

June 15, 1926.

1,589,096

H. S. BECKER

REVERSING SWITCH FOR TOY ELECTRIC TRAINS

Filed June 30, 1925

3 Sheets-Sheet 1

Fig. 1.

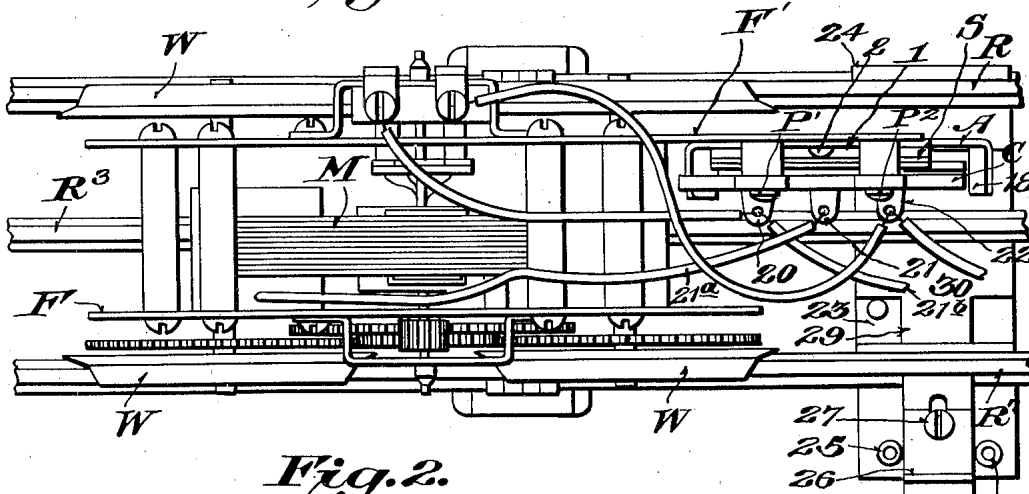
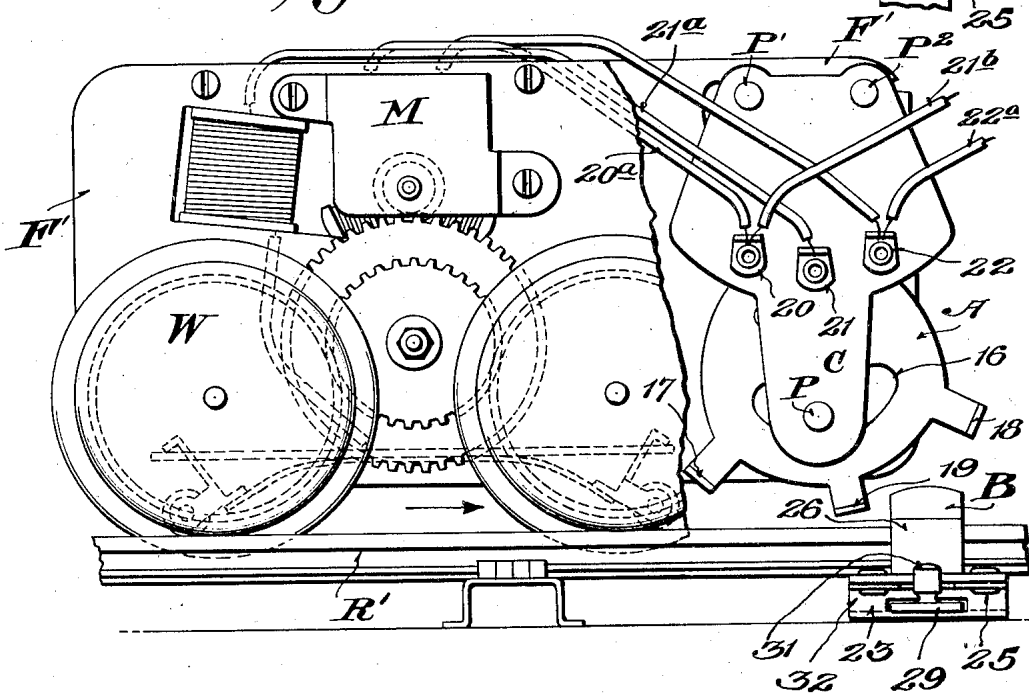


Fig. 2.



