

April 27, 1943.

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2,317,727

PUSH BUTTON CONTROLLER

Filed March 16, 1940

2 Sheets-Sheet 1

Fig. 1.

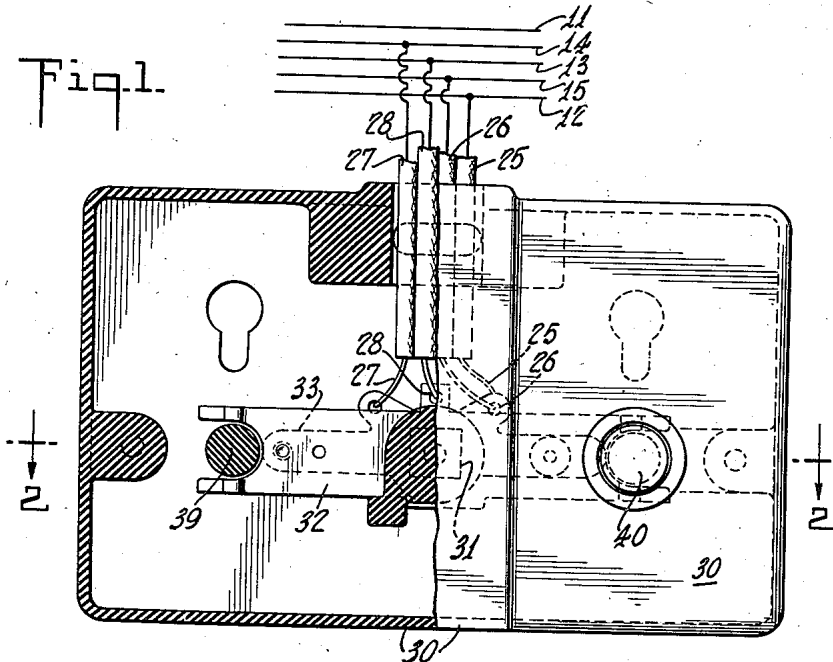


Fig. 2.

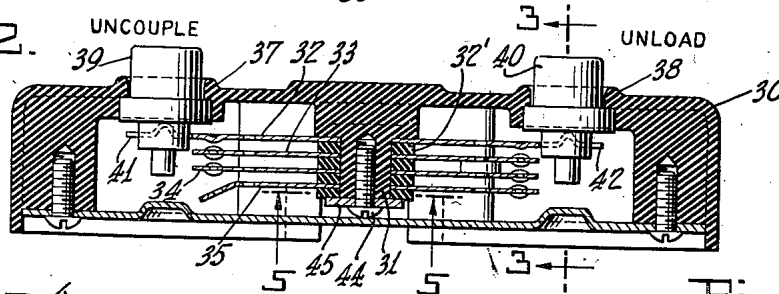


Fig. 4.

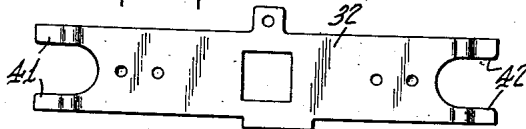


Fig. 3.

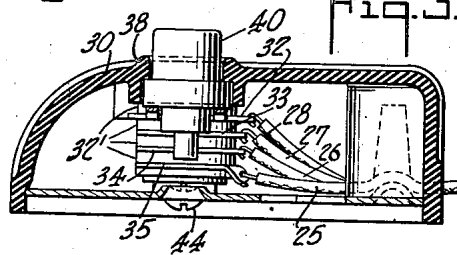
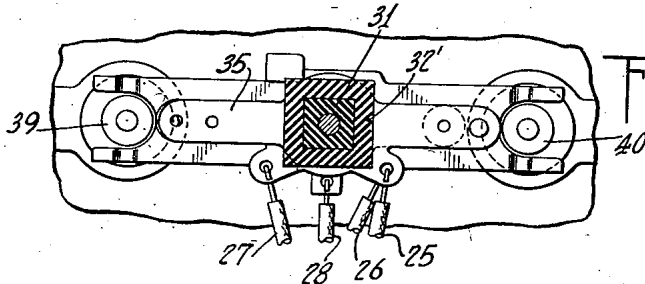


Fig. 5.



