

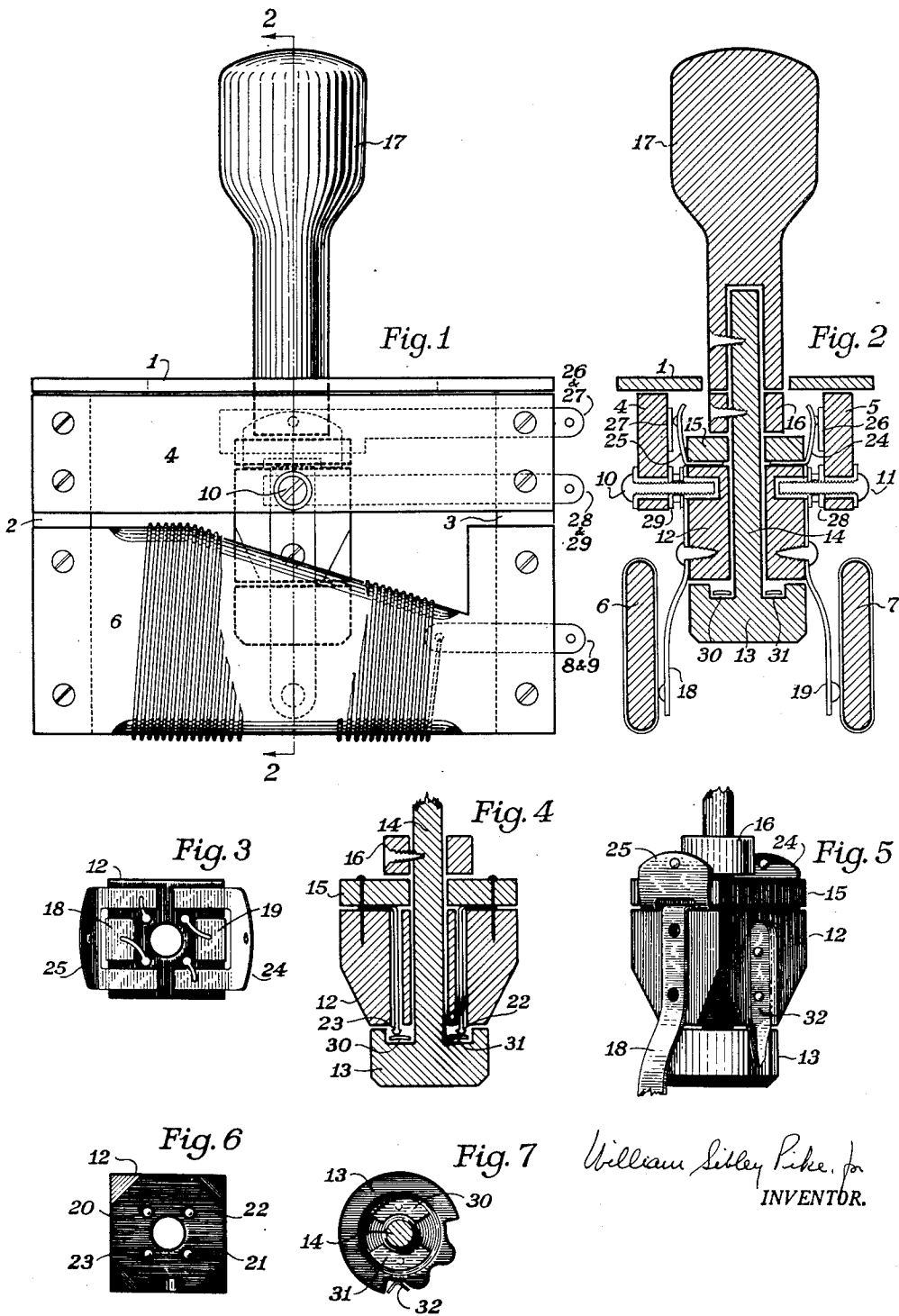
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ELECTRICAL CONTROL DEVICE FOR SCALE-MODEL RAILROADS

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ELECTRICAL CONTROL DEVICE FOR
SCALE-MODEL RAILROADS

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The invention relates to improvements in devices used, to control direct-current circuits in which it is necessary to vary the resistance and reverse the polarity. The primarily intended, although not necessarily the sole, application for the invention is in speed and direction control of scale-model railroad trains where direct current is used for propulsion and reversal in direction of travel is accomplished by reversing the track polarity at the control panel.

