Sept. 6, 1938. J. L. BONANNO 2,129,258

CIRCUIT CONTROLLERS FOR TOY RAILROADS

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Fig. 1.

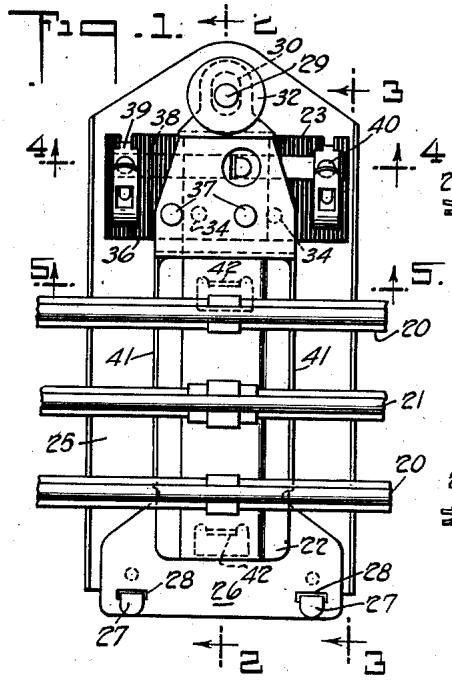


Fig. 2.

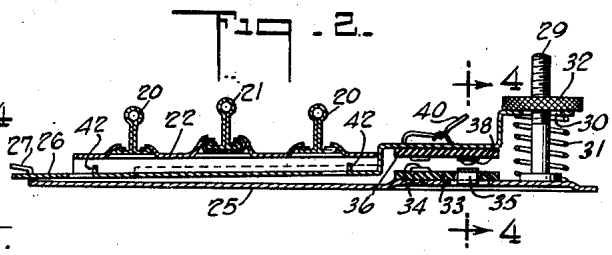
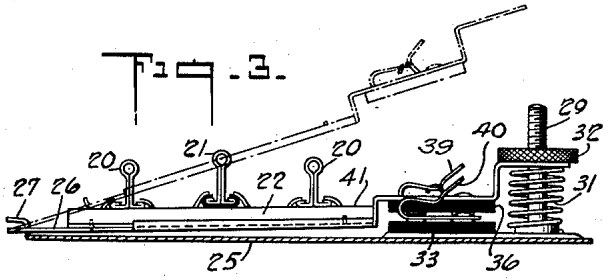


Fig. 3.



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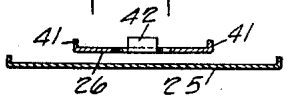


Fig. 4.

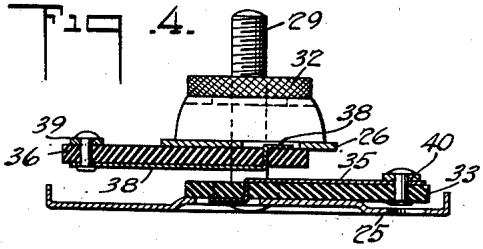


Fig. 7.

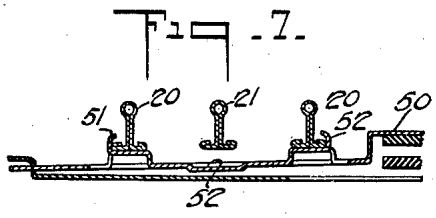


Fig. 6.

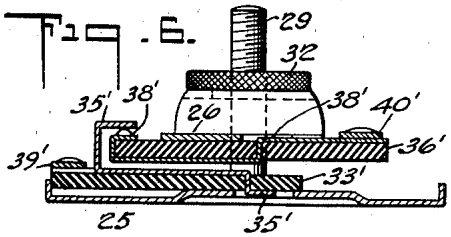
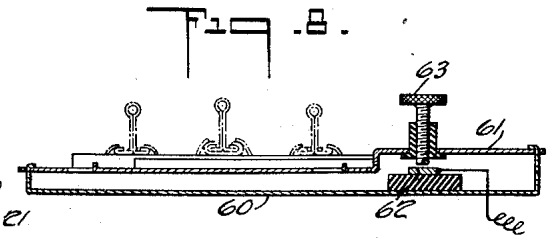


Fig. 8.