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2 Sheets-Sheet 2

Fig. 7.

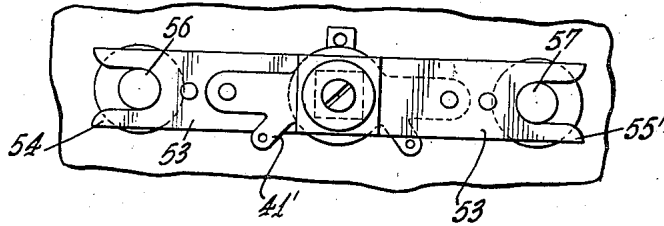


Fig. 6.

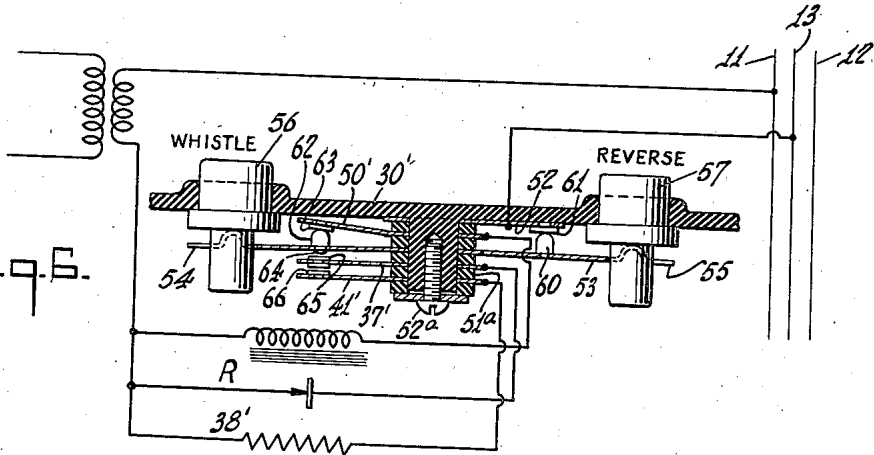


Fig. 8.

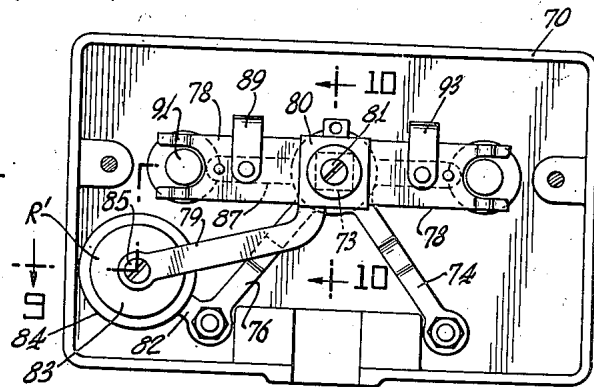


Fig. 10.

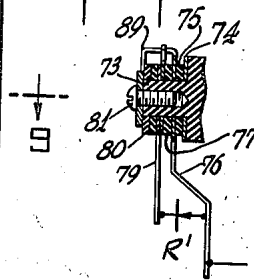
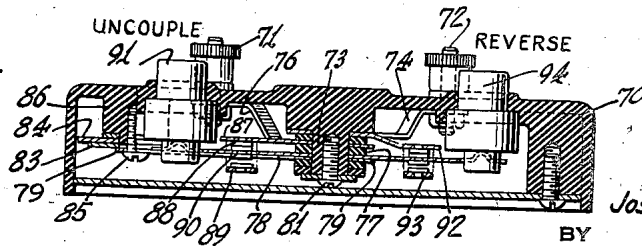


Fig. 9.