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3 Sheets-Sheet 2

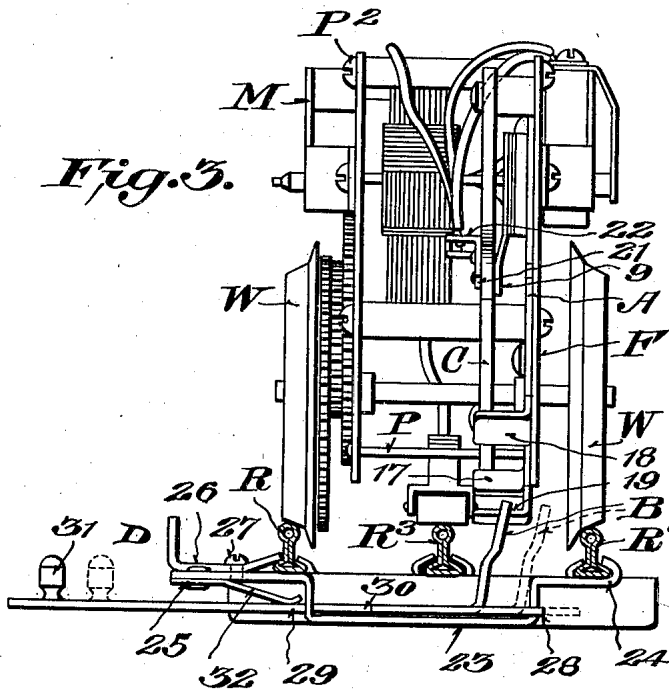


Fig. 3.

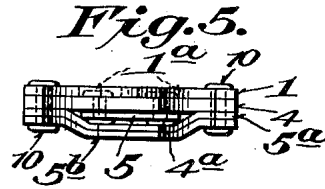


Fig. 5.

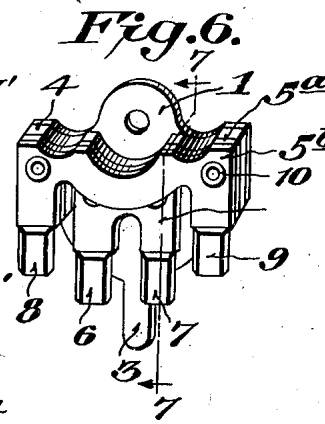


Fig. 6.

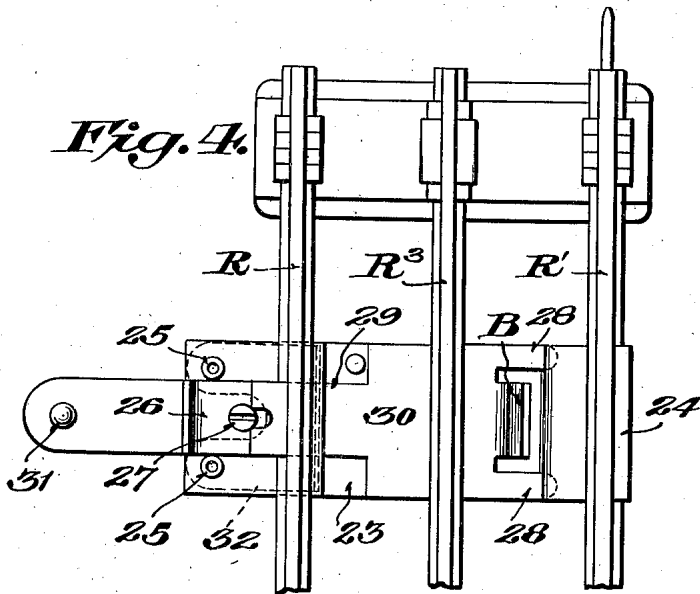
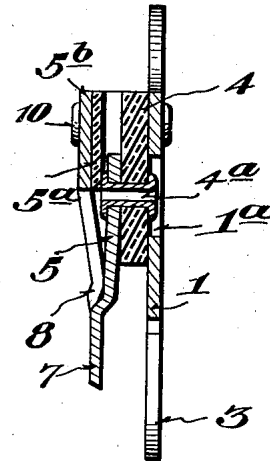


Fig. 4.

Fig. 7.



