June 4, 1935. C. V. GIAIMO 2,003,686

CIRCUIT BREAKER

Filed March 26, 1931

FIG. 1.

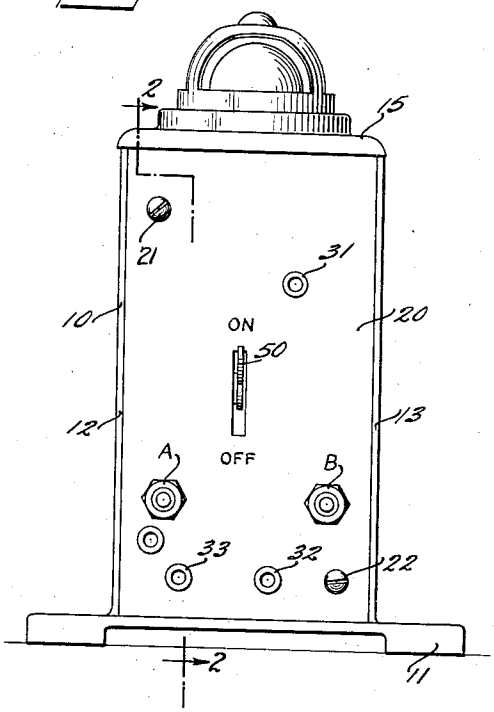


FIG. 2.

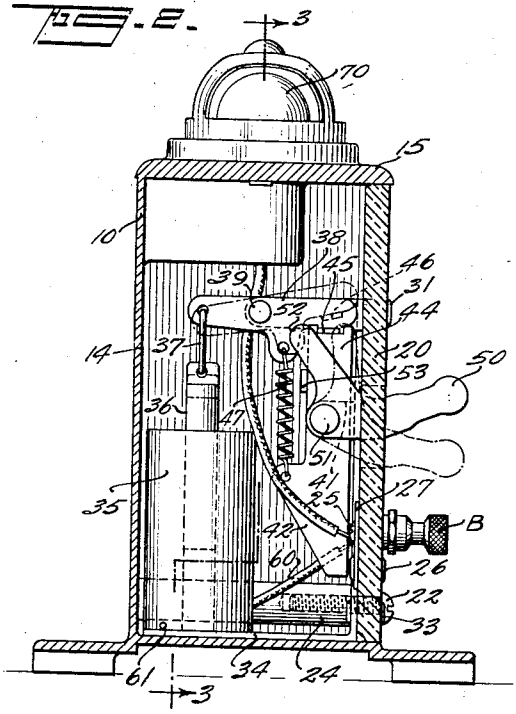


FIG. 3.

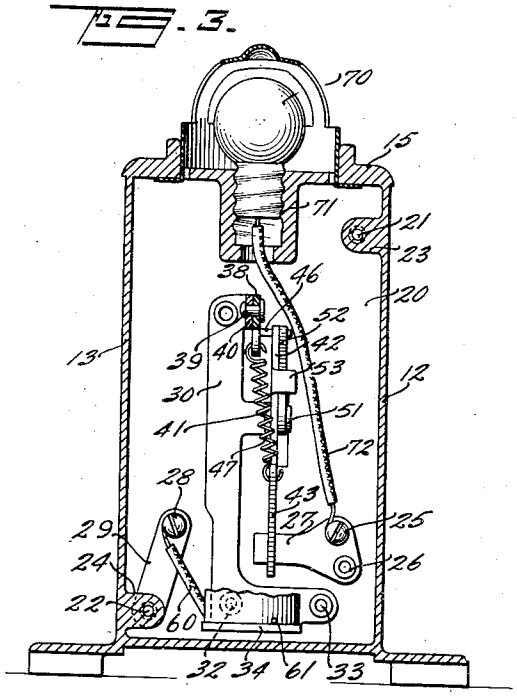
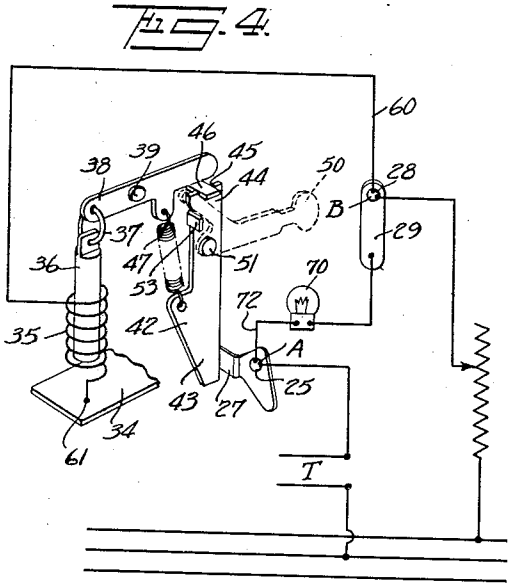


