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CONTROL OF RAILWAY APPARATUS.

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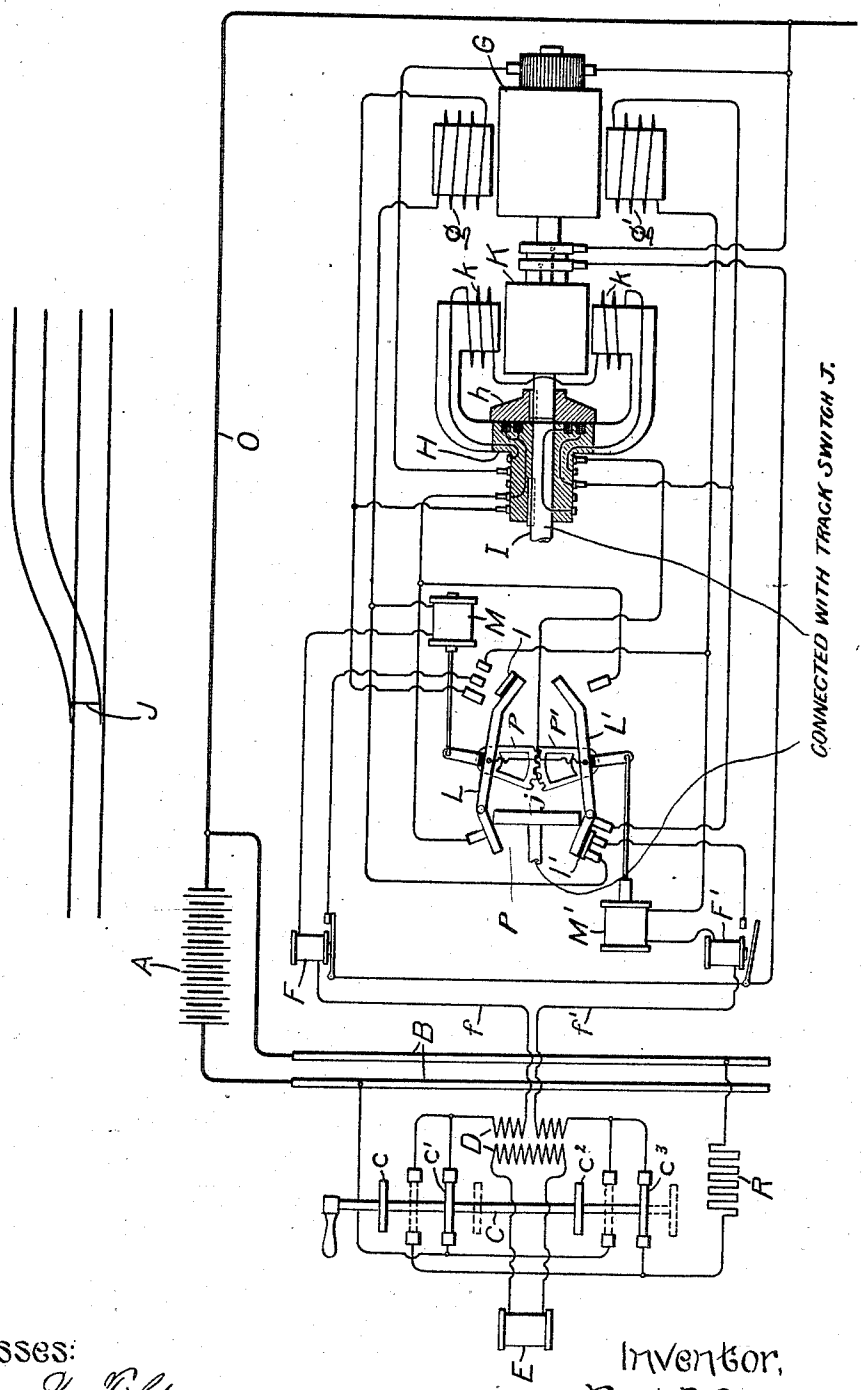
1,051,557.