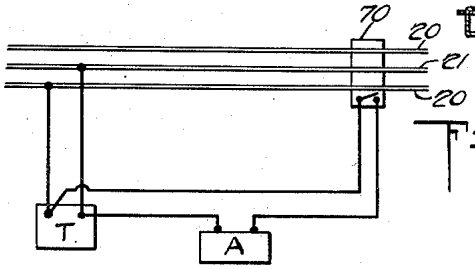


Fig. 9.

INVENTOR
Joseph L. Bonanno.
BY
Julius Silberman
ATTORNEY

Sept. 6, 1938. J. L. BONANNO 2,129,258

CIRCUIT CONTROLLERS FOR TOY RAILROADS

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Fig. 10.

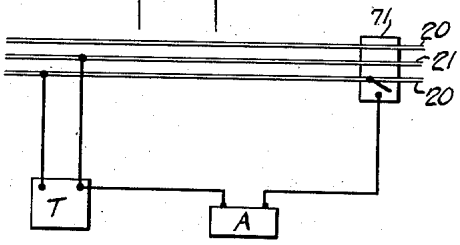


Fig. 11.

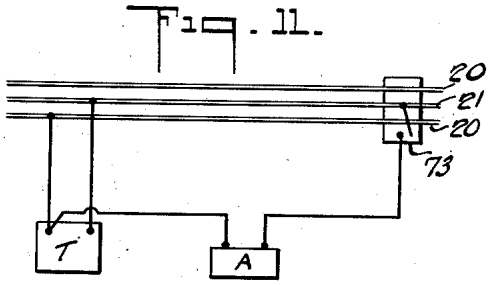


Fig. 12.

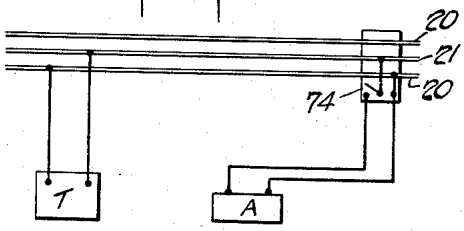
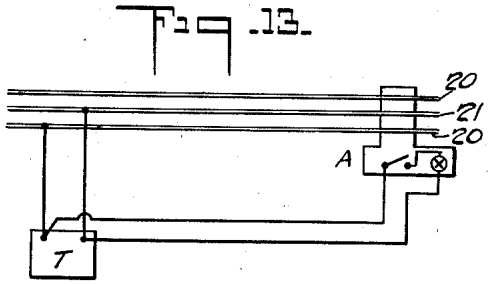


Fig. 13.



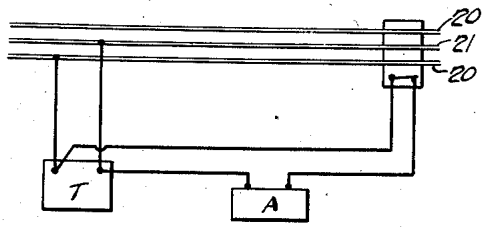
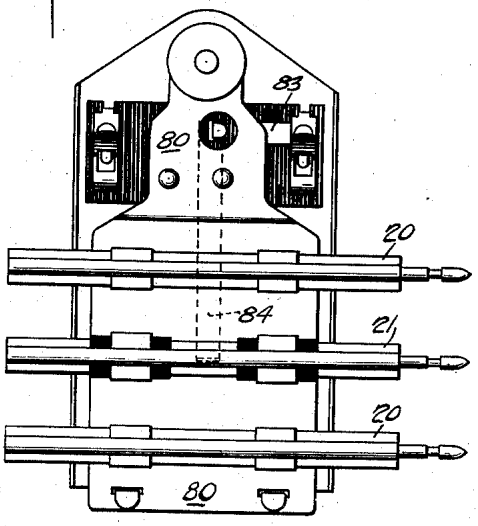


Fig. 14.

