

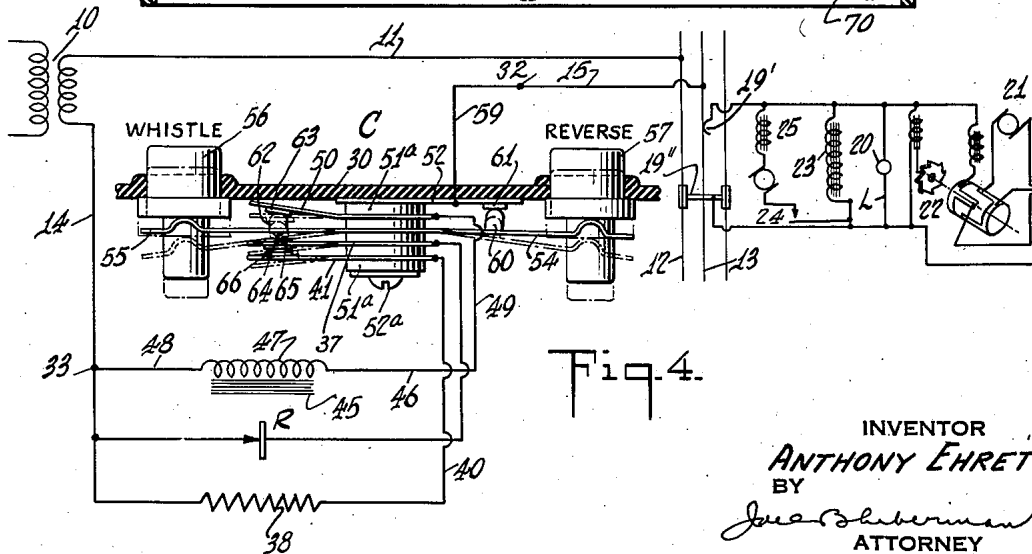
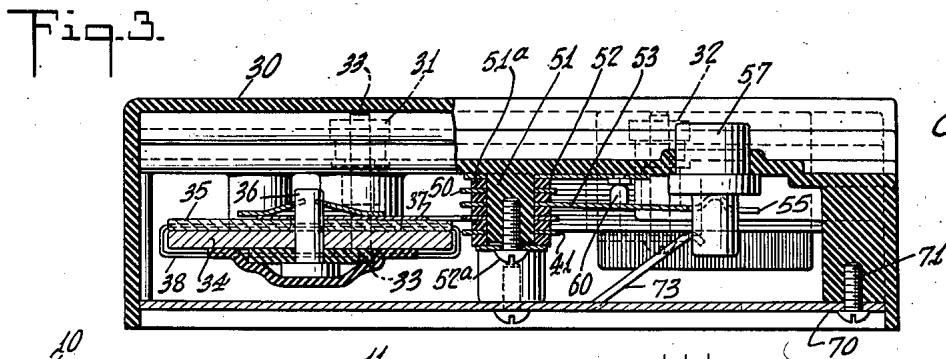
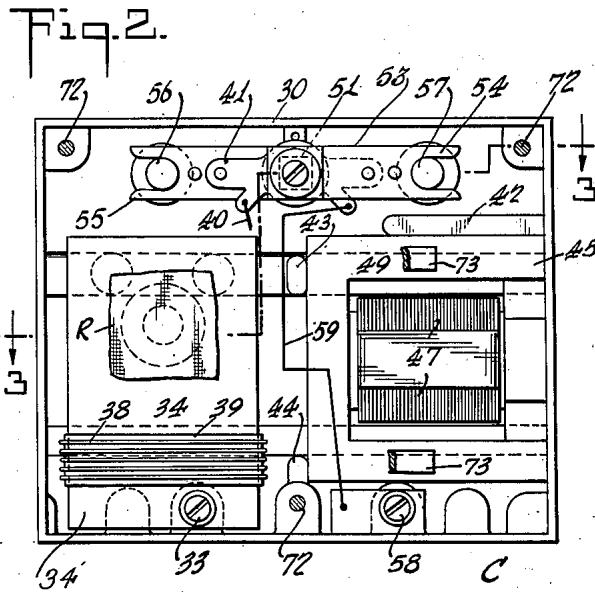
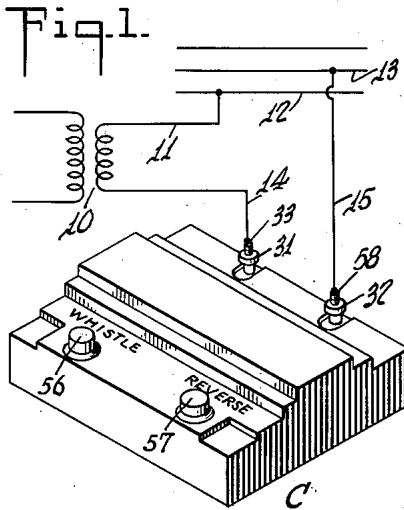
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CONTROLLER FOR TOY TRAINS

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2,243,671

CONTROLLER FOR TOY TRAINS

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10 Claims. (Cl. 104—150)

The present invention relates to controllers for toy trains, and is more particularly directed toward controllers suitable for use in starting, stopping and reversing a toy locomotive, and for the operation of a whistle or other relay controlled accessory on the train.