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# UNITED STATES PATENT OFFICE

2,317,727

## PUSH BUTTON CONTROLLER

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Application March 16, 1940, Serial No. 324,246

6 Claims. (Cl. 200—1)

The present invention relates to push button controllers, and is more particularly directed toward controllers and switches operated by push buttons for use in controlling the circuits for low voltage electrical apparatus such as toy electrical trains.

The present invention contemplates controllers for the above purpose adapted to be connected to toy railroad layouts and suitable for push button control of locomotive reversing switches, couplers and other electrical mechanism carried by the train.

The present invention contemplates the construction of push button switches wherein the plurality of resilient contact carrying strips are secured in definite relation to one another and arranged so that the operation of the push button can change the circuit connections in definite sequence.

The present application is a continuation in part of my copending application Serial No. 236,241 filed October 21, 1938, for Accessory control circuits for toy electric railroads and apparatus therefor (now Patent No. 2,232,508 of February 18, 1941).

The accompanying drawings show, for purposes of illustrating the present invention, several 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:

Figure 1 is a top plan view of a form of controller designed to operate couplers on toy cars and to operate an unloading circuit on toy cars, parts being broken away to show interior construction;

Figure 2 is a longitudinal sectional view on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view on the line 3—3 of Figure 2;

Figure 4 is a plan view of the control spring for the circuit controller;

Figure 5 is an inverted plan view of the controller with parts in section along the line 5—5 of Figure 2;

Figure 6 is a fragmentary sectional view through a form of construction arranged to operate the locomotive reversing switch and a whistle, the wiring diagram being superposed;

Figure 7 is an inverted plan view of the structure shown in Figure 6;

Figure 8 is an inverted plan view of the form of construction arranged to operate the loco-

5 motive reversing controller and uncouplers carried by a car; and

Figures 9 and 10 are sections on the lines 9—9 and 10—10, respectively, of Figure 8.

10 In Figure 1 the track rails and the toy electric railroad set-up are indicated at 11 and 12, the third rail at 13, and the two supplemental rails at 14 and 15. As shown in the application above referred to these five rails may form part of a special track section and are used to supply current to various current consuming devices carried by the train. The rails are connected to the controller by wires indicated at 25, 26, 27 and 28.

15 The circuit controller is a small portable device adapted to be conveniently placed near the track layout and connected up by the wires such as indicated. It has an insulating body member 30 provided with a central downwardly extending square post 31 adapted to receive four contact strips or straps 32, 33, 34 and 35 spaced above one another and separated by washers 32', as will be apparent from the drawings. The body member is apertured, as indicated at 37 and 38, to receive push buttons 39 and 40. These push buttons bear on the opposite ends 41 and 42 of the upper contact strip 32, stiffer than the others, which acts as a control spring for the circuit controller, and holds the push buttons in the upper or normal position at which time none of the contact strips are in electrical contact. When the left button 39 is pushed down it brings the left ends of strips 32, 33 and 34 into electrical contact and therefore brings both of the supplemental rails 14 and 15 to third rail potential so that uncoupling devices of cars may be operated as described in the application above referred to.

When the right-hand button 40 is pressed down it brings the contacts 32 and 33 together and owing to the interposition of an insulating spacer 43, the contact strip 33 is kept out of electrical contact with the contact strip 34, and this latter strip 34 is pressed down into contact with strip 35. The operation of this push button has therefore brought the lower supplemental rail 15 to track rail potential so that a device, such as an unloader, connected between the two supplemental rails may be operated as described in the application above referred to.

50 In manufacturing the switch above described, the body may conveniently be in the form of a piece of molded insulating material and all the sheet metal contact carrying strips in the form of stampings. The strip 32 is preferably made out of more rigid material than the other contact

strips. They are provided with soldering lugs as will be apparent from the drawings. The strips and insulating washers may be readily assembled on the square post and will be properly aligned. They are clamped firmly in place by a screw 44 and clamping plate 45.