Patented Jan. 28, 1913.



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UNITED STATES PATENT OFFICE.

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CONTROL OF RAILWAY APPARATUS.

1,051,557. Specification of Letters Patent. **Patented Jan. 28, 1913.**

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To all whom it may concern:

Be it known that I, FRED B. COREY, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in the Control of Railway Apparatus, of which the following is a specification.

My invention relates to the control of railway apparatus for controlling traffic, such as track-switches, driven by electric motors, and its object is to provide a novel arrangement for giving the return indication to show that the movement of the track-switch, or other apparatus, is completed.

In systems of this character, commonly known as electric interlocking systems, the control levers are ordinarily so arranged that the first part of the movement of the control-lever energizes the electric motor to drive the switch controlled by the lever. The control-lever is arrested before it has completed its movement by a catch which is released only by the return indication, showing that the movement of the switch has been completed. The movement of the lever may then be completed, so as to unlock other levers interlocked therewith. The safety of the system depends largely on the certainty that the track-switch has completed its movement when the return indication is received.

It is the usual practice to place a magnetic clutch between the electric motor and the track-switch; the clutch being deënergized by contacts controlled by the track-switch when the track-switch has completed its movement. I provide a small generator having its two elements, the field and armature, mechanically connected to the electric motor and to the track-switch, respectively, so that when the magnetic clutch is energized and the motor is driving the track-switch, the generator armature and field are locked together, so that no current can be induced in the generator armature. When the switch has completed its movement, and the clutch is deënergized, one element of the generator becomes stationary, while the other element is driven by the motor and a current is therefore generated. I employ this current for actuating the return indication device, which is arranged to respond only to current from the small generator, and not to the motor current. The small generator may deliver alternating current, and the return indication device be arranged to respond only to alternating current. By means of such an arrangement, the possibility of a false indication, due to an accidental crossing of the control-wires, is avoided.

My invention will best be understood by reference to the accompanying drawing, which shows diagrammatically a control system for a track-switch arranged in accordance with my invention.

In the drawing A represents a battery, or other source of current for supplying the motor for driving the switch. The terminals of the battery are connected to bus-bars B.

C represents a switch member actuated by a suitable lever. Switch member C carries four contacts c to c^3

D represents a transformer, the secondary of which is connected to the return indication magnet E, while its two primaries are inserted in series with the control-wires f and f^1.

F and F^1 represent relays in the control-wires.

G represents the armature, and g, g^1 the field windings of an electric motor. This motor is reversible, the field windings being connected for this purpose in the well-known manner, so that one winding or the other is energized for the opposite directions of rotation of the motor.

H represents a magnetic clutch, the member carrying the energizing winding of the clutch being fast to a shaft I, which drives through suitable connections (not shown) a track-switch indicated diagrammatically at J. The armature h of the clutch is fast to the shaft of the motor armature G. The clutch is shown provided with two concentric windings, either of which may energize it, two windings being used merely to simplify the wiring.

K represents the armature of a small alternating-current generator, which armature is mounted on the shaft of the motor armature. This generator is provided with field windings k k, which are carried on a field magnet, which is in turn carried by the shaft I. When the clutch H is energized, the armature and field of the small generator are locked together, and no current can be induced in the generator armature. When the shaft I is stationary, the clutch H deëner-

gized, and the motor-armature G running, an alternating voltage is induced in the generator-armature K, which voltage is employed for furnishing the return indication. Collector rings are provided for clutch H, armature K, and field *k*, as shown.

L L^1 represent switch-contact members, which are controlled by a member *j* connected to and moving with the track-switch. These contact members carry auxiliary contacts *l* and l^1.

M and M^1 represent a pair of electromagnets connected to the control-wires *f* and f^1, respectively, and jointly with the member *j* controlling the switch members L L^1. These switch contact members are connected in any suitable manner to move simultaneously; as here shown, they are connected by means of two meshing segmental gears P and P^1, secured respectively to members L and L'.

