May 8, 1962 W. E. REXFORD 3,033,983

ACCESSORY CONTROLLER FOR TOY RAILWAY

Filed June 25, 1958 3 Sheets-Sheet 1

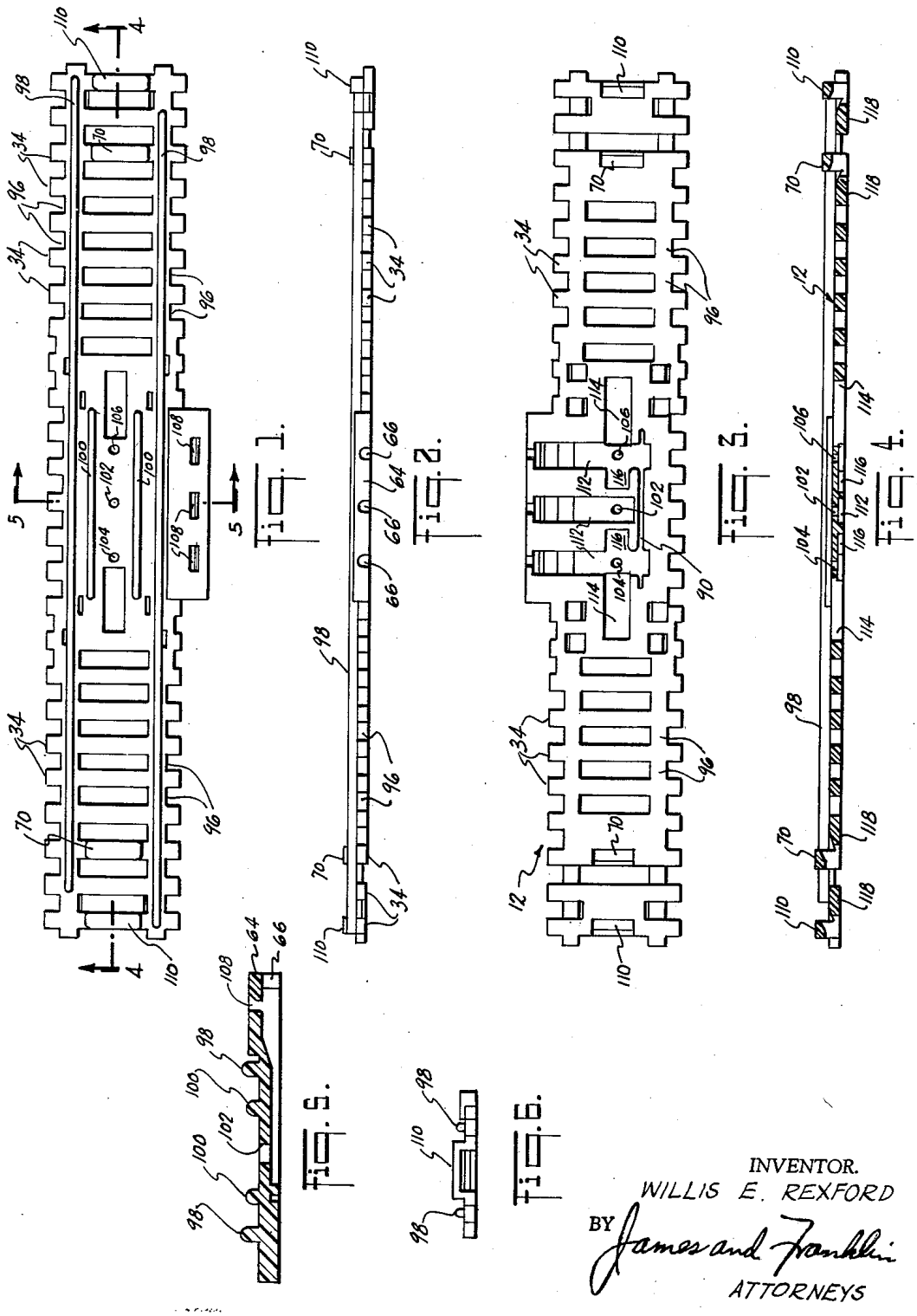

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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Filed June 25, 1958 3 Sheets-Sheet 2