FIG. 4.



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CIRCUIT BREAKER

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4 Claims. (Cl. 200—106)

The present invention relates to circuit breakers and is more particularly directed toward circuit breakers adapted for use in controlling the circuit for toy railroad operation.

Toy railroads are operated at low voltage obtained from a transformer, or batteries or a current reducer. The third rail of the track layout is connected to one side of the supply source while the track rails form the return and are connected by a wire with the other side of the current source. The third rails and track rails are exposed so that accidental short circuits may readily occur should a car be derailed or some other conductor accidentally come in contact with the third rail and the grounded track rail. Any such short circuit will draw excessive current and will stop the operation of the train.

The present invention contemplates a circuit breaker particularly adapted for use in the operation of toy trains, the circuit breaker being placed in series with one of the leads and adapted to carry the normal operating current of the track layout without acting to open the circuit. It, however, operates an overload or short circuit to open the circuit thereby protecting the battery or transformer. It is preferably arranged so that a warning light will be illuminated when the circuit breaker is opened, this warning light to remain lighted as long as the short circuit continues. The invention also contemplates an overload circuit breaker for the purposes above referred to, which is capable of manual operation to open and close the circuit.

The accompanying drawing shows, for purposes of illustrating the invention, one of the many possible embodiments in which it 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 front elevational view of a complete circuit breaker;

Figure 2 is a sectional view on the line 2—2 of Figure 1, parts being shown in circuit closing position in full lines and in circuit opening position in dot and dash lines;

Figure 3 is a sectional view on a broken line 3—3 of Figure 2, the parts being shown in circuit closing position in full lines and in circuit opening position in dot and dash lines; and

Figure 4 is a diagrammatic view with superposed wiring diagram.

In the drawing the housing or casing for the circuit breaker is indicated at 10. It has a base 11, three side walls 12, 13 and 14, and top wall 15. It has an open side opposite the wall 14, this open side being closed by a plate of insulating material 20, which is held in place by screws 21 and 22, threaded into lugs 23 and 24 formed inside of the housing.

This insulating panel 20 supports the operative parts for the circuit breaker and the binding posts for connecting the device into the circuit. One binding post is indicated at A while the other binding post is indicated at B. The binding post A is held in place by a screw 25. This screw and a rivet 26 support a spring contact 27 on the inside face of the insulating block. The binding post B is held in place by a screw indicated at 28 which also supports a strap 29, which extends downwardly to be opposite the lug 24 whereby the binding post B can be grounded to the housing of the circuit breaker when the parts are assembled.

The insulating plate 20 also carries the frame or chassis member 30 which is secured in place by three rivets as indicated at 31, 32 and 33. This chassis member is provided with a lower rearward extension 34, which supports a solenoid coil 35. The armature 36 for the solenoid is supported by a link 37 carried on the rear end of the lever 38 pivoted at 39 in a rearward extension 40 of the frame 30.