The objects of the invention are, first, to provide for simplified speed and direction control of a train on "main-line" or "yard" trackage through manipulation of a single control knob (rather than the customary two separate controls: conventional rheostat and double-pole double-throw toggle); second, to permit stopping and reversing the train without the necessity of running the rheostat to the extreme off-end position (thus speeding up operations in yards, on grades, and when running heavy trains, and providing for emergency stops); and, third, to provide a separate non-reversing circuit for powering "reversing loops" of track (wherein, because a train leaving the "main-line" and entering the "loop" travelling, say, west will re-enter the "main" travelling east, it is necessary to reverse the polarity of the "main-line" without affecting the speed or direction of the train moving in the "loop").

One form of the invention is illustrated in the accompanying drawing in which Figure 1 is a side elevation of the device; Figure 2, a vertical section on line 2—2, Figure 1; Figure 3, a top view of the center block showing the arrangement of the contacts; Figure 4, a vertical section drawn diagonally through the center assembly; Figure 5, a vertical diagonal view of the center assembly; Figure 6, a bottom view of the center block; and Figure 7, a top view of the rotor.

The frame of the device may be bolted in one piece or may be built up of separate pieces consisting of a slotted top, 1, two end blocks, 2 and 3, and two side pieces, 4 and 5 (Figures 1 and 2).

Affixed to the end blocks are two parallel flat coils, 6 and 7, of suitable total resistance. The coils are preferably "taper"-wound to effect a better correspondence between the amount of movement of the control knob or lever and the change in speed of the train; "tapering" may be provided by (a) varying the size of the coil form as shown in the drawing (Figure 1), or (b) varying the size of the wire, or (c) varying the spacing of the winding. The coils terminate at one end in terminals 8 and 9.

Mounted between the coils 6 and 7 is a mov-

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able contact-bearing center assembly of suitable non-conductive material which may be constructed as a slide, or as a lever as shown in the drawing. The center assembly contains a built-in double-pole double-throw center-off switch which is operated by rotation of the control knob and which may be of the toggle type suitably mounted, or of the rotary type, or may consist of cam-actuated contacts. The drawing shows a simple rotary type in a center assembly suspended on pivot bolts 10 and 11 from the side pieces 4 and 5; and consisting of a square center block 12; a round rotor 13; rotor shaft 14; cap 15; and collar 16, which holds the rotor and shaft in place. The control knob 17 is mounted on the shaft 14.

The electrical contacts are arranged as follows: two spring contacts, 18 and 19, are mounted on opposite sides of the center block 12, extending downward to make wiping contact with the coils 6 and 7 and extending upward to the top of the center block as shown in Figure 3. There they join wires or rods extending downward through the center block and terminating in contact points 20 and 21 (Figure 6). Two additional contact points, 22 and 23, are connected through the center block to contacts 24 and 25 mounted on the top of the block, which make wiping contact with strips terminating in terminals 26 and 27 (Figures 1 and 2). Terminals 28 and 29 make contact with spring contacts 19 and 18, respectively, through pivots 11 and 10. Set into a recess in the rotor 13 are two spring contacts, 30 and 31, as shown in Figure 7, so arranged that in one setting of the control knob, spring 30 makes contact between contact points 21 and 23, and spring 31, between points 20 and 22. Rotation of the control knob (and rotor) through 45-degrees breaks both contacts (the center-off position); a further rotation of 45-degrees establishes contact between points 21 and 22, and between 20 and 23.