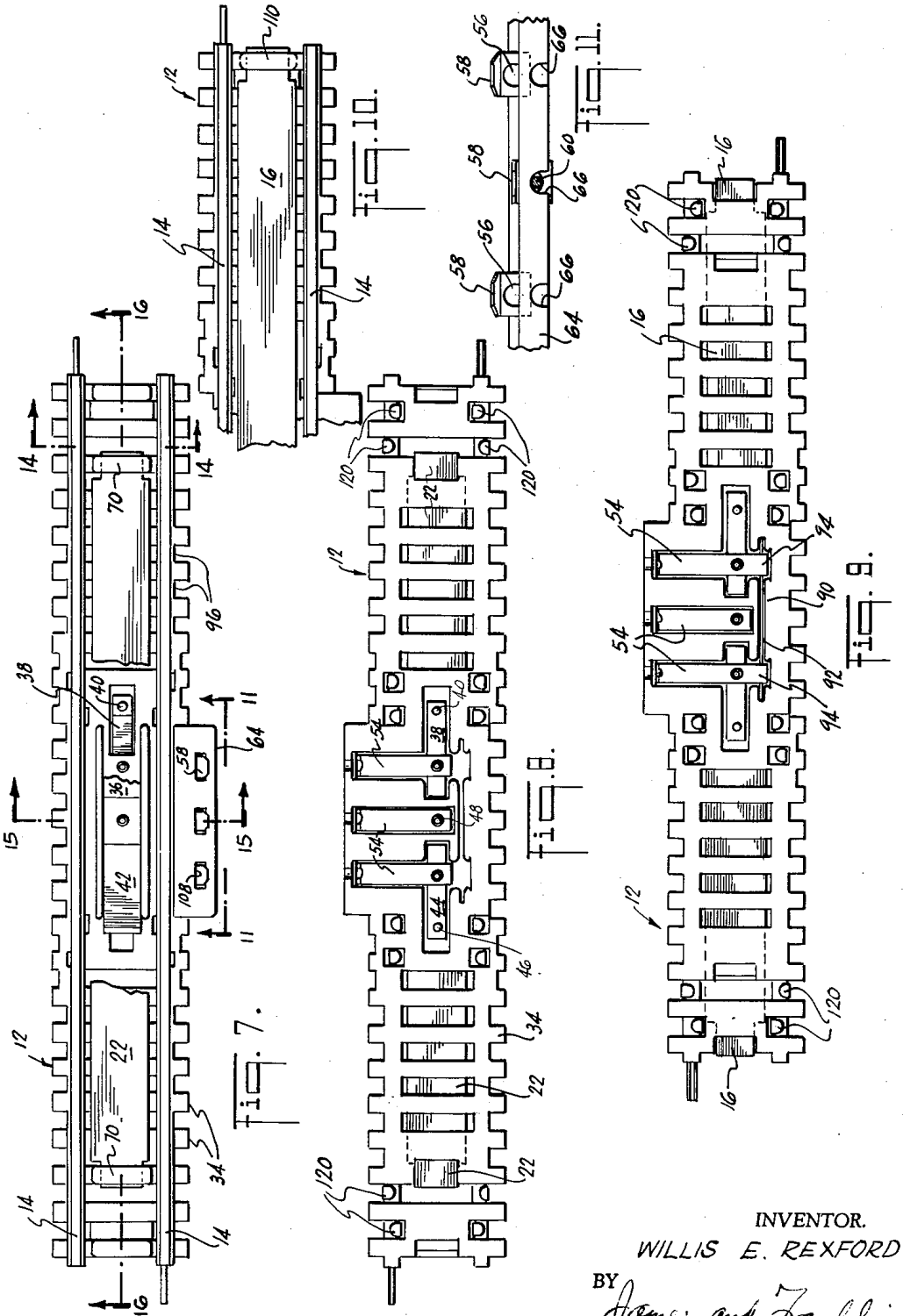

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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ACCESSORY CONTROLLER FOR TOY RAILWAY

Filed June 25, 1958 3 Sheets-Sheet 3

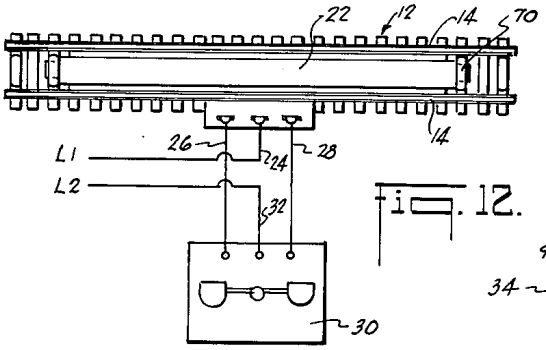

Fig. 12.

