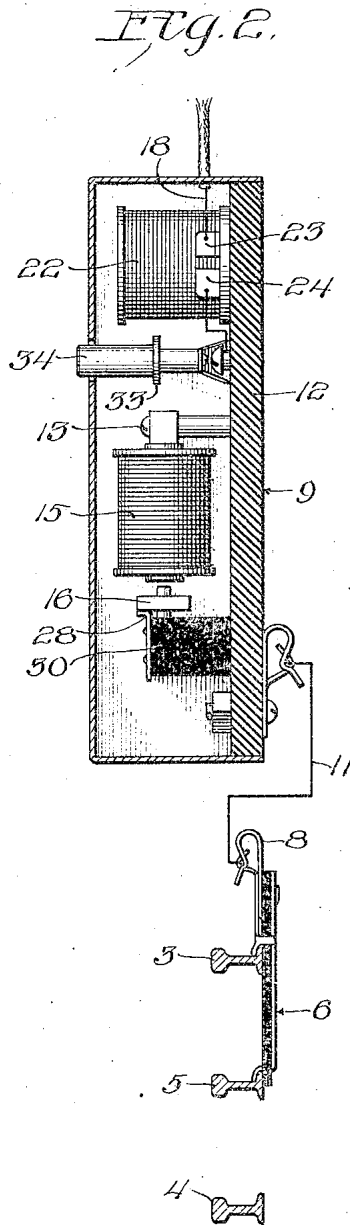
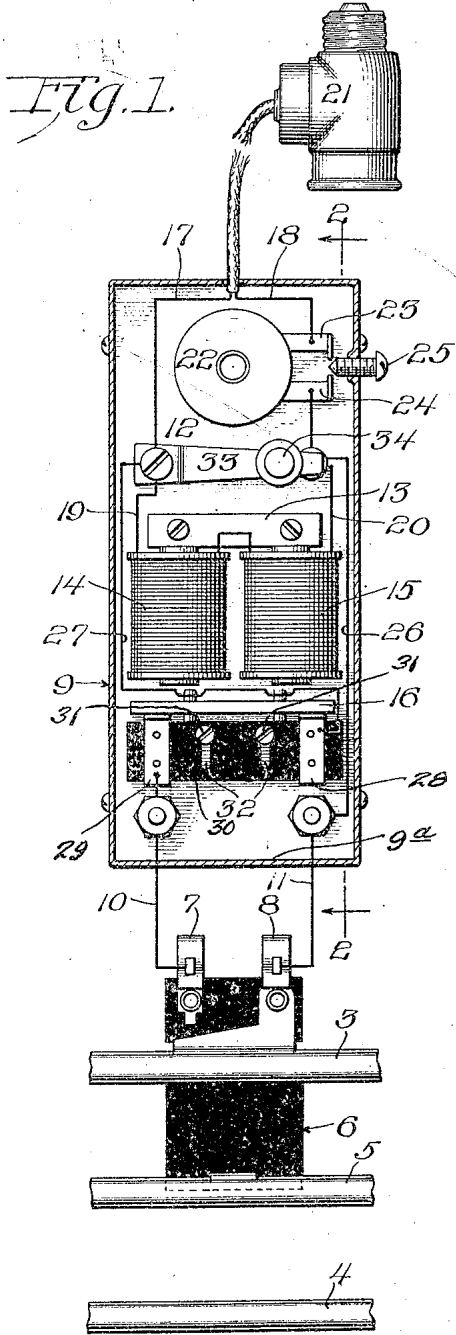


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1,441,494.

A. FROHNE.
TOY ELECTRIC RAILWAY CONTROL SWITCH.
FILED SEPT. 29, 1921.



Inventor:
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UNITED STATES PATENT OFFICE.

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TOY-ELECTRIC-RAILWAY CONTROL SWITCH.

Application filed September 29, 1921. Serial No. 504,219.

To all whom it may concern:

the rails so as to protect the child or other user.

Another object is to provide a very simple but effective arrangement for accomplishing the foregoing results. Another object of the invention is to so arrange the parts that they may be very easily and cheaply manufactured and will be of considerable durability and strength.

Other objects and uses will appear from a detailed description of the invention, which consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawing:

Figure 1 shows a face view of the control switch, the cover being cut away so as to show the interior mechanisms, the switch being in the closed circuit position; and it also shows connections from the switch to sections of the running rails. It should be mentioned that the switch itself stands in the vertical position of Fig. 1, whereas the rails ordinarily lie at right angles to the plane of said figure; and

Fig. 2 shows a longitudinal section taken on line 2—2 of Figure 1 looking in the direction of the arrows.