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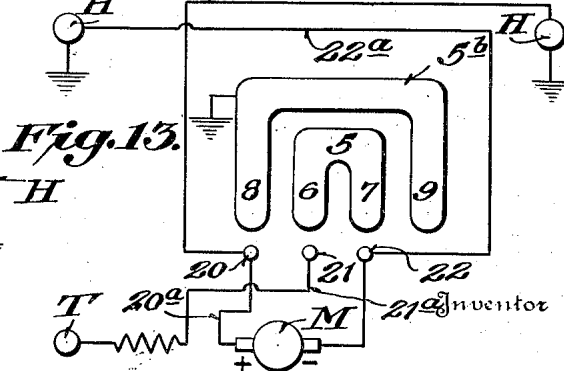
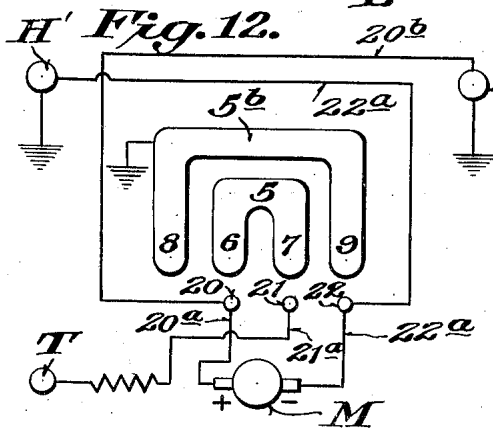
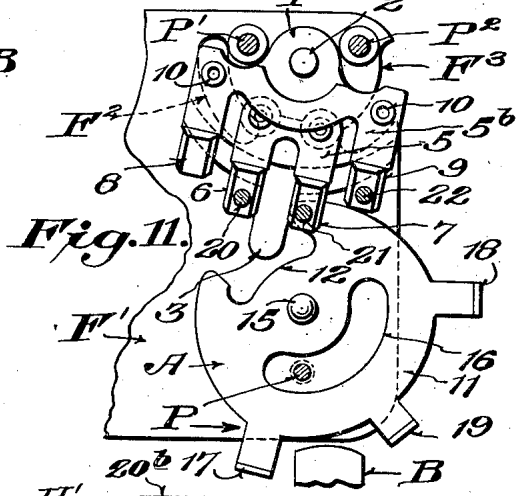
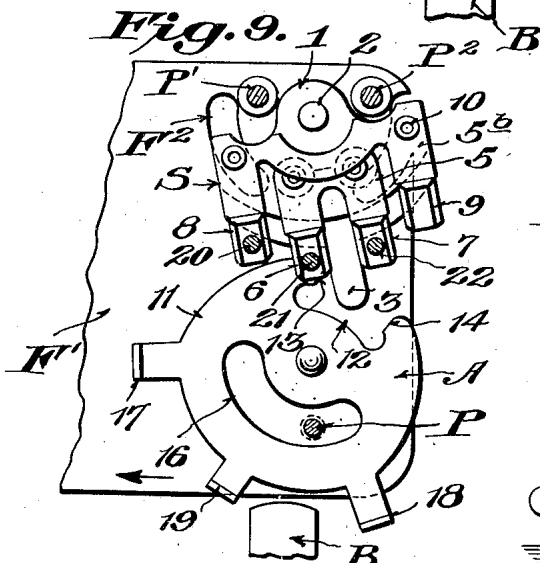
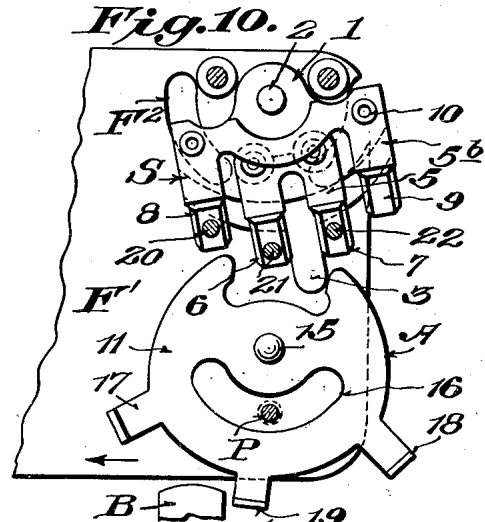
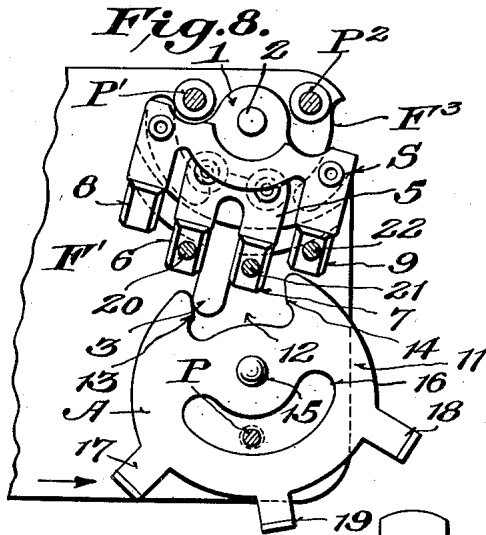
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REVERSING SWITCH FOR TOY ELECTRIC TRAINS