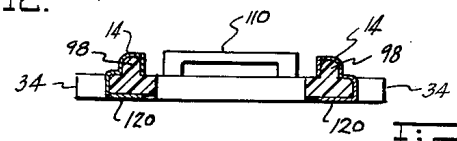

Fig. 14.

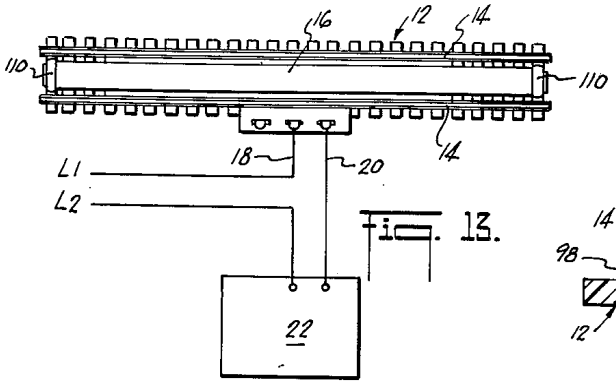

Fig. 13.

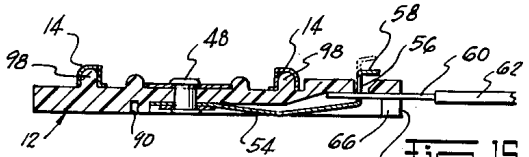

Fig. 15.

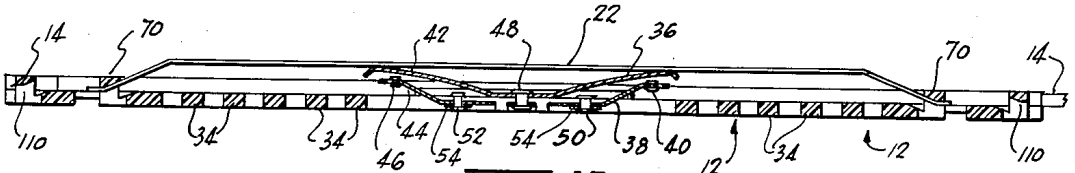

Fig. 16.

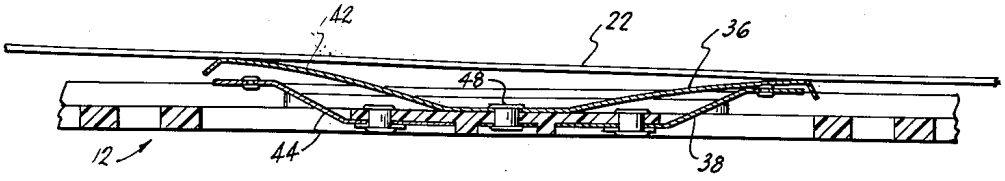

Fig. 17.

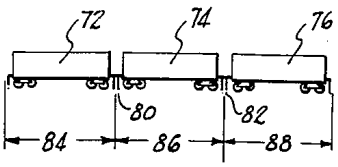

Fig. 18.

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ACCESSORY CONTROLLER FOR TOY RAILWAY

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Filed June 25, 1958, Ser. No. 744,361
9 Claims. (Cl. 246—246)

This invention relates to toy railways, and more particularly to a controller forming a part of the track system for controlling accessories.

Toy railways have a variety of accessories such as a crossing gate, a semaphore, a block signal, a two-light flashing signal, a track-side bell or whistle, mechanisms for loading or unloading logs, barrels, baggage, or other items, automatic control of track switches, and so on. These are usually controlled by the approach and departure of a moving train, or the position of a stopped train.

There is a trend toward miniature toy railways using the so-called "HO" gage. The track for such trains is usually of the two-rail type, with the rails insulated from one another, and commonly mounted on an insulation base simulating cross ties. The general object of the present invention is to provide an accessory controller which forms a part of a two-rail track system, and more specifically, an HO gage track system.

More specific objects of the invention are to provide an accessory controller which is simple in construction, easy to manufacture, dependable in operation, which will not interfere with the normal operation of HO gage trains, and which does not require the cars to have metal wheels.