The frame 30 also has a rear extension indicated at 41 in which is mounted a lever 42 adapted to act as the movable contact of the switch. The lower end 43 of this lever is opposite the fixed contact 27 while its upper end 44 is notched as indicated at 45 to receive a lug 46 on the front end of the lever 38. A spring 47 interconnects parts 38 and 41 as indicated, this spring acting to hold the lug 46 in the notch 45 when the switch is closed and to draw the movable contact away from the fixed contact when the solenoid acts on the lever 38 to release the movable contact.

A warning light 70 is carried at the upper part 15 of the housing. This lamp is threaded into a socket indicated at 71, one side of which is grounded. The other side of the socket is connected by a wire 72 with the screw 25. This lamp will be lighted when the circuit breaker is open and connection is made in the track circuit. It will, therefore, indicate the existence of a short circuit which caused the operation of the circuit breaker.

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.

A manually operable lever or finger piece 50 is carried on the forward extension 41 alongside the movable switch member 43, these parts being held together by a pivot post 51. The inner end of the lever 50 is indicated at 52. It is engageable with a lug or projection 53 carried by the movable switch contact 43 to close the switch so that the lug 46 enters the notch 45 to hold the switch closed. It is also engageable with this lug to release the latch so that the switch is snapped open by the spring 47.

The chassis frame 30 levers 33 and 50 may be made out of sheet steel or other magnetizable material while the movable switch contact 43 is preferably made out of brass or other non-magnetizable material.

One end of the coil 35 is connected by wire indicated at 60 with the screw 28 while the other end is grounded to the chassis as indicated at 61. When the circuit is closed the current will flow from the transformer or other current source T, indicated in Figure 4, to the binding post A through the contacts 27 and 43 to the chassis frame 30 and then through the coil 35, lead 60 to binding post B. This binding post and the other side of the transformer may be connected to the track layout as indicated. Should a short circuit or overload occur in the track layout an excessive current will flow through the coil 35 which will release the latch mechanism and allow the spring 47 to open the circuit.

What is claimed is:

1. A circuit breaker adapted for low voltage circuits comprising an insulating plate, a conducting frame secured to one face of the plate, a contact secured adjacent the frame, a solenoid coil supported from the frame and connected at one end to the frame, an armature core movably carried in the coil, a switching member pivotally secured to the frame and having a free end engageable with the contact to complete a circuit from the contact through the switching member, frame and coil, a manually operable lever pivotally carried by the frame for actuating the switching member, a latching lever connected to the armature and cooperable with the switching members to hold it in closed position, and a spring between the switching member and the latching lever, the spring holding the latching lever in position to hold the switching member in closed position and pulling the switching member away from the contact.

2. A circuit breaker as claimed in claim 1, wherein the frame is made of sheet metal, the pivoted members are secured to rearwardly bent lugs, and the coil is supported on a rearwardly extending platform formed by bending the frame.

3. In a circuit breaker for controlling low voltage circuits, a fixed contact, a sheet metal frame insulated from the fixed contact, a coil carried by the frame, an armature for the coil actuating a lever pivoted to the frame, a bar pivoted to the frame, one end of the bar being engageable with the fixed contact and the other end being adjacent the lever, a spring interconnecting the bar and lever and tending to move the link away from the fixed contact, the adjacent ends of the bar and lever having interengageable latching means releasable by the armature to allow the spring to open the circuit breaker, and a manually operable lever for operating the bar to circuit-opening or circuit-closing position.

4. A circuit breaker for toy railroads and the like comprising a metal housing open at one side; a circuit breaker unit including a mounting plate of insulating material for closing the open side of the housing, fixed and movable contacts carried by the plate inside the housing the fixed contact being connected to an external terminal, a solenoid supported from the plate and connected at one side to an external terminal carried by the plate and at the other side to the movable contact, a spring for biasing the movable contact toward open position, an armature for the solenoid, an externally accessible manually operable switch opening and closing means, and a latch member operable by the solenoid for releasing the movable contact.

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