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE.

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## REVERSING SWITCH FOR TOY ELECTRIC TRAINS.

Application filed June 30, 1925. Serial No. 40,594.

This invention relates to toy railways, and more particularly to a reversing switch for controlling the direction of movement of the locomotive or train and simultaneously changing the headlights of the locomotive in accordance with the direction of travel.

One of the objects is to provide a novel switch and an actuator therefor operated by a track abutment. Customarily toy railways run on trackways of loop or circular formation and the train reverses at the end of each cycle of movement. The present construction contemplates an arrangement which will reliably function to reverse the current to the motor as well as the headlights, in the manner set forth in the application of Frank S. Culver, Ser. No. 9667, filed Feb. 16, 1925.

Another object of the invention is to provide a novel track trip or abutment which may be readily set so as to cause the train to reverse or continue in its cycle without reversing, according to the desire of the operator.

A further object of the invention is to provide a simple, practical and reliable construction particularly adapted and designed for toy use and which may be economically manufactured and assembled thereby enhancing the value of the invention from both a commercial and practical standpoint.

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 top plan view of the improved construction.

Fig. 2 is a side elevation of a motor with the frame partly broken away to illustrate the position of the novel switch device and the actuator therefor.

Fig. 3 is a vertical section and end elevation of the construction shown in Figs. 1 and 2 viewed from the switch-end of the device.

Fig. 4 is a detail view of the track carried trip device applied in position.

Fig. 5 is a top plan view of the novel switch unit.

Fig. 6 is a perspective view of the switch unit shown in Fig. 5.

Fig. 7 is a detail cross sectional view taken on the line 7-7 of Fig. 6.

Fig. 8 is a diagrammatic view illustrating the relative position of the switch unit, the actuator and the track abutment after the actuator has been set and is about to throw the switch by engaging with the abutment.

Fig. 9 is a view similar to Fig. 8 showing the position of the actuator as a portion thereof is about to engage the track abutment for setting the actuator to throw the switch on the next trip around the track.

Figs. 10 and 11 are respectively switch-throwing and switch-actuator-setting positions for the next reversal of current to the motor and headlights.

Fig. 12 is a diagrammatic view illustrating the path of the circuits in one direction of travel.

Fig. 13 is a diagram indicating the position of parts and the path of the circuit when the train moves in the opposite direction.

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

As previously indicated the present invention is directed to a novel switch actuating means for controlling the motor and reversing the headlights on the locomotive, and in that respect represents a carrying forward of the idea disclosed in the Frank S. Culver application previously referred to.

By reference to the drawings it will be observed that the motor unit designated generally as M is mounted on a frame F carried in the usual manner by the wheels W which travel upon the track that includes the rails R, R' and R<sup>2</sup>.

The said frame F has one side thereof extended as indicated at F' thereby to provide a support or carrier for the novel switch unit designated generally as S and an actuator A adapted to operate in conjunction with an abutment B of the track trip device designated generally as D, positioned in the trackway transversely of the rails. The novel features of the abutment B will be referred to more in detail hereafter.

