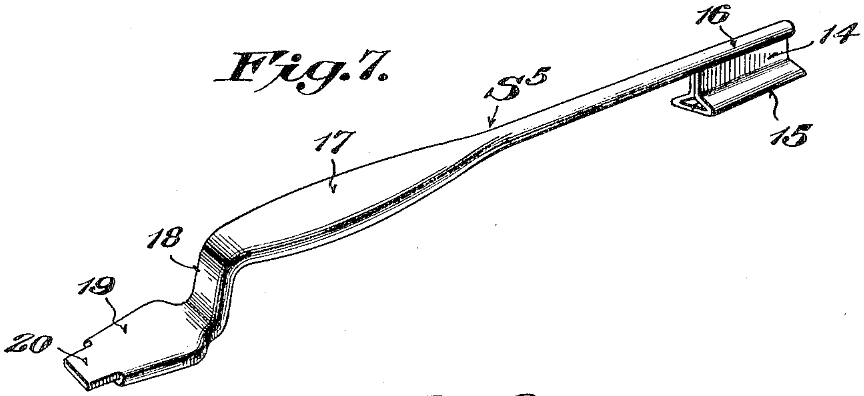


Fig. 8.

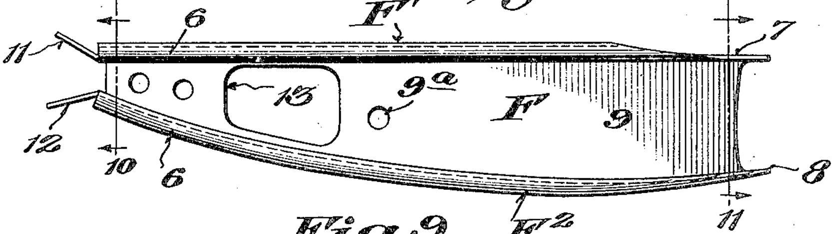


Fig. 9.

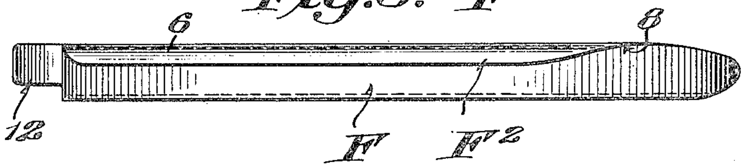


Fig. 10.

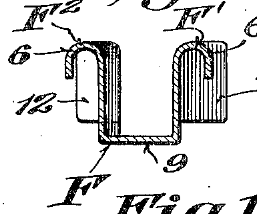


Fig. 11.

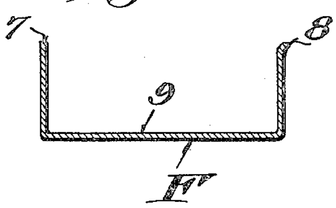
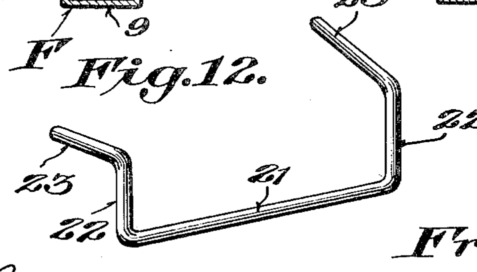


Fig. 12.



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UNITED STATES PATENT OFFICE.

FRED MIZE, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN FLYER MFG. CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SWITCH FOR TOY RAILWAYS.

Application filed May 1, 1925. Serial No. 27,254.

This invention relates to switches for toy railways, and more particularly to switches adapted to be set or operated by the train, thereby to cause the train to move over various portions or sections of the track in a certain prescribed order without attention from the operator.

To that end the invention contemplates as a general object a type of switch which although particularly adapted for use with electrically driven trains, may nevertheless be used with mechanically operated locomotives because no electrical equipment is required to operate the same. In other words the invention provides a switch of more or less universal application, and having features of construction which permit of its mechanical operation by a car of the train whereby control is independent of any electrical circuits even when the same is used in connection with a third rail track.

A further object of the invention is to provide a switch which will permit of the use of a plurality of loops thereby to cause the train to move the various loops in succession without any attention on the part of the operator, and repeat the operations as long as the train continues to run.

Another and more specific object of the invention is to provide novel frog controlling means whereby the frog may be set by the train as it leaves or enters the switch to either permit the train to change its course after leaving one loop, or continue in its travel through a loop intersection without danger of derailment by closing an open switch upon approaching the track junction at the intersection.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings in which:—

Figure 1 is a plan view of a toy railway track equipped with switches according to the present invention.

Figure 2 is a plan view of the switch showing one form of frog control.

Figure 3 is a longitudinal cross sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a plan view similar to Figure 2 showing another form of frog control.