Fig. 15.



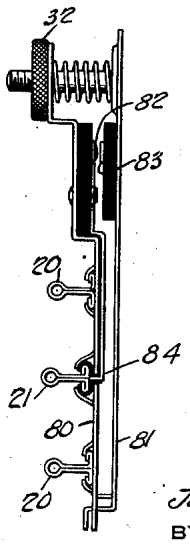


Fig. 16.

INVENTOR
Joseph L. Bonanno.
BY
Jules Shiberman
ATTORNEY

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UNITED STATES PATENT OFFICE

2,129,258

CIRCUIT CONTROLLER FOR TOY RAILROADS

Joseph L. Bonanno, Forest Hills, N. Y., assignor to The Lionel Corporation, New York, N. Y., a corporation of New York

Application May 29, 1936, Serial No. 82,477

15 Claims. (Cl. 246—251)

The present invention relates to circuit controllers for toy railroads.

Toy railroads are customarily provided with accessories, such as crossing gates, bells, lights, semaphores, and the like, adapted to operate in accordance with the passing of the train about the track.

In toy electric railroads, it has been customary to have each accessory connected to the third rail and included in a normally open shunt circuit adapted to receive the full potential of the propulsion current when the circuit is closed by the passage of the train.

Completion of this shunt circuit has generally been effected by the running gear of the toy vehicle which grounded an insulated rail or one of more insulated contacts.

The use of electrically controlled signals in connection with mechanically propelled trains required the use of track having the insulated rails as well as the addition of a collector shoe on the train. Such signals were not available for mechanically propelled trains operated on ordinary two-rail toy track.

When the accessory is controlled by completing the circuit through the trucks of the train, the operation of the accessory continues during the entire time that any car of the train was on the portion of the track carrying the insulated rails or contacts and hence duration of signals was related to length of train.

The present invention contemplates circuit controlling devices for use on toy railroads which act in response to the weight of the passing vehicle. According to the present invention, these controllers may be in the form of detachable accessories adapted for use with wide gauge or narrow gauge, three-rail toy railroad track, or with two-rail track and adapted to be secured to either the rails or the cross ties, or they may be secured to the rails in the same way as cross ties.

The connectors contemplated by the present invention may be designed to have the circuit through them normally closed and to be opened by the passing of the vehicle, or to have the circuit normally open and be closed by the passing of the vehicle. They may be designed to have both contacts insulated from the rails, or the contacts may be either or both connected with the rails of the adjacent track. It is thus possible to completely separate the accessory circuit from the propulsion circuit or to have one or both of the rails supply the current for the accessory.

The present invention may be conveniently embodied in a thin shallow structure adapted to be placed underneath the toy railroad track to elevate that portion of the track a slight but imperceptible amount above the supporting surface. The device may employ a lower or base plate adapted to rest on the supporting surface, and a load-depressible track-supporting plate, these plates being provided with contacts which may be insulated from one or both the plates and disposed opposite one another so as to have their spacing changed by change of load on the track.

The device is provided with means for adjusting the spacing of the contacts whereby they may be placed in a normal condition (either open or closed) when there is no load on the track (or when the load is below a predetermined amount), so that upon the arrival of a load in excess of that for which the adjustment is made, the normal relation of the contacts will be changed. In this way the contacts may be adjusted to close only when a predetermined load is on the tracks, or to open only when a predetermined load is on the tracks, depending upon the contact arrangement employed. This possibility of adjustment makes it possible for the circuit controller to function when the locomotive passes over the device and not function when the cars are passing.

Other and further objects of the invention will appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, several of the many embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Fig. 1 is a top plan view showing a detachable form of connector supporting the cross tie of a track;

Fig. 2 is a vertical cross sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a vertical cross sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a transverse sectional view on the line 4—4 of Figs. 1 and 2;

Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 1, the cross tie being omitted;

Fig. 6 is a view similar to Fig. 4 illustrating the modification of the contact arrangement of Fig. 1, to provide a controller of the normal closed circuit type;

Fig. 7 is a vertical sectional view similar to Fig. 2 showing a form of circuit controller adapted for direct connection to the rails;

Fig. 8 is a longitudinal cross sectional view through a modified form of detachable connector;

Figs. 9 to 14 inclusive are circuit diagrams; and Figs. 15 and 16 are top plan view and end elevational views of a connector adapted for permanent securement to the track.