Further objects of the invention are to provide an accessory controller which will provide continuous closing of an electrical circuit; a modified controller which will provide intermittent closing, as for the operation of a two-light flashing signal or a bell; and to provide a controller the base and most of the parts of which may be used with either the continuous or intermittent controller.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, the invention resides in the controller and track elements and their relation one to another as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings in which:

FIG. 1 is a plan view of a one-piece molded insulation base for the controller;

FIG. 2 is an edge view thereof;

FIG. 3 is a bottom view thereof;

FIG. 4 is a longitudinal section taken approximately on the line 4—4 of FIG. 1;

FIG. 5 is a transverse section drawn to enlarged scale and taken approximately on the line 5—5 of FIG. 1;

FIG. 6 is an end view;

FIG. 7 is a plan view of an assembled controller embodying features of my invention, with a part of the ramp broken away to show the contacts therebeneath;

FIG. 8 is a bottom view of the controller shown in FIG. 7;

FIG. 9 is a bottom view similar to FIG. 8, but showing a modification using a longer ramp and a shunt for continuous contact;

FIG. 10 is a fragmentary plan view similar to one end of FIG. 7, but showing the longer ramp of FIG. 9;

FIG. 11 is a fragmentary elevation looking in the direction of the arrows 11—11 of FIG. 7 and explanatory of a detail, drawn to larger scale;

FIG. 12 is a wiring diagram showing the controller applied to a two-light flashing signal;

FIG. 13 is a wiring diagram showing the controller applied to an accessory requiring continuous contact;

FIG. 14 is a transverse section drawn to enlarged scale and taken approximately on the line 14—14 of FIG. 7;

FIG. 15 is a transverse section drawn to enlarged scale and taken approximately on the line 15—15 of FIG. 7;

FIG. 16 is a longitudinal section taken in the plane 16—16 of FIG. 7;

FIG. 17 is a fragmentary section drawn to enlarged scale and showing how intermittent contact is obtained; and

FIG. 18 is a schematic elevation of a train to show the effective spacing of the operating projections of the train.

Referring to the drawing, and more particularly to FIG. 13, the accessory controller replaces one length or section of track, and for this purpose comprises an insulation base generally designated 12, with metal rails 14 thereon. There are superposed contacts which are concealed by a relatively long ramp 16 overlying the base and the contacts between the rails 14. The contacts are connected by conductors 18 and 20 to an accessory 22, and a power supply source is connected to leads L1 and L2. The arrangement and dimensioning of the ramp 16 is such that a passing train bears down on the ramp and closes the contacts, thereby closing the supply circuit to the accessory 22. In this case, the contacts are closed continuously.

Referring now to FIG. 12, the controller there shown comprises a similar base 12 with metal rails 14 and a ramp, but the ramp 22 here shown is shorter than the ramp 16. Two pairs of superposed normally open spring contacts, not shown, are disposed beneath the ramp 22. There is a common connection 24, and separated connections 26 and 28 to the spaced pairs of contacts. These lead to a two-light flashing signal 30, while a common conductor 24, and another common conductor 32 lead to a suitable power supply connected at L1, L2. In this case the circuit is closed intermittently.

The arrangement shown in FIG. 13 may be considered, electrically, as a single-pole single-throw switch, while the arrangement shown in FIG. 12 may be considered, electrically, to be a single-pole double-throw switch.

Referring now to FIG. 16, the base 12 is preferably a one-piece molded insulation base, and it preferably simulates ties 34. One of the rails is indicated at 14, while the ramp is shown at 22. There are two oppositely directed pairs of superposed, normally open, spring contacts disposed longitudinally of the base 12, and secured near the center thereof. The upper and lower contacts of one pair are shown at 36 and 38, the latter preferably having a contact point 40. The other pair of contacts is shown at 42, 44, the latter having a contact point at 46. The contacts 36 and 42 are preferably a single continuous piece of very thin spring metal secured at its center by means of an eyelet 48. The contacts 38 and 44 are preferably separate contacts secured by eyelets 50 and 52.

Connectors extend transversely from the contacts to the side of the base, and one of these is most clearly shown at 54 in FIG. 15. This connector is preferably made of spring metal and its outer end is bent upward at 56, and outward at 58. The upwardly bent part at 56 is provided with a hole to receive the stripped end 60 of a flexible insulated wire 62. The sidewall 64 of the base is preferably apertured or notched, as is best shown at 66 in FIG. 11. On reflection it will be evident that by pressing the tab 58 downward, the wire 60 may be slid through the then-aligned apertures 66 and 56, and that on release of tab 58 the wire will be held by the resilient upward restoring movement of the spring connector 54 (FIG. 15).