Figure 6 is a detail vertical sectional view illustrating the car carried means for setting the switch.

Figure 7 is a detail perspective view of the switch third rail unit.

Figure 8 is a top plan view of the switch member.

Figure 9 is a side elevation of the switch member.

Figure 10 is a cross sectional view taken on the line 10—10 of Figure 8.

Figure 11 is a cross sectional view taken on the line 11—11 of Figure 8.

Figure 12 is a detail perspective view of the third rail connector.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

Primarily the present invention includes in its organization a novel switch device designated generally as S, and possessing special features of construction whereby the movable switch member F may be mechanically controlled in a reliable and accurate manner to cause the train to traverse a novel path.

Practically all toy trains are made to run on tracks of loop formation, and while it has heretofore been the practice to use crossovers, hand operated and electro-magnetically operated switches to increase the path of travel of the train, nevertheless these expedients either do not permit of the novel routing of the trains proposed herein, or are more or less of a nuisance in the case of manually operated switches while electro-magnetically operated switches require additional apparatus and add to the expense of installation and are liable to easily get out of order. Also in toys of this kind it is desirable to keep the cost as low as possible.

As will be observed from Figure 1 of the drawings the present switch device S is used in connection with straight and curved sections of track thereby to provide the loop A, while a second switch S′ is employed to provide the second and third loops B and C. The exit ends of the loops B and C are connected with the main line leading to the loop A by the switches S^2 and S^3 whose structural features and characteristics are similar to

the switches S and S′ except for the switch control feature, as will presently appear. After the novel switch devices have been described the operation of the train over the loops A, B and C will be further referred to but for the present it will be understood that it is the purpose of the present switch devices to cause the train to proceed through the loops A, B and C in succession, assuming that the direction of travel is that indicated by the arrow in loop A.

Referring first to the switch device S it will be observed more particularly from the enlarged illustration thereof shown in Figure 2 and the detail shown in Figures 7 to 11 inclusive that the same essentially comprises a base 1 which is formed with the downturned flanges 2 to provide adaquate space for housing the operating connections beneath the switch and at the same time raise the rails thereof to the same level as the rails of connecting track sections which rest upon the usual cross ties. The said base 1 is preferably made from sheet metal and is suitably reinforced by the depressed portions 3 which may alternate with the struck up rail engaging clip portions 4^a, as shown, and which clamp the base flanges of the through rails R, main line rail R′, and the insulated third rail R^3. Also the said base is provided with openings or cut away portions 4 which give lightness thereto and also afford convenient means for assembling the several parts of the switch.

The rails, R, R′ and R^3 constitute the main track of the switch while the main turn-out rail R″, stock rail R^{12} and insulated third rail R^{13} constitute the rails of the loop or turn-out section of the track. The stock rail R^{12} of the turn-out section of track is provided at its inner side with a guard rail 5 clearly shown in Figure 2 and in the vertical sectional view in Figure 4. The purpose of this guard rail is properly to guide the wheels of the train when passing over the switch into the shunt or loop section of the track thereby to prevent derailment.

Between the main line track and the turn-out section, the switch member F is located, and as will presently appear more in detail, the same is equipped with the novel control means D and D′ either of which may be brought into use according to where the device is to be used. At location where the means D is used, D′ serves to make the setting accurate but does not function to control the movement of the train. On the other hand at points where D′ is used the control means D is preferably dispensed with entirely as shown in the case of the switches S^2 and S^3.

Proceeding, however, with a description of the switch member F it will be observed that the same is formed of sheet metal and has a substantially U or trough shaped formation with the opposite edge portions thereof turned upwardly to provide the straight lead rail F of the pivoted switch and the curved lead raid F^2. As will be observed from Figures 8 and 10 the convergent or frog ends of the lead rails F′ and F^2 are provided with the relatively wide head portions 6 thereby to match up with the heads of the main line rail R′ and the main turn-out rail R″ according to the position of the pivoted frog. Also the opposite or switch ends of the rail portions F′ and F^2 are cut away to a taper as indicated at 7 and 8 thereby to form a mitered joint with the rails R′ and R of the main line track, according to the position in which the frog is set. The bottom wall 9 of the switch member is provided with an opening 9^a for receiving a fastening 10 for pivotally connecting the same at the proper position on the base.

Also, the converging ends of the lead rails F and F′ are provided with the outwardly flaring or divergent control extensions or wings 11 and 12 for engaging with opposite sides of the heel formed at the junction of the main rails R′ and R″ thereby to constitute the frog control means D′ which is engaged by a front wheel of the locomotive.