In the drawings, two wheel bearing rails of ordinary 3-rail toy railroad track are indicated at 20, and the third or propulsion rail is indicated at 21. Instead of 3-rail track, 2-rail track may be used. In Fig. 1 these rails are shown as being secured to a conventional sheet metal cross tie 22.

The connector shown in Figs. 1 to 5 has a base plate 25 somewhat longer than the cross tie so that when placed under the track, it can project out to one side of the track as apparent in the drawings. The upper plate is indicated at 26. The inner end of the base plate is provided with upwardly extending ears 27 adapted to pass through holes 28 in the upper plate. The other or outer end of the base plate is provided with a threaded stud which passes up through an opening 30 in the corresponding upwardly offset end of the upper plate.

A coiled spring 31 is interposed between the outer ends of the plates, and this spring may be held under compression and the spacing of the plates adjusted by means of a thumb nut 32 threaded on to the stud 29.

The lower plate 25 carries an insulating plate 33 secured in place by rivets, indicated at 34. This insulating plate supports a contact strip 35 as indicated. The upper plate 26 supports an insulating plate 36 secured in place by rivets indicated at 37, and this insulating strip supports a contact strip 38 disposed on its lower face. The inner ends of the contact strips 35 and 38 are opposite one another and are preferably provided with silvered contact surfaces. Each contact strip is secured to a spring clip for attachment of wires, these clips being indicated at 39 and 40.

The upper plate 26 is provided with a configuration adapting it to fit the cross ties of toy railroad track. This configuration includes two upwardly extending flanges 41 adapted to engage the side edges of a sheet metal cross tie as indicated at 22. The plate 25 is also provided with two upwardly bent ears 42 adapted to fit into the hollow bottom of die-cast cross ties or the cross ties of the mechanical track. By giving the plate the configurations just referred to, it can be made to fit all commercial forms of cross ties in use on wide and narrow gauge toy railroad track so that the accessory will be held in place relative to the track by merely placing in position under a cross tie.

When the connector is placed under the track, it is connected up with the current supply and signal in a suitable circuit arrangement to be described. The thumb nut 32 is then turned down to bring the contacts into engagement and close the circuit, and is then turned back a sufficient amount to open the circuit. The amount which the nut is turned back after the circuit is broken will vary the amount of movement required to close the circuit. This movement is brought about by the increase in the load on the track, and may be that of the drivers of the heaviest locomotive in use or may be that of the lightest car in use. The added weight causes a slight deflection of the upper plate, bringing the contacts toward one another and as soon as sufficient added weight arrives over the device, the circuit is closed. The spring 31 acts at all times to hold the parts in the normal position to which they have been adjusted.

In the form shown in Fig. 6, the insulating strip 33' supports a contact strip 35' having an end extending upwardly and inwardly as indicated, so as to be opposite the end of a contact strip 38' carried by the upper insulating plate 36'. These contact strips are connected to spring clips 39' and 40' for connection with wires. As the movable contact is now below the fixed contact, it will be apparent that the device made as shown in Fig. 6 is adapted for a normal closed circuit operation, and will open the circuit upon the arrival of the load in excess of that for which the device is adjusted.

Fig. 7 illustrates a form of connector which is substantially the same as that shown in Fig. 1, except that the upper plate 50 is designed to be clipped on to the rails of the toy track. For this purpose, it is provided with two upwardly extending fingers 51 and 52 between which the rails may be inserted. The plate 50 may be depressed as indicated at 52 to be below the third rail.