Referring first to the switch unit S it will be observed that the same includes in its organization a carrier plate designated gener-

ally as 1 adapted to be pivotally mounted as indicated at 2 upon the frame extension F'. This carrier plate is provided with an offset or downwardly projecting arm 3 while the body thereof is provided with openings 1<sup>a</sup> whose function will presently appear. The said plate 1 is therefore pivotally mounted on the frame so as to oscillate, and has the upper part of its face opposite the frame covered by an insulation filler 4. Attached to the intermediate portion of the filler 4 is a main bridge contact member 5 having the contact fingers 6 and 7 integral therewith. The said bridge contact 5 is secured to the insulating filler 4 by means of the fastenings 4<sup>a</sup>, the heads of which lie in the openings 1<sup>a</sup> thereby to avoid electrical contact between the bridge member 5 and the plate 1. The plate 1 is, of course, connected to the frame F and the frame is grounded to one of the rails of the track. Therefore, it is important to insulate the bridge member 5 from the plate 1 which is in the ground circuit.

The web portion of the bridge member 5 is covered by an insulating member 5<sup>a</sup>, and the ground contact bridge member 5<sup>b</sup> having the contact fingers 8 and 9 is secured in position by the rivets 10 or equivalent fastenings passing through the bridge portion 5<sup>b</sup> and electrically uniting the contact fingers 8 and 9 with the plate 1, which, as previously indicated, is grounded through the frame of the machine. The contact fingers 8 and 9 are therefore ground contact fingers. In order that the plate 1 may lie flush with the face of the frame, the said frame is preferably cut out or depressed as indicated at F<sup>2</sup> and F<sup>3</sup> to accommodate the heads of the fastenings 10.

With the arrangement described it will be understood that the switch member S includes the contact fingers 6 and 7 which are insulated from the ground contact fingers 8 and 9, and both are carried upon an oscillating plate pivotally suspended from one of the frame parts of the motor assembly.

The actuator A for engaging with the arm 3 is mounted directly beneath the switch S and preferably comprises a body 11 of disk-like formation having therein a notch 12 which provides the opposite shoulders 13 and 14. Also the body of the member A is pivotally attached to the frame part F' by a spring tensioned fastening 15 which frictionally clamps the actuator to the frame and provides looseness. Below the pivot 15 the body 11 is provided with a slot 16 adapted to cooperate with one of the posts P of the insulating terminal plate carrier designated generally as C, to limit the movement of the actuator as will presently appear. The lower edge of the disk-like body 11 carries the relatively radially projecting switch setting projections 17 and 18 and an intermediate switch throwing projection 19.

These projections are preferably of angular formation at their outer ends as will be clearly observed from the drawings so that the horizontal portion thereof may readily engage with the abutment B.

As will be observed from the drawings the switch throwing projection 19 is shorter than the setting projections 17 and 18, or in other words does not extend as far outwardly from the periphery of the body 11 so as to insure clearance between the projection 19 and the abutment B, so that after the switch has been thrown it will not be again thrown as it travels back over the abutment until it has been reset by either one of the setting projections 18 or 19.

The insulating terminal plate carrier C is preferably a plate of insulating fiber or equivalent material which is carried by the post P previously referred to and the additional posts P' and P<sup>2</sup> located at the upper part of the frame. Thus, the insulating terminal plate is carried by and spaced from the frame extension F' and substantially covers the switch S and actuator A, and serves to mount the terminal contacts 20, 21 and 22 in such a way that they may be engaged at proper times by the contact fingers 6, 7, 8 and 9. The terminals 20 and 21 are connected by the wires 20<sup>a</sup> and 21<sup>a</sup> respectively with the armature and field of the motor M, said field being connected with the third rail R<sup>3</sup> by the trolley T, (see Fig. 11). The terminals 20 and 22 are respectively connected to the front headlight H of the locomotive by the wire 20<sup>b</sup> while the wire 22<sup>a</sup> connects with the rear headlight H'.