In addition to being provided with the opening 9 the floor of the switch member F is also formed with the opening 13 which registers with one of the large openings 4 of the base thereby to permit of the carrying into effect another of the novel and distinctive features of the present improvement. That feature resides in the provision of the novel third switch-rail unit S^5 (Fig. 7). This unit preferably consists of a rail member formed at one end with a full rail section including the web 14, base flanges 15 and tubular head 16, the said base flange 15 being held to the base 1 by the rail clips 17 and the said head 16 extending forwardly and being flattened out as indicated at 17, in the same plane, however, as the head 16. This flattened out portion 17 provides an extended bearing for the trolley wheel of the locomotive as it passes through the switch and prevents a gap in the feeding of the current to the locomotive. In other words the switch third-rail unit S^5 permits of feeding the current to the trolley for a longer period than has been heretofore possible with other types of switches. The forward end of the third-rail member S^6 between the flattened portion 17 is bent downwardly as indicated at 18 and passes through the opening 13 in the switch member and through the open space 5 in the rail base, whereupon it is again bent into a horizontal plane as indicated at 19 and cut to provide a tongue 20 adapted to be bent around a third rail connector 21 to which it may be soldered to give a good electrical connection.

The said third rail connector 21 is preferably in the form of a wire loop of substantially U-shaped formation having the upwardly extending arms 22 and the horizontally extending divergent arms 23 (see Fig. 12) for fitting into the tubular head portions of the third rail sections R^3 and R^{13}. It will therefore be apparent that the third rail R^3 of the main line may be readily electrically connected with the third rail R^{13} of the turn-out track section and likewise the said third rail sections may also be connected with the third rail loop by means of the third rail S^5.

Referring more in detail to the frog control means D it will be observed more particularly from Figures 2 and 3 that the small end of the switch member F projects over one of the openings 4 in the base and has attached thereto by the fastenings 24, the inner end of an operating arm or lever 25. This operating lever has the end thereof which is attached to the frog bent upwardly as shown in Figure 3 into the plane of the top of the base 1 while the main body of the arm or lever lies in the hollow portion of the base afforded by the vertical supporting flanges 2. The outer end of the arm 25 carries therewith a suitable abutment 26 which may be formed with or attached to the upwardly extending portion of the arm, and in the instance shown is preferably of pentagonal formation thereby to provide the nose 27 and divergent sides 28 and 29. The said divergent sides 28 and 29 are adapted to be alternately engaged by a suitable projection carried by the last car of the train. For convenience, this projection may be in the form of a tubular member 30 that may be readily fitted over the projecting end portions 31 of an axle 32 on the rear car so that as the last car has passed through the switch the projection 30 will engage with either the side 28 or the side 29 thereby to shift the arm 25 and move the switch member F. It will therefore be apparent that the said switch F may be shifted from the position shown in Figure 2 which is the straight-away position, to a position to direct the train into the turn-out section of the switch when the projection 30 strikes the face 29 of the abutment.

The switch devices S^2 and S^3 have all of the essential structural features and characteristics of the switch devices S and S'. Therefore similar references in Figure 5 designate the same parts as in Figure 2.

In the instance shown (Figure 5) the switch member F^4 is properly set for the train to come out of a loop and go into the straight section of track. However, if the pivoted switch member F^4 is set as shown in Figure 5 and a train approaches the switch S^2 from the straight-away or main line, the front wheel of the locomotive will strike the extension 11^a of the curved lead rail F^5 and throw the straight lead rail of the switch into line thereby opening the switch at the point F^6 and closing it at the point F^7. On the other hand if the switch is set in the position for straight-away travel on the main line, and a train approaches from a loop through the turn-out section, the front wheel of the locomotive would strike the inside of the projection 12^a of the straight lead rail F^8 and cause the curved lead rail F^5 to assume the position shown in Figure 5 whereby the exit or leaving end of the switch will be closed at F^6 and opened at F^7.

The operation of the system including the switches of the S—S' type and the switches of the S^2—S^3 type is substantially as follows:—

Assuming that the switches S and S' which may be termed "automatic" switch devices are set as indicated in Figure 1 to deflect trains into the loops A and B, and that the train in loop A is traveling in the direction of the arrow, it will be apparent that the train will pass into the left hand section of loop A due to the fact that the switch member F is set to direct the train into that portion of the loop instead of permitting it to go on straight to loop B. As the last car having the projection 30 thereon passes the position of the abutment 26 the said projection 30 will engage the face 28 of the switch control means D and move the lever 25 outwardly thereby to shift the switch into position to cause the train to run straight-away and avoid loop A on the next trip around as will presently appear.