In the arrangement shown in Figure 8, the connector has a lower plate 60 and an upper plate 61 permanently fastened together. The lower plate carries an insulated fixed contact 62 adapted for connection by suitable clips with one current supply wire, while the upper plate carries an insulated thumb screw 63 adapted to be adjusted relative to the fixed contact. This thumb screw is connected to wiring in any convenient manner. With this construction, the thumb screw is adjusted to engage the lower contact then turn back and the device closes the circuit whenever the load in excess of the adjustment is placed on the track.

In Figs. 9 to 14 the transformer or power source is indicated by the letter "A". The transformer is connected to the third rail and to one of the track rails to supply propulsion current in the usual manner. In Fig. 9 the accessory is indicated as being connected to the transformer and to a normal open circuit controller 70 which may be of any open circuit controller type adapted to be closed by load on the track rails.

In Fig. 10 the circuit arrangement for operating the accessory includes the lower track rail 20 and the movable contact of the controller 71, shown, as being grounded to that rail. This would be effected in a device such as shown in Fig. 1 by grounding the contact 38.

In Fig. 11 the accessory circuit includes the third rail 21 and the movable contact 73 is connected to the third rail. This may be done in the manner indicated in Fig. 16, to be described.

In Fig. 12, the accessory is connected at one side to the wheel bearing track rail and is connectable through a normally open circuit switch 74 with the third rail.

In Fig. 13, the accessory and contactor are combined in a single unit attached to the track and the circuit is established by closing the contact in the manner above described.

In Fig. 14, the accessory is one which is used in a normally closed circuit and the circuit is opened by the load on the track.

In the arrangement shown in Figs. 15 and 16, the upper plate 80 for the circuit controller is made up so as to function as a cross tie and it is permanently secured to the rails 20 and 21 as indicated. It is secured to a base plate 81 in the same manner as the upper plate 26 of Fig. 1. The upper plate 80 carries a movable insulated contact 82, similar to the contact 38, and placed opposite a fixed contact 83 carried by the lower plate. The movable contact is

here shown as permanently connected to the third rail 21 by means of a strip 84 insulatedly supported below the upper plate.

It will, of course, be understood that any of the structural arrangements shown herein may be arranged for normally open or normally closed circuit operation, and that instead of having both contacts insulated, either contact may be grounded so as to be connected with the return rail, or either contact may be permanently or temporarily connected with the third rail so as to secure the various alternative modes of control.

It is obvious that the invention may be embodied in many forms and constructions within the scope of the claims and I wish it to be understood that the particular forms shown are but a few of the many forms. Various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A circuit controlling unit for use with toy railroad tracks, comprising a lower or base plate, a superposed track-supporting plate having its ends supported from the lower plate and connected thereto to prevent relative sliding movement of the plates, the intermediate portions of the plates being out of physical contact with each other whereby the upper plate may bend when loaded intermediate its ends, the plates being adapted to extend under the rails of the track and support both track rails and to receive intermediate their ends the load of a vehicle carried by said tracks, and a pair of opposed circuit controlling contacts carried by the respective plates intermediate the ends thereof, the contacts having a normal electrical relation in the absence of a load on the track and movable out of said relation into the opposite electrical relation when the upper plate is bent downwardly by the load on the track.

2. A circuit controlling unit such as claimed in claim 1, wherein the upper plate has upwardly extending elements to fit a cross tie whereby the circuit controller may be held in definite position by said cross tie.

3. A circuit controlling unit such as claimed in claim 1, wherein the upper plate is permanently secured to the rails.

4. A circuit controlling unit such as claimed in claim 1, wherein the fixed contact is below the movable contact and the contacts are normally in the open circuit position.

5. A circuit controlling unit such as claimed in claim 1, wherein the fixed contact is above the movable contact and the contacts are normally in the closed circuit position.

6. A circuit controlling unit such as claimed in claim 1, wherein the fixed contact is below the movable contact and the contacts are normally in the open circuit position, and having means at one end of the plates for adjusting the normal spacing of the contacts whereby the minimum effective load for closing the circuit may be varied.