The form of relay used for the whistle motor circuit or other accessory is of the type which does not respond to alternating current of the voltage available in the toy railroad circuit, but does respond to a small superposed direct current so that it is sensitive to the modified current, and the present controller is one particularly well adapted to effect the induction of the direct current component.

The reversing mechanism commonly used in a toy electric locomotive is of the type which operates in response to an opening of the current supply circuit to the locomotive. It is adapted to be controlled by an impulse sender which operates a relay to first open the circuit of the propulsion motor without opening the circuit for the other accessories on the train, and then on the next impulse reestablish the circuit for the motor reversing the field or armature so that the motor operates in the other direction.

With such reversible locomotives it is important that the controller used to introduce a direct current component into the power supply circuit should not open the power circuit, and the present controller is one which is particularly designed to maintain the closed circuit relation at all times, except when the reverse button is manipulated.

The accompanying drawing shows, for purposes of illustrating the present invention, one of the many embodiments in which the invention may take form, it being understood that the drawing is illustrative of the invention rather than limiting the same.

In the drawing:

Figure 1 is a perspective view of a controller unit showing how it is connected to the track;

Figure 2 is an inverted plan view of the controller unit of Figure 1, the bottom cover plate being removed;

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2; and

Figure 4 illustrates the complete wiring diagram for a reversible locomotive and whistle.

In the arrangement shown in the drawing the alternating current source such as a transformer is indicated at 10. It may have a variable voltage output, if desired, but for toy train operation is designed to give a maximum voltage

of 25 volts. The transformer is connected by the wire 11 with one of the wheel bearing rails 12 of a toy railroad track. The other side of the transformer is connected with the third rail 13 through the controller C and wires indicated at 14 and 15.

The structures diagrammatically illustrated at the right of the railroad track are those carried on the locomotive or train. The current is picked up by the usual current collector 19' bearing on the third rail and returned through the axles 19". A load, indicated at L, may include lamps on the cars or locomotive indicated at 20, and a propulsion motor 21 whose field and armature are interconnected with the supply line by a reversing switch 22. This reversing switch is electromagnetically operated and is preferably of the type which operates to stop the propulsion motor or reverse its direction of rotation when the manual train controlling switch 19 is manipulated. This type of reversing switch does not affect the train lights. It is in common use in this art.

The train also carries a relay 23 of the type shown in Bonanno Patent 2,155,343 granted April 18, 1939. It is constructed so that the maximum alternating current voltage available will not operate the relay so as to close the contact indicated at 24. The contact 24 is in series with an accessory 25 such as a motor with field and armature adapted to operate the blower of an air whistle.

The controller C employs an inverted box-like body 30 of insulating material. The body is provided with binding posts 31 and 32 as indicated. The binding post 31 has a screw 33 which passes through one of the elements 34 of a rectifier R. The other element 35 of the rectifier is secured to the element 34 by a suitable insulated rivet indicated at 36. This rivet passes through a sheet metal connecting strap 37. A resistance coil 38 is wound about the support 34' of rectifier element 34 and insulated from it by a strip of paper or other insulating material, indicated at 39. One end of this resistance coil is connected under the head of the binding post screw 33. The other end of the resistance coil is connected by a wire 40 with a contact strip 41.

The body member 30 has downwardly extending elements 42, 43 and 44 which form a rectangular receptacle for the core 45 of a choke coil 46, the winding being indicated at 47. One end of this winding is connected by a wire 48 with the binding post 33 and the other end is connected by a wire 49 with a contact 50.

The insulating body 30 has a downwardly extending square post 51 which receives the straps

or contacts 37, 41 and 50 above referred to, 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. This type of assembly of contacts for circuit controllers is covered by copending application of Joseph L. Bonanno, Serial No. 324,246 filed March 16, 1940, executed concurrently herewith.

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 screw 58 of the binding post 32 by a wire indicated at 59. 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 the choke. When the button 56 is pushed down the spring nature of the conducting strip 50 causes the contact 63 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 immediately thereafter 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. The purpose of introducing the rectifier momentarily without protective shunt or resistance is to generate enough direct current to close the relay even when the load may consist of only the relay coil. This may occur when the train is standing still and there are no lamps or other current consuming devices in the circuit. During the downward movement of button 62 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 impedance of the choke coil and the joint resistance of the resistance coil and rectifier are selected so that there will be substantially the same voltage available on the track circuit, irrespective of the change in the loading brought about by a change from alternating current to alternating current with a direct current component so that the lights, propulsion motor and other accessories have practically the same effective voltage for operation. During the very short interval of time while the rectifier alone is in circuit enough current will flow to keep the reversing unit on the locomotive from operating. The time is too short to cause a noticeable slowing down of the train or dimming of the lights.