On reference to any of FIGS. 7, 8, 9, 11, 12 and 13, it will be seen that there are three such connectors affording convenient connection of three wires. Moreover, from inspection of FIGS. 8, 9 and 17, it will be

understood that the center connector leads to both upper contacts, while the side connectors lead to the lower contacts **38** and **44**.

Both the shorter ramp **22** and the longer ramp **16** are long relative to the contacts. The ramp is preferably made of insulation material, such as a thin sheet plastics material, or if made of thin sheet metal, it is preferably coated with insulation material. This precaution is not essential with all HO gage trains, but is desirable if the controller is to be usable with most such trains without concern over possible short circuiting of some of the electrically charged parts of the train.

The ends of ramp **22** are slid beneath yokes **70** (FIG. 7). These yokes are preferably integral with the base, and preferably are raised portions of a simulated tie, the raised portion being located between the rails. This is clearly shown at **70** in FIG. 1 and FIG. 7, as well as in FIG. 16. In FIG. 7 it will be seen that the ends of the ramp are necked to reduced width in order to be received in the yokes **70**, and to locate the ramp against longitudinal movement while affording vertical movement. In other words, the shoulders formed by the necking of the ends of the ramp prevent any substantial displacement of the ramp out of its desired position.

The shorter ramp **22** shown in FIG. 16 has a length somewhat less than the spacing of most of the operating projections on the train. In most cases, the operating projection is the coupling mechanism between cars, and referring to FIG. 18, the cars **72**, **74**, and **76** are coupled at **80** and **82**. The effective length of a car, or the spacing of the operating projections, is indicated by the dimensions 84, 86 and 88. It will be understood that the train may be much longer, with many more couplings. In one specific case the effective length of a car is six inches, and the short ramp is five and one quarter inches long.

When a first operating projection reaches the ramp **22** it depresses one end, and consequently closes the contacts **36**, **38**, while the contacts **42**, **44** remain open, as shown in FIG. 17. When the projection reaches the other half of the ramp, the contacts **42**, **44** close and the contacts **36**, **38** open. This is so because in general only one operating projection bears on the ramp at any one time. Thus the intermittent or flashing action desired for some accessories, such as the two-light flash signal shown in FIG. 12, is obtained.

On the other hand, when the ramp is longer than the spacing **86**, **88** shown in FIG. 18, a consequence is that two operating projections bear on the ramp much of the time, thus keeping the contacts closed. The desired result is further assured by connecting the two pairs of contacts together, which might be done by running the lead **20** in FIG. 13 to both outer connectors, but which is more conveniently done here by a connection in the controller itself. Referring to FIG. 15, there is a channel **90** to receive a short length of conductor, and referring to FIG. 9, the channel **90** has a bare wire conductor **92** therein, the said conductor underlying the ends **94** of both outer connectors, thereby shunting the same. Thus with either end down the circuit is closed. In the specific case mentioned above the longer ramp is six and one half inches long. The track section is seven and one half inches long.

A preferred form of molded base is shown in FIGS. 1 through 6 of the drawing. This base is so designed that it may be used for either type of accessory controller, that is the one with the short ramp or the one with the long ramp. The simulated ties are indicated at **34**. They are connected by cross-connections **96** which preferably underlie the rails so as to be concealed thereby. The particular rails here shown are inverted channels of sheet metal, and the base is provided with ridges **98** over which the sheet metal rails are placed. However, rails made of solid metal are even more common, and may equally well be employed here, the sole change then needed being to omit the ridges **98**, and to add means to hold the rails

on the base. If U-shaped staples are employed, which are common, the base is provided with appropriate holes at intervals to receive the said staples, the upper ends of which are bent toward one another around the parallel edges of the bottom flange of the solid metal rail. In general, the advantages of the present construction are independent of the specific nature of the rail used.