In the form of construction shown in Figures 6 and 7 the insulating body 30' has a downwardly extending square post 51 which receives the straps or contacts 37', 41' and 50', and also an upper contact strip 52 and comparatively stiff spring member 53 all of which have square holes to fit the square post. They are separated by insulators 51a and held in place by a screw 52a.

The spring member 53 extends laterally, as indicated at 54 and 55. The ends are bifurcated to receive insulating push buttons 56 and 57. The upper contact 52 is connected to the power rail 13, as shown. The right-hand extension 54 of the spring member 53 has a contact 60 adapted to normally be held against the contact 61 on the end of the conductor strip 52 so that when the button 57 is not depressed the power rail 13 is always connected with the conducting strip 53. Depressing button 57 opens the circuit. The left end of this conducting strip has an upwardly extending contact 62 opposite the contact 63 at the end of conducting strip 50', so that when the button 56 is in normal position connection is always made through the coil 47 of a choke. When the button 56 is pushed down the spring nature of the conducting strip 50' causes the contact 53 to follow the contact 62 during the early part of the movement of the contact 62. This conducting relation continues until the lower contact 64 carried by the spring 53 is brought against the contact 65 carried on the spring 37'. At this time the rectifier R will be in shunt with the choke coil. Further downward movement of the button 56 will carry the contact 62 away from the contact 63 and will bring the contact 65 on conductor spring 37' against contact 66 on conducting spring 41', thereby introducing the resistance 38' in circuit in shunt with the rectifier. During this operation it will be seen that the circuit to the load has not opened and one has been able to pass from the condition where a choke was in circuit to a position where a rectifier shunted by a resistance is substituted. The circuit control described in connection with Figures 6 and 7 forms the subject matter of copending application of Anthony Ehret for Controllers for toy trains executed concurrently herewith, Serial No. 324,329, filed March 16, 1940 (now Patent No. 2,243,671 of May 27, 1941).

The controller shown in Figures 8, 9 and 10 has a body of insulating material 70 which supports two binding posts 71 and 72 connected to the transformer and to the power rail. The body 70 has a downwardly extending square post 73 which receives a contact strip 74 connected with the binding post 72, an insulating washer 75, a contact strip 76 connected with the binding post 71, an insulating washer 77, a comparatively stiff contact spring 78, a conducting strip 79 bearing against the strip 78, insulating washers 80, and the binding screw 81. The conducting strip 76 has an arm 82 connected to one side 83 of a dry rectifier R' preferably of the copper oxide type. The other element 84 of the rectifier and the conducting strip 79 are in engagement, these parts being held in place by a screw 85 threaded into a boss 86 carried by the insulating body 70. The strip 76 has an extension 87 which

overlies the left end of the comparatively stiff spring 78 and carries an upper contact 88 normally in engagement with the spring 78. It also has a U-shaped extension 89 which passes underneath the left end of the strap 78 and provides another contact 90 below the strap 78. The left end of the strap 78 is operable by a push button 91.

The conductor strap 74 at the right of the drawings has an extension 92 with a contact normally in engagement with the right-hand end of the stiff strip 78 and passes under the stiff strip 78 as indicated at 93 to form another contact below the strip 78. The right-hand end of the strip 78 is operable by a push button indicated at 94. When the parts are in the normal position, as indicated in the drawings, the circuit is completed from the binding post 71 through the strip 76, extension 87, contact 88, strip 78, upper contact on the right-hand end of the strip 78 to the extension 92 of strap 74. As the strap 79 is in conducting relation with the strap 78, the rectifier R' is short circuited. Pressing down the button 94 will open the circuit to the track and then reclose the circuit when the lower contact 93 is reached, this single back and forth movement therefore being suitable for effecting a motor reversal.

When the button 91 is pressed down it disconnects the longer and stiffer strip 78 from the strip 76 and introduces the rectifier in circuit so that a direct current impulse may be sent to the track.