The bottom plate 70 is secured to the insulating body by screws 71 threaded into holes indicated at 72. This plate has upwardly extending springs 73 adapted to press against the field of the choke coil and hold it in place.

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 form shown is but one 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. In a controller for use on alternating current circuits, in combination, a common supply terminal, a choke coil, a rectifier, a resistance connected to said common supply terminal, a manually movable load connectible contact, an output contact for the choke coil normally in contact relation with the manually movable contact during a portion of the movement thereof, an output contact for the rectifier engageable by the manually movable contact before the latter is moved away from the choke connected contact whereby the choke is shunted with the rectifier and then the shunt circuit is opened so that direct current only is supplied to the load connectible contact without opening the circuit, and an output contact for the resistance against which the choke connected contact is brought on further movement of the manually movable contact so that alternating current with a component of direct current may be supplied the load connectible contact.

2. A controller such as claimed in claim 1, wherein the impedance of the choke coil will produce substantially the same voltage drop as the rectifier and resistance in parallel so that the voltage available for operating a load is substantially the same regardless of the resultant change in loading.

3. A controller such as claimed in claim 1, wherein the load connectible contact is in the form of a comparatively stiff spring, and the choke coil output contact is in the form of a comparatively weak spring bearing thereon.

4. A controller such as claimed in claim 1, wherein the resistance is in the form of a coil wound about the rectifier support.

5. A controller such as claimed in claim 1, having a pair of normally closed contacts in series with the load connectible contact whereby current impulses may be transmitted.

6. An alternating current controller for continuously operable loads comprising means for supplying the load with alternating current through a choke coil, means for shunting the choke coil including a half wave rectifier, and means for instantaneously disconnecting the choke coil so that the rectifier is in series with the load whereby a relatively high direct current voltage is impressed on the load circuit and for thereafter shunting the rectifier with a resistance of a value to obtain substantially the same voltage drop as the choke coil.

7. A controller for use in series with a load having a plurality of current consuming elements in parallel at least one of which includes a direct current operable electromagnetic device not responsive to alternating current of a voltage at which the other current consuming devices function, comprising two terminals, a normally closed circuit maker and breaker connected to one terminal for interrupting the circuit to the load, a choke coil, a rectifier and a resistance each of which is connected to the other terminal, contacts to which the choke coil, the rectifier and resistor are separately connected, a spring connected to the movable contact of the circuit maker and breaker and carrying a contact normally in circuit closing relation with

the choke coil connected contact during a predetermined movement of the spring, whereby this choke coil is normally in circuit with both terminals and during such movement the rectifier connected contact being opposite the spring carried contact and engageable thereby during said movement whereby the choke coil may be shunted by the rectifier and thereafter placed in series with the load, the resistance connected contact being opposite the rectifier contact and movable into engagement therewith upon continued movement of the spring.

8. The method of controlling the supply of current to a load circuit which includes a motor with associated motor reverser continuously in circuit and operable by alternating current or alternating current with superposed direct current responsive to impulses and having an open circuit position so that two impulses are necessary to effect reversal of the motor, a relay continuously in circuit, the relay being not responsive to alternating current but responsive to alternating current with a superposed direct current component, a device connectible to the circuit by the relay and operable by alternating current with superposed direct current component, which comprises supplying alternating current to the load circuit through a choke coil, shunting the choke coil with a rectifier, disconnecting the choke coil from the circuit so that relatively high direct current voltage is available and thereafter shunting the rectifier by the resistance of a value to cause

substantially the same voltage drop as the choke coil so that either alternating current or alternating current with direct current component of substantially the same voltage may be supplied the load circuit for indefinite periods.

9. A controller for electric trains comprising an inverted box-like body, two binding posts adjacent one side edge of the body, two push buttons adjacent the opposite edge, a dry rectifier secured in the body by the mounting screw of one of the binding posts so that one element is in conducting relation therewith, the rectifier extending nearly to one of the buttons, a resistance coil wound about the rectifier and grounded to said element thereof, a choke coil mounted in the box alongside the rectifier and connected to said rectifier element, an output contact adjacent one of the buttons and connected to the other binding post, and switching means including contacts biased to connect the choke coil to the output contact and operable by one of the push buttons for connecting the rectifier in shunt therewith and then disconnecting the choke coil and connecting the resistance in shunt with the rectifier.

10. A controller such as claimed in claim 9, wherein the field structure of the choke coil is aligned by depending lugs carried by the body and is held in place by upwardly extending springs carried by a bottom cover plate secured to the insulating body.

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