The base has a pair of ridges **100** (FIGS. 1 and 5) between which the upper contact spring (**36**, **42** in FIG.17) is secured by means of an eyelet passing through hole **102** (FIGS. 1 and 5). The lower contacts (**38** and **44** in FIG. 17) are secured by eyelets passing through holes **104** and **106** (FIG. 1). The upwardy directed tabs of the transverse connectors pass through slots indicated at **108** (FIGS. 1 and 5), these being aligned with the holes **102**, **104** and **106**, so that the same eyelet may be used for both the contact and the connector. The base has the yokes **70** and also another pair of yokes spaced further apart, as indicated at **110**. These receive the ends of the longer ramp when the longer ramp is used.

FIG. 2 shows the apertures **66** in wall **64**, previously referred to in connection with FIGS. 11 and 15 as receiving the wires. FIG. 3 shows the bottom of the base, including three transverse recesses **112** for the connectors, and openings **114** and recesses **116** for the bottom contacts. There is also a groove **90** for receiving the shunt connection wire between the two bottom contacts.

FIG. 4 shows how the yokes **110** and **70** and the adjacent parts **118** of the base are sloped to more readily receive the ends of the ramp when assembling the ramp with the base. On reflection it will be understood that the base may be molded between the halves of a simple two-part mold, there being no undercuts requiring retractible cores. It will also be understood that the base, as molded, includes appropriate guides, holes and slots which facilitate assembly with the metal parts.

FIGS. 7 and 8 show the assembly of the base with a short ramp **22**, while FIGS. 9 and 10 show the assembly of the base with a long ramp **16**. These drawings include the contacts, the connectors **54**, and the rails **14**, as well as the ramp **16** or **22**. In FIG. 7 the middle portion of ramp **22** has been broken away to expose the upper contacts **42**, **36**, and a part of contact **36** has been broken away to expose the lower contact **38**.

In FIG. 11, one tab **58** has been depressed to receive a wire **60**, while the other two tabs are still in raised position.

Disregarding the rails, the entire assembly requires only three small eyelets, and the contacts and connectors, held by the eyelets, cannot turn or pivot because they are received in recesses which hold them against turning. The rails are secured in whatever way is applicable to the track system in general. In the present case, the sheet metal rails are held by bending small tongues beneath the base, as shown at **120** in FIGS. 8 and 9. When solid metal rails are used, they may be fastened in any other conventional fashion, as by means of U-shaped staples referred to above.

It will be understood that the resilient sheet metal used for the contacts is exceedingly thin. The restoring force is just enough to raise the ramp. This is so in order not to exert a force tending to derail a train passing over the ramp. The ramp itself is thin and light and is freely movable up and down in the yokes which locate the same. The relative displacement of the eyelet or deflection point of the upper and lower springs is such that a slight wiping action occurs on the contacts, tending to keep the contacts clean.

It is believed that the construction, method of assembly, and operation of the improved accessory controller, as well as the advantages thereof, will be apparent from the foregoing detailed description. It will also be apparent that while the invention has been described in a preferred form, changes may be made in the structure shown without departing from the scope of the invention, as sought to be defined in the following claims:

What is claimed is:

1. An accessory controller for toy railway track of the two rail HO gauge type, said controller comprising a molded insulation base simulating tries for a toy track section of standard length interchangeable with other toy track sections of similar length, two spaced metal rails on said base, superposed normally open leaf spring contacts disposed on said base about midway between said rails, the springs of said contacts extending longitudinally of the base and being thin and easily deflected, electrical connectors extending from said contacts to the side of the base for detachable wire connections to provide an accessory controlling switch circuit which is insulated from and electrically independent of the rail circuit, a relatively long generally horizontal ramp overlying said base and said contacts between said rails, said ramp being substantially as long as the track section, yokes on said base receiving the ends of said ramp therebeneath, the ends of said ramp being necked to reduced width to be received in said yokes and to locate the ramp against longitudinal movement while affording vertical movement of the ramp, the arrangement and dimensioning of the parts being such that parts of a passing train slide along and bear down on the ramp and thereby close the contacts.