The continued movement of the train through the left hand section of the loop A will cause the front wheel of the locomotive to engage with the projection 12^a and move the switch member F^4 on its pivot thereby to close this switch member at the point F^6 and open it at the point F^7 and permit the train to proceed around the right hand section of the loop A. When the train again reaches the switch S after having been through the loop A, it will not again enter the loop A but will pass on through the straight portion of the track connecting loops A and B, and due to the position of the switch S' it will pass into the loop B. As the last car of the train passes the face 29 of the abutment constituting the control means D it will again return the member F of switch S' back to its original position, namely that shown in Figure 1. The train then proceeds through loop B, and as the switch device S^3 is properly set for this movement, the same will not be moved and the train will continue on through the straight-away section communicating with loop A. As soon as the front wheels of the locomotive strike the projection 11^a the pivoted switch member F^4 will be shifted so

as to open the switch at F^6 and close it at F^7 thereby to let the train come into the right hand portion of the loop A.

As the train continues on around the right hand portion of loop A it will again encounter the switch device S and since this is now set to its original position the train will proceed through the left hand section of loop A whereupon the last car of the train will again shift the lever 25 to cause the member F to assume a straight-away position.

When the train comes out of the loop A and passes on to the straight-away section toward loop B, it will not enter loop B because the last car of the train in passing into loop B shifted the lever 25 of the switch S′ and set the switch member of that device to the straight-away position. Therefore, the train will continue into loop C and as the last car of the train passes into loop C the projection 30 on the axle of the first truck will engage with the face 29 of the frog control means D and again set the switch S′ to direct a train into loop B. As the train moves out of loop C into the straight away section between loops B and A the front wheel of the locomotive will properly set the switch device S^3 so that the train can proceed on toward loop A, the switch device S^2 being also set by the front wheels of the locomotive in proper position in the manner already described. After the train reaches the loop A the cycle of operations may be repeated indefinitely.

Therefore, it will be apparent that by setting the switches S′, etc., in the positions shown in Figure 1, and starting the train in loop A in the direction of the arrow, the train will first make a complete circuit through loop A, properly setting the switch S^2, and after making one complete circuit through loop A will pass on to loop B. As it passes from loop B into the straight-away section leading to loop A the switch S^3 being correctly set the train will make a second trip through loop A because the switch S was reset to its original position as the last car of the train passed the switch S in going into loop B. After its second circuit through loop A the train will not enter loop B but will pass onto loop C, and from loop C it will pass onto loop A where it will make a complete circuit before again entering loop B.

From the foregoing it will be apparent that the present novel type of switch device makes it possible to use a plurality of connected and intercommunicating routes A, B and C. In other words by the use of the switch devices of the S type and S^2 type, in combination with straight or parallel sections of track and intervening curved sections it is possible to provide a track of indefinite length with as many intervening loops as desired. By reason of the reverse relation of the switches of the S and S^2 type in the sense that one is operated upon the approach of the train while the other is operated as a train passes into the turn-out section, it will be understood that as long as the train continues to run the same will be routed over the intercommunicating loops without manual attention.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention and scope of the appended claims.

I claim:—

1. In a toy railway track system including straight and curved sections of main line track, the combination of a pair of mechanically operated switch devices each including a base having straight and curved turn-out track sections mounted thereon and switch members pivotally connected to the base, and abutment means carried by and projecting from the frog ends of said switch members and adapted to be moved by the train in its travel whereby one switch member is shifted as the last car of the train passes through the switch while the other switch member is shifted as the leading car of the train approaches the other switch device.

2. A switch for toy railways including a main track section and a turn-out track section, a switch member pivoted at the junction of the main and turn-out sections and including curved and straight lead rails, and a lever carried by the frog end of the switch and having an abutment arranged adjacent the trackway, and means carried by the rear car of the train adapted to alternately engage opposite sides of said abutment thereby to shift the switch member.

3. A switch for toy railways including a main track section and a turn-out track section, a switch member pivoted at the junction of the main and turn-out sections and including curved and straight lead rails, and a lever carried by the frog end of the switch member and having a multi-sided abutment at its outer end located between the main line of the switch and the turn-out section, and means carried by the rear car of the train adapted to engage opposite sides of said abutment thereby to shift the switch member as the train leaves the switch device.

4. A switch for toy railways including a main track section and a turn-out track section, a switch member pivoted at the junction of the main and turn-out sections and including curved and straight lead

rails, and a lever carried by the frog end of the switch member, an abutment carried by the lever and having oppositely flaring sides and said abutment being located between the main and turn-out sections of the switch device, and a switch operating projection carried by the rear of the train adapted to alternately engage said oppositely flaring sides of the abutment.

5. A switch device for toy railways including a main track section and a turn-out track section, a switch member pivoted at the junction of the main and turn-out sections and including curved and straight lead rails, and wings carried by and projecting from said lead rails and adapted to be engaged by the front wheels of a car going through the turn-out section.

6. A switch device for toy railways including a main track section and a turn-out track section, a switch member pivoted at the junction of the main and turn-out sections and including curved and straight lead rails, and divergent wings carried by and projecting from said lead rails and adapted to be alternately engaged by the front wheels of a car going through the turn-out section.

In testimony whereof I hereunto affix my signature.

FRED MIZE.