Referring to the track carried trip device which includes the abutment B it will be observed that the same includes in its organization a main clamp member 23 of substantially U-shaped formation at its intermediate portion, and having an upwardly extending rail engaging arm 24 at one end and an offset arm 25 at the other end carrying a rail engaging clip 26 which may be made secure by a fastening 27. The upwardly extending portions of the U-shaped body 23 are provided with horizontal slots to receive the extensions 28 and body portion 29 of the trip member 30. This trip member is provided at the portions between the upstanding sides of the part 23 of the body with the upright abutment B, while the opposite end is provided with a finger knob 31 to assist in slidably adjusting the member B so as to position it to be in or out of the path of the projections 17, 18 and 19 of the actuator A. For the purpose of holding the slidable member 30 in the desired set position any suitable and convenient means may be utilized, such for example as the spring 32 carried by the extension 25 and frictionally bearing upon the upper face of the slidable member 30 as clearly indicated in Fig. 3.

With the arrangement described it will be understood that the track trip device D includes means for gripping the outside rails R and R' of the track, and positions the abutment B between the third rail R<sup>3</sup> and the rail R'. The slidable abutment B may be moved into or out of the path of the actuator A to either permit the free continued movement of the train, or its reversal, as desired by the operator.

The operation of the device is substantially as follows:

Assuming that the rails R', R<sup>2</sup> and R<sup>3</sup> are part of circular, oval or other continuous trackway, and the trip device D is mounted thereon and the abutment B set in position to engage the actuator A; and, also assuming that the locomotive carrying the present switch device has been around the track once and is travelling in the direction of the arrow in Fig. 8, it will be apparent that the switch throwing projection 19 will shortly engage the abutment B to change the position of the switch S. With the switch S in the position shown in Fig. 8 the circuit will take the path shown in Fig. 12.

That is to say, when the train is travelling from right to left as shown in Fig. 8, the bridge contact fingers 6 and 7 engage with the terminals 20 and 21 while the ground contact including the finger 9 engages with the contact 22. Thus, the current passes to the motor from the trolley T and also to the front headlight H through the wire 20<sup>b</sup> while the rear headlight H' is extinguished due to the fact that the ground finger 9 engages with the ground terminal 22.

Again referring to Fig. 8 and assuming that the projection 19 has struck the upstanding abutment B the result will be the position of parts shown in Fig. 9. As will be observed from the latter figure the finger 19 is pushed above the top of the abutment B and the shoulder 13 of the actuator A has engaged the arm 3 to shift the switch so as to change the relative position of the contact fingers 6, 7, 8 and 9 thereby to reverse the current to the motor, extinguish the front headlight H and illuminate the rear headlight H'.

The direction of current flow when the motor is reversed may be observed from Fig. 13. From this figure it will be seen that the main bridge contact fingers 6 and 7 engage with the terminals 21 and 22 while the finger 8 of the ground contact engages with the terminal 20. The effect of this position of the switch is to cause the current to flow reversely through the motor and illuminate the rear headlight H' through the medium of the wire 22<sup>a</sup> connected with the terminal 22. Front headlight H will be extinguished due to the ground of finger 8 contacting with the finger 20.

As will be observed from the drawings

Figs. 8 and 10 are switch throwing positions while Figs. 9 and 11 are setting positions. In other words the only time the switch S is thrown is when the projection 19 engages with the abutment B. When projections 17 or 18 engage with abutment B they merely set the actuator A into position to effect switch throwing the next time that the projection 19 comes into engagement with the upstanding abutment B.

For example in Fig. 8 with the train travelling in the direction of the arrow it will be apparent that the projection 19 will engage the abutment B which will have the effect of causing the switch S to be moved through the engagement of shoulder 13 of the actuator with the arms 3, and the projection 18 will be brought downwardly into the position shown in Fig. 9. Thus when the parts reach the position shown in Fig. 9 the current to the motor and to the headlights is reversed and the projection 18 will engage the abutment B and give the actuator A an idle movement corresponding to the distance between the shoulders 13 and 14 at each side of the notch 12 in the actuator A, thereby to bring the throwing projection 19 into the position shown in Fig. 10. Thus, after the current is reversed and the motor travels backward the shoulder 14 of the actuator is brought into engagement with the arm 3 of the switch so that when the throwing projection 19 engages with the abutment B the switch S will be thrown to the position shown in Fig. 11. This again reverses the current to the motor M and also illuminates the front headlight H and as soon as the current is reversed and the motor travels in the direction of the arrow in Fig. 11 the projection 17 will engage the abutment B thereby to shift the actuator A idly back to the position shown in Fig. 7 whereby it will be ready to throw the switch S when the projection 19 engages with the abutment B.