The running rails are designated by the numerals 3 and 4, and the third or current-supply rail by the numeral 5. I have in the present case illustrated a clip member 6 for establishing electrical connection with one of the running rails and with a third rail, said clip member having terminal clips 7 and 8. This clip member is of the particular form shown in my co-pending applications for Letters Patent of the United States, Serial No. 473,744, which was filed May 31, 1921, on connectors for toy electric railroads. It will be understood, however, that any other suitable form of connector might be substituted therefor.

The switch control device is designated in its entirety by the numeral 9. It ordinarily stands in a vertical position on its lower end 9^a. It is intended to take current from an electric socket or other suitable source and deliver it to the terminal clips 7 and 8 over the wires 10 and 11. The control device itself includes a base member 12 generally of insulating material. On said base member there is mounted an electric magnet 13 including the coils 14 and 15, which magnet

Be it known that I, ALBIN FROHNE, a citizen of Germany, residing at Chicago, Illinois, having declared my intention of becoming a citizen of the United States, have invented certain new and useful Improvements in Toy-Electric-Railway Control Switches, of which the following is a specification.

This invention has to do with certain improvements in control switches for electric railways, and has reference particularly to control switches for toy electric railways for controlling the supply of current to the tracks.

One of the objects of the invention is to provide an arrangement whereby the current supply to the rails may be reduced so as to make it possible to operate on a standard 110 volt circuit. In this connection another object is to so arrange the switch and the related parts that by a very simple operation they may be adjusted for use on standard circuits of a lower voltage, as, for example, 32 volts. This will make it possible to use the outfit either on the standard 110 volt electric lighting circuits or on so-called farm lighting outfits such as are coming extensively into use. These generally operate at a lower voltage, frequently 32 volts.

One of the objects of the invention is to provide an arrangement whereby the track circuit will be so protected as to make it impossible for the child or other operator to receive a shock of severe intensity by contact with the running and electric wires. In this connection it must be mentioned that in those cases where a 110 volt supply is used, which is reduced by a lamp or coil in series, the voltage at the tracks becomes 110 volts as soon as the circuit is opened, and only falls when the current begins to flow, such fall being occasioned by the resistance of the lamp or coil. It is therefore very desirable to provide an arrangement such that the circuit will be automatically opened and held open at a point in advance of the rails until the operator purposely causes the circuit to be closed. In this connection it is also desirable to so arrange the circuits that as soon as the demand for current at the rails ceases, the circuit will again be automatically opened at a point in advance of

is adapted to operate on the vertically movable armature 16. The magnet is normally connected to the supply wires 17 and 18 by the leads 19 and 20, and the magnet is thus energized at all times as long as current is on the line. The current-supply to the magnet is ordinarily reduced from the supply voltage of 110 or 32 as the case may be. I have shown a lamp socket 21 adapted to receive a lamp in series with the terminal supply wires 17 and 18, so that the current flowing through the magnet is limited by the resistance of the magnet and the lamp. The voltage at the terminals of the magnet will be limited to the product of current flowing through the magnet multiplied by the resistance thereof (the resistance including also the electro-magnetic reluctance when an alternating current is used).

In case the lamp socket and lamp be suitable for operation on a 32 volt circuit, a coil 22 may be connected into the supply lead 18 so that the current will be further limited by the resistance of this coil. When operating on the full voltage of 110 the coil may be left in the circuit so as to establish the proper current through the system and to maintain the proper voltage across the magnetic coil. When, however, the system is to be operated on a lower voltage, as, for example, a 32 volt farm lighting system, the terminals 23 and 24 of the coil may be short-circuited together by means of a screw 25 so as to cut out the coil.

The coil terminals 19 and 20 connect to the operating terminals 10 and 11, in the following manner: A wire 26 extends from the lead 20 to the terminal 11; a wire 27 extends from the lead 19 to a contact 28 beneath the armature 16; and another contact 29 beneath the armature 16 connects with the terminal lead 10. As long as the armature stands in the lowered position shown in Figs. 1 and 2, it lies across the contacts 28 and 29 so that the terminals 10 and 11 have impressed upon them substantially the same voltage as exists across the wires of the magnet. When the rail circuit is opened, that is, when there is no locomotive or other current-consuming device connected thereto, the voltage impressed on the coil terminals 19 and 20 will cause a flow of current there-through sufficient to raise the armature 16 and thus interrupt the rail circuit between the contacts 28 and 29. The armature 16 rests directly on said contacts, and in order to adjust the device so that the armature will be raised under such conditions, I have mounted the contacts 28 and 29 on a block of insulating material 30 which is vertically adjusted on the back plate 12. Such adjustment may be effected by the medium of set screws 31 extending through slots 32 in the block 30 and into the back plate 12.