The controller illustrated in Figures 8, 9 and 10 is one peculiarly adapted for use in remote control of automatic uncoupling device and automatic reversing mechanism for toy trains and the circuits in which it is used form the subject matter of copending application of Anthony Ehret and Henry J. Ferri, Serial No. 324,330, filed March 16, 1940 (now Patent No. 2,274,538 of February 24, 1942).

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 switch comprising an insulating body having a non-circular post, a plurality of resilient sheet metal contact carrying strips having non-circular openings receiving the post, a plurality of insulating washers intermediate the strips, means clamping the washers and strips closely together and securing them in place on the post, one of the strips being more rigid and longer than the others, and a push button movably carried by the body and bearing on said longer strip, the longer strip being bendable by the push button to alter its circuit relation with at least one adjacent contact carrying strip.

2. A switch comprising an insulating body having a non-circular post, a plurality of resilient sheet metal contact carrying strips having non-circular openings receiving the post, a plurality of insulating washers intermediate the strips, means clamping the washers and strips closely together and securing them in place on the post, one of the strips being more rigid than the others and extending on two opposite sides of the post, two push buttons, one bearing on each end of said more rigid strip, the other strips being shorter and arranged opposite one end of the

more rigid strip in a manner different from their arrangement opposite the other end so that manipulation of one push button will secure a different circuit condition than manipulation of the other.

3. A switch comprising an insulating body having a non-circular post, a plurality of resilient sheet metal contact carrying strips having non-circular openings receiving the post, a plurality of insulating washers intermediate the strips, means clamping the washers and strips closely together and securing them in place on the post, one of the strips being more rigid than the others, all the strips extending on two opposite sides of the post, two push buttons, one bearing on each end of said more rigid strip, there being four strips opposite one end of the more rigid strip, the first being out of contact therewith and with the second strip, the second and third strips being insulated from one another near their ends, the third strip being out of contact with the fourth, the strips bending so that first the said other end of the more rigid strip is brought in contact with the second strip and then the third strip into engagement with the fourth strip, the other ends of the first three less rigid strips being opposite the other end of the more rigid strip and normally out of contact therewith and with one another, the said other end of the more rigid strip being flexible to contact the adjacent strip and the latter mentioned adjacent strip being flexible to contact the strip adjacent thereto.

4. In a push button circuit controller, an insulating body having a downwardly extending non-circular post and a pair of push button receiving openings on opposite sides of the post, shouldered push buttons therein, a conductor spring having a non-circular opening non-rotatably received by the post and having ends opposite the push buttons to hold them in place, and other circuit controlling contacts each hav-

ing a non-circular opening non-rotatably receiving said post and disposed opposite the ends of the conductor spring whereby different circuit controls may be had by manipulation of the push buttons.

5. A switch comprising an insulating body having a non-circular post, a plurality of resilient sheet metal contact carrying strips having non-circular openings receiving the post, a plurality of insulating washers intermediate the strips, means clamping the washers and strips closely together and securing them in place on the post, one of the strips being more rigid and longer than the others and normally in contact with one of the shorter contact strips, and a push button movably carried by the body and bearing on the longer strip to move it away from the shorter strip, the said shorter strip having a second contact on the opposite side of the longer strip and against which the push button moves the longer strip on continued movement.

6. A switch comprising an insulating body having a downwardly opening contact receiving cavity into which projects a downwardly extending non-circular integral post, the top wall of the cavity having an opening spaced from the post, a push button passing through the opening, a plurality of sheet metal contact carrying strips having non-circular openings receiving the post, and a plurality of insulating washers intermediate the strips, means clamping the washers and strips closely together and securing them in place on the post, one of the strips being more rigid and longer than the others, the push button carried in the opening and bearing on the longer strip, the longer strip being bendable by the push button to alter its circuit relation with at least one adjacent contact carrying strip, the strip being housed within the cavity in the insulating body.

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