7. A circuit controlling unit for use with toy railroad tracks, comprising a lower or base plate, a superposed track-supporting plate supported at both ends and having one end connected to the lower plate to prevent relative sliding movement, the plates being adapted to extend under the rails of the track and support both track rails and to receive intermediate the ends thereof the load of a vehicle carried thereby, a pair of opposed circuit controlling contacts carried by the respective plates intermediate the ends thereof and having a normal electrical relation in the absence of a load on the track and movable out of said relation into the opposite electrical relation when the upper plate is bent downwardly by the load on the track, a threaded post carried by the lower plate at the opposite end and extending through the upper plate, a compression spring between the two plates, and a nut threaded on the post for adjusting the spacing of the plates and contacts, the spring holding the upper plate against the nut.

8. A circuit controlling unit for use with toy railroad tracks, comprising a lower or base plate, an upper track supporting plate having one end non-slidably secured to one end to the base plate, a stud carried by the other end of the base plate and extending upwardly through the upper plate, a fixed contact carried by the lower plate near said stud, a cooperative movable circuit controlling contact carried by the upper plate, a nut threaded on the stud for adjusting the spacing of the plates, and an expansion spring between the plates, said plates being normally otherwise spaced apart and adapted to be moved relative to one another by the weight of a car on said tracks.

9. The combination with a toy railroad track having a plurality of longitudinally extending rails, a transversely extending base plate, a superposed track-supporting plate having its ends supported from the lower plate and connected thereto to prevent relative sliding movement of the plates, the intermediate portions of the plates being out of physical contact with each other whereby the upper plate may bend when loaded intermediate its ends, the two plates extending laterally from the track, a pair of opposed circuit controlling contacts carried by the extended ends of the plates and having a normal electrical relation in the absence of a load on the tracks and movable out of said normal relation into the opposite electrical relation when the upper plate is bent downwardly by the load on the track, and wiring connectors carried by the plates and in circuit with the contacts.

10. The combination set forth in claim 9, wherein the support for the lateral extension of the base plate includes a threaded stud extending through the extension of the upper plate, the stud carrying a nut, the extension of the upper plate being angled, and having an expansion spring on the stud between the plate extensions adapted to be held under compression by the nut whereby the spacing of the contacts may be varied.

11. The combination with a toy railroad track, of a transverse lower or base plate, an upper track-supporting plate adapted to be flexed under load with respect to said base plate, the plates having extensions to one side of the track, opposed contacts carried by said extensions, means carried by the extensions for adjusting the contacts to a normal relation, and a spring interposed between the extensions to hold the end of the upper plate up, the upper plate being flexed by a vehicle of predetermined weight on the track.

12. A circuit controlling unit for use with toy railroad tracks, comprising an elongated base plate adapted to be positioned transversely of and beneath the track, an upper track-supporting plate adapted to bend under load of a vehicle on said track, the upper plate being supported from and lateraly unmovable relative

to said base plate, said plates being substantially coextensive and having portions extending laterally of the track at one side, and opposed contacts carried by the extended portions of said plates for controlling an electrical circuit during movements of the upper plate under the weight of a vehicle in motion on the track.

13. The circuit controlling unit as set forth in claim 12, wherein the said upper plate is detachably secured to the end of the base plate remote from the extensions, and having a compressible means interposed between the opposite extended ends of the plates to hold the upper plate up, and an adjustable abutment against which the upper plate is held.

14. The circuit controlling unit as set forth in claim 12, wherein the said upper plate is detachably secured to the end of the base plate remote from the extensions and has its laterally extending end upwardly offset, and having a compressible means interposed between the extended ends of the plates to hold the upper plate up, and an adjustable abutment against which the upper plate is held.

15. The combination with the two wheel bearing rails of a toy railroad track, of a track supporting member extending transversely under both rails and adapted to receive between the ends thereof the load of a passing vehicle, an underlying base member for said track supporting member, supports on said base member for the ends of the track supporting member, a fixed contact carried by said base member, a cooperative contact carried by the track supporting member, means to adjust the spacing of the contacts so as to place them in normal relation, the track supporting member flexing to move the movable contact out of said normal relation in response to the passing of a vehicle of predetermined weight.

JOSEPH L. BONANNO.