Assuming that a locomotive or other cur-

rent consuming device is in connection with the rails, the circuit to the rails may be closed by causing the armature 16 to fall. This may be done by temporarily short-circuiting the magnet coils, as, for example, by the use of a spring switch 33 extending between the coil terminals 19 and 20, and having a finger button 34, by means of which it may be manipulated. With this arrangement it will be evident that the establishment of the electric circuit to the rails must be performed intentionally by the operator; and if, when such circuit is intentionally established by causing the armature 16 to fall by momentarily short-circuiting of switch 33, said armature will be immediately raised again as soon as the switch 33 is released, provided there be no current-consuming devices in connection with the rails. When, however, a track or other load circuit is closed for normal operation, its resistance will be so much less than that of the coils 14 and 15, that said coils will be unable to attract the armature 16 and thus break the track circuit across the terminals 28 and 29 under the conditions of voltage used and the adjustment of the set screws 31.

The provision of an adjustable arrangement, by which the clearance of the armature from the magnet may be adjusted, makes it possible to secure an accurate operation with considerable differences of voltage, and also makes it possible to adjust the device at the home to operate properly on the slight variation of voltage which may be found there as compared with the standard and an intended line voltage.

I claim:

1. In a control switch the combination of a base member, an electro-magnet mounted thereon, another member mounted on the base member, means permitting adjustment of said member towards and from the electro-magnet, a pair of upwardly facing contacts on said adjustable member, an armature between said contacts and the electro-magnet in position to be raised by the influence of said magnet away from said contacts, a resistance coil on the base member, terminal contacts therefor, means under the control of the operator for short circuiting said terminal contacts, incoming line terminals, out going line terminals, connections normally placing the resistance coil and magnet in series with each other and in connection with the incoming line terminals, other connections normally placing the out going line terminals in shunt with the electro-magnet and including the upwardly facing contacts and armature, and means under the control of the operator for short circuiting the terminals of the electro-magnet, substantially as described.

2. In a control switch the combination of a base member, an electro-magnet mounted

thereon, another member mounted on the base member, means permitting adjustment of said member towards and from the electro-magnet, a pair of upwardly facing contacts on said adjustable member, an armature between said contacts and the electro-magnet in position to be raised by the influence of said magnet away from said contacts, a resistance coil on the base member, incoming line terminals, out going line terminals, connections normally placing the resistance coil and magnet in series with each other and in connection with the incoming line terminals, other connections normally placing the out going line terminals in shunt with the electro-magnet and including the upwardly facing contacts and armature, and means under the control of the operator for short circuiting the terminals of the electro-magnet, substantially as described.

3. In a control switch the combination of a base member, an electro-magnet mounted thereon, another member mounted on the base member, means permitting adjustment of said member towards and from the electro-magnet, a pair of upwardly facing contacts on said adjustable member, an armature between said contacts and the electro-magnet in position to be raised by the influence of said magnet away from said contacts, incoming line terminals, out going line terminals, connections between the incoming line terminals and the magnet, other connections normally placing the out going line terminals in shunt with the electro-magnet and including the upwardly facing contacts and armature, and means under the control of the operator for short circuiting the terminals of the electro-magnet, substantially as described.

4. In a control switch the combination of a base member, an electro-magnet mounted thereon, a pair of upwardly facing contacts beneath the electro-magnet, an armature between said contacts and the electro-mag-

net in position to be raised by the influence of said magnet away from said contacts, a resistance coil on the base member, incoming line terminals, out going line terminals, connections normally placing the resistance coil and magnet in series with each other and in connection with the incoming line terminals, other connections normally placing the out going line terminals in shunt with the electro-magnet and including the upwardly facing contacts and armature, and means under the control of the operator for short circuiting the terminals of the electro-magnet, substantially as described.

5. In a control switch the combination of a base member, an electro-magnet mounted thereon, a pair of upwardly facing contacts beneath the electro-magnet, an armature between said contacts and the electro-magnet in position to be raised by the influence of said magnet away from said contacts, incoming line terminals, out going line terminals, other connections normally placing the out going line terminals in shunt with the electro-magnet and including the upwardly facing contacts and armature, and means under control of the operator for short circuiting the terminals of the electro-magnet, substantially as described.

6. The combination with the electric rails of a toy electric railroad and a source of electricity supply, of a resistance element, an electro-magnet normally in series therewith, an armature influenced by said electro-magnet, connections between the terminals of the electro-magnet and the electric rails and including a contact device normally closed but opening with actuation of the armature by the electro-magnet, and means under the control of the operator for short circuiting the electro-magnet on the magnet side of the resistance element, substantially as described.

ALBIN FROHNE.