The edge of the rotor is shaped as shown in Figure 7, to engage a spring, 32, and provide stops at 45-degree rotation on both sides of the center-off position.

The circuits are as follows: the coil terminals 8 and 9 are the input terminals and are connected to the plus and minus terminals of the direct-current power source. The non-reversing circuit is completed between terminals 8 and 29 through coil 6, contact 18, and pivot 10; and between terminals 9 and 28 through coil 7, contact 19, and pivot 11. In the reversing circuit, at one setting of the control knob, the circuit is completed between terminals 8 and 27 through

coil 6, contact 18, point 20, contact 31, point 23, and contact 25; and between terminals 9 and 26 through coil 7, contact 19, point 21, contact 30, point 22, and contact 24. At the opposite setting of the knob (90-degree rotation) the circuit is completed between terminals 8 and 26 through coil 6, contact 18, point 20, contact 31, point 22, and contact 24; and between terminals 9 and 27 through coil 7, contact 19, point 21, contact 30, point 23, and contact 25.

I am aware that prior to my invention reversing rheostats have been made, which require that the rheostat be run to the off-end before the circuit can be broken or its polarity reversed; and in which the movement of the lever or knob in one direction first increases the resistance, then breaks the circuit, and finally, with further movement in the same direction, decreases the resistance with the polarity of the circuit reversed. I therefore do not claim reversing rheostats broadly; but I claim:

1. A reversing rheostat which permits the circuit in which it is used to be broken and its polarity reversed without changing the resistance value, the device comprising a frame, appropriate electrical resistance suitably arranged and mounted on the said frame, a center assembly pivotally mounted on the said frame and provided with a control lever and with contacts arranged so that movement of the assembly on its pivotal axis by means of the said control lever introduces continuously variable resistance into the circuit in which the device is used, the said control lever being mounted in the said center assembly for rotation about its longitudinal axis independently of the pivotal movement of the said assembly, an electrical switch of suitable design mounted on the said center assembly and attached to the said control lever in such a way as to be operated by rotation of the said control lever about its longitudinal axis, and contacts and terminals attached and arranged so that rotation of the said control lever about its longitudinal axis first breaks the said circuit and then re-establishes it but with reverse polarity.

2. The combination in a single device operated by a single control lever of a reversing rheostat and a non-reversing rheostat, the said device comprising the structure set forth in claim 1, and being provided with additional contacts and terminals arranged and attached in such a manner as to by-pass the said electrical switch and to provide a second output circuit which is unaffected by rotation of the said control lever about its longitudinal axis but in which the resistance value is always the same as that in the

first-mentioned circuit at any setting of the said control lever upon its pivotal axis.

3. A reversing rheostat which permits the circuit in which it is used to be broken and its polarity reversed without changing the resistance value, the device comprising a frame, appropriate electrical resistance suitably arranged and mounted on the said frame, a center assembly mounted within the said frame for sliding movement parallel with the said electrical resistance, the said center assembly being provided with a control knob and with contacts arranged so that sliding movement of the said center assembly by means of the said control knob introduces continuously variable resistance into the circuit in which the device is used, the said control knob being mounted in the said center assembly for rotation about its longitudinal axis independently of the sliding movement of the said center assembly, an electrical switch of suitable design mounted on the said center assembly and attached to the said control knob in such a way as to be operated by rotation of the said control knob about its longitudinal axis, and contacts and terminals attached and arranged so that rotation of the said control knob about its longitudinal axis first breaks the said circuit and then re-establishes it but with reverse polarity.

4. The combination in a single device operated by a single control knob of a reversing rheostat and a non-reversing rheostat, the said device comprising the structure set forth in claim 3, and being provided with additional contacts and terminals arranged and attached in such a manner as to by-pass the said electrical switch and to provide a second output circuit which is unaffected by rotation of the said control knob about its longitudinal axis but in which the resistance value is always the same as that in the first-mentioned circuit at any setting of the said control knob in its slide.

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