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 movable switch for toy electric locomotives, the combination with the motor of a movable switch electrically connected with the motor, a track abutment, and means engaging the abutment a first time to set the switch for operation and then engaging the abutment a second time to completely shift the switch for reversing the current.

2. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected

with the motor, an abutment, an actuator for the switch, having setting means, and switch throwing means.

3. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected with the motor, track carried abutment means, an actuator for the switch having means adapted to engage with the abutment means for first setting the actuator and for subsequently causing the actuator to throw the switch.

4. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected with the motor, a track carried abutment, an actuator for the switch, having means for engaging with the abutment to first set the actuator and subsequently to cause the same to throw the switch.

5. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected with the motor, a track carried abutment, and an actuator for the switch adapted to engage with the abutment and having means whereby the actuator has an idle movement as the switch throwing member thereof passes over the abutment after the reversal of the direction of movement of the locomotive.

6. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected with the motor, a track carried abutment, and an actuator for the switch having an offset member for engaging with the abutment member whereby the actuator may throw the switch, and means on the actuator whereby it may be moved to render the said offset member inoperative as the locomotive passes over the abutment after reversing the current to the motor.

7. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected with the motor, a track carried abutment, an actuator for the switch having an offset switch throwing projection and a pair of offset actuator setting projections, said setting projections adapted to bring said switch throwing projection in position to alternately engage the opposite sides of the abutment.

8. In a reversing mechanism for toy electric locomotives, the combination with the motor, of an oscillatable switch electrically connected with the motor, an actuator also mounted to oscillate and having means for idle movement to effect setting prior to engaging the switch, and an abutment for shifting said actuator to control the switch.

9. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a track carried abutment, a switch

pivoted to the motor frame and having an offset arm, terminal elements operating in conjunction with said switch and electrically connected to the motor, an actuator for the switch comprising a disk-like member having a notch adapted to receive said arm, and said actuator being also pivotally mounted on the motor frame, and a plurality of spaced offset projections carried by said actuator adapted to engage with said abutment.

10. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a track carried abutment, a switch including bridge contact member terminal elements electrically connected with the motor and adapted to be engaged with said bridge contact member, an actuator pivotally supported adjacent the switch and adapted to engage the same, and a plurality of projections carried by the actuator and adapted to engage with said abutment.

11. In a reversing mechanism for reversing the current to the motor of toy electric locomotives and also changing the current from the front to the rear headlight thereof, a switch comprising an oscillatable body, main bridge contacts carried by the body and ground contacts carried by the body, a plurality of terminal elements electrically connected with the motor and headlights, an actuator pivotally supported adjacent the switch and having means for engaging the body to shift the same, a plurality of projections carried by the actuator and adapted to engage with said abutment.

12. In a reversing mechanism for toy electric locomotives, the combination with the motor, of a switch electrically connected with the motor, a shiftable actuator having means for making a partial idle movement before operating the switch, and a track carried trip device including an abutment adapted to be engaged by the actuator or moved out of the path thereof.

13. In a reversing mechanism for toy electric locomotives, the combination with the motor, of reversing means for the motor, and a track carried trip device for operating said means, said trip device including a clamp having means for engaging the rails of the track, and an upstanding abutment slidably mounted in the clamp whereby it may be shifted transversely between the rails to change its position.

14. In a reversing mechanism for toy electric locomotives, the combination with the motor, of reversing means for the motor, and a track carried trip device for operating said switch means, said trip device including a clamp comprising a body having means for engaging one of the outside rails of the track, a detachable clamp cooperating with the other side of the body to engage the other outside rail of the track, an

abutment member including an upright portion and a horizontal portion, the latter being slidably mounted in the body of the clamp, said horizontal portion having an extension projecting beyond the trackway for manual manipulation thereof, and means for holding said slidable abutment member in a relatively set position.

15. In a mechanism for reversing the current to toy locomotives, and changing the current from the front headlight to the rear

headlight of the locomotive, the combination of a multiple contact switch electrically connected with the motor and with the headlights, of an actuator for said switch, and a track carried abutment adapted to be engaged by said actuator to control the movement of the switch.

In testimony whereof I hereunto affix my signature.

HARRY S. BECKER.