2. An accessory controller for a toy railway track of the two rail HO gauge type, said controller comprising a molded insulation base simulating ties for a toy track section of standard length interchangeable with other toy track sections of similar length, two spaced metal rails of standard length and gage on said base, superposed normally open leaf spring contacts disposed longitudinally of said base about midway between the rails, the springs of said contacts being thin and easily deflected, electrical connectors extending transversely from said contacts to the side of the base for detachable wire connections for connection to an accessory and its power supply to provide an accessory controlling switch circuit which is insulated from and electrically independent of the rail circuit, a relatively long generally horizontal insulated ramp overlying said base and said contacts about midway between said rails, said ramp being substantially as long as the track section, said ramp being made of thin sheet material disposed horizontally and having a width approaching that of the space between the rails, and yokes on said base receiving the ends of said ramp therebeneath, each yoke being integral with the base and being a slightly raised portion of a tie between the rails, with open space beneath said raised portion, the ends of said ramp being necked to reduced width to be received in said yokes and to locate the ramp against longitudinal movement while affording vertical movement of the ramp, the arrangement and dimensioning of the parts being such that bottom parts of a passing train slide along and bear down on the ramp and thereby close the contacts, and the restoring force being too slight to derail the train even when made up of small cars such as HO gauge cars.

3. An accessory controller for toy railway track of the two rail HO gauge type, said controller comprising a molded insulation base simulating ties for a toy track section of standard length interchangeable with other toy track sections of similar length, two spaced metal rails on said base, two oppositely directed pairs of superposed normally open leaf spring contacts disposed longitudinally of said base and secured near the center thereof about midway between the rails, the springs of said contacts being thin and easily deflected, electrical connectors extending transversely from said contacts to the side of the base for detachable wire connections to provide a pair of accessory controlling circuits which are insulated from and electrically independent of the rail circuit, a relatively long generally horizontal ramp overlying said base and both pairs of contacts between said rails, said ramp being substantially as long as the track section and yokes on said base receiving the ends of said ramp the ends of said ramp therebeneath being necked to reduced width to be received in said yokes and to locate the ramp against longitudinal movement while affording vertical movement of the ramp, the arrangement and dimensioning of the parts being such that parts of a passing train slide along and bear down on the ramp and thereby close the pairs of contacts.

4. An accessory controller as defined in claim 3 in which the ramp has a length somewhat less than the spacing of most of the operating projections on the train which projections bear down on the ramp, whereby the first and second pairs of contacts are closed alternately so that the controller may be used to operate an accessory such as a two-light flashing signal.

5. An accessory controller as defined in claim 3 in which the ramp is longer than the spacing of most of the operating projections on the train which projections bear down on the ramp, and in which a shunt connector is provided connecting the pairs of contacts, so that the accessory circuit is closed continuously during the passage of a train.

6. An accessory controller for toy railway track of the two rail HO gauge type, said controller comprising a molded insulation base simulating ties for a toy track section of standard length interchangeable with other toy track sections of similar length, two spaced metal rails of standard length and gage on said base, two oppositely directed pairs of superposed normally open leaf spring contacts disposed longitudinally of said base and secured near the center thereof about midway between the rails, the springs of said contacts being thin and easily deflected, electrical connectors extending transversely from said contacts to the side of the base for detachable wire connections to an accessory and its power supply to provide a pair of accessory controlling circuits which are insulated from and electrically independent of the rail circuit, a relatively long generally horizontal insulated ramp overlying said base and both pairs of contacts about midway between said rails, said ramp being substantially as long as the track section, said ramp being made of thin sheet material disposed horizontally and having a width approaching that of the space between the rails, and yokes on said base receiving the ends of said ramp therebeneath, each yoke being integral with the base and being a slightly raised portion of a tie between the rails with open space beneath said raised portion, the ends of said ramp being necked to reduced width to be received in said yokes and to locate the ramp against longitudinal movement while affording vertical movement of the ramp, the arrangement and dimensioning of the parts being such that bottom parts of a passing train slide along and bear down on the ramp and thereby close the pairs of contacts, and the restoring force being too slight to derail the train even when made up of small cars such as HO gauge cars.

7. An accessory controller as defined in claim 6 in which the ramp has a length somewhat less than the spacing of most of the operating projections on the train which projections bear down on the ramp, whereby the first and second pairs of contacts are closed alternately so that the controller may be used to operate an accessory such as a two-light flashing signal.

8. An accessory controller as defined in claim 6 in which the ramp is longer than the spacing of most of the operating projections on the train which projections bear down on the ramp, and in which a shunt connector is provided connecting the pairs of contacts so that the accessory circuit is closed continuously during the passage of a train.

9. An accessory controller as defined in claim 6 in which the base is provided with four yokes to alternatively receive either one of two ramps of somewhat dif-

ferent length, two of said yokes being located to receive a shorter ramp, and the other two of said yokes being located to receive a longer ramp.

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