The diagram shows the conditions when the movement of the track-switch from one direction to the other has just been started. The control-lever has been moved to bring the switch member C from the initial dotted-line position to an intermediate position, shown in full lines. In this position of the switch member C, a circuit is closed from the left-hand terminal of battery A, through contact c^1, through one primary of transformer D, control-wire *f*, relay F, magnet M, motor field winding *g*, the inner winding of clutch H, contact member L, generator field winding *k* and motor armature G, to the common main O. Relay F, magnet M, clutch H, motor field winding *g*, generator field winding *k*, and motor-armature G are all energized. The motor consequently starts and drives the track-switch, since the clutch connects the two together. Although the generator field *k* is energized, no current is induced in the generator-armature, since the two elements of the generator are locked together by the clutch. As the track-switch moves from one position to the other, member *j* moves from left to right. When the track-switch completes its movement, member *j* throws the switch members L and L^1 to their other positions. This short-circuits the inner winding of clutch H. This short-circuit may be traced from the left-hand collector-ring on clutch H, through switch member L and through switch member L^1 to the second collector ring from the left on clutch H. Motor-armature G is, therefore, disconnected from the track-switch and runs free. The field of the alternating-current generator is, therefore, stationary, while its armature is driven by the motor. Furthermore, the generator-armature is now connected to line-wire f^1. This circuit may be traced from the left-hand collector-ring of armature K through the contact of relay F, through auxiliary contacts *l* of switch member L, through magnet winding M^1 and relay F^1, the lower primary of transformer D, contact c^3, resistance R, right-hand bus-bar B and common main O, to the right-hand collector ring of generator-armature K. The alternating-current generated in this armature consequently produces a voltage in the secondary of transformer D, to which the return-indication magnet E is connected. This magnet is, therefore, energized, releasing the control-lever and allowing the movement of switch member C to be completed, so as to break the motor circuit at contact c^1. To reverse the track switch, switch member C is thrown in the other direction.

It will be understood that the relays F and F^1 are arranged not to respond to the current from the alternating-current generator. They may be so arranged, either by adjusting them to respond only to a predetermined current-strength, since the current from the alternating generator is naturally less than the motor current, or they may be designed in any of the well-known ways, to render then unresponsive to alternating-current.

In the normal operation of the system, the magnets M and M^1 perform no useful function. If, however, the completion of the movement of the track-switch is prevented, so that switch members L and L^1 are left in an intermediate position, then, by throwing switch member C to its other position, magnet M or M^1 is energized to draw the switch members back to their original position.

I do not desire to limit myself to the construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In combination, an electric motor, a traffic-controlling device, a small electric generator having its elements mechanically connected to the motor and to the device respectively, a magnetic clutch for connecting the motor to said device to drive it, means controlled by the movement of said device to a predetermined position for deënergizing said clutch, and an electro-magnetic device responsive to current produced by said generator.

2. In combination, an electric motor, control-wires therefor, a traffic-controlling device, a small electric generator having its elements mechanically connected to the motor and to the device respectively, means for connecting the generator armature in series with one of the motor control wires, a magnetic clutch for connecting the motor to said device to drive it, means controlled by the

movement of said device to a predetermined position for deënergizing said clutch, and an electro-magnetic device responsive to current produced in the control-wire by said generator but not to the motor current.

3. In combination, a direct-current motor, a traffic-controlling device, a small alternating-current generator having its elements mechanically connected to the motor and to the device respectively, a magnetic clutch for connecting the motor to said device to drive it, means controlled by the movement of the device to a predetermined position for deënergizing said clutch, and an electro-magnetic device responsive to current produced by said generator but not to direct-current.

4. In combination, a direct-current motor, a traffic-controlling device, a small alternating-current generator having its elements mechanically connected to the motor and to the device respectively, means for connecting the generator-armature in series with one of the motor control wires, a magnetic clutch for connecting the motor to said device to drive it, means controlled by the movement of said device to a predetermined position for deënergizing said clutch, and an electro-magnetic device responsive to alternating-current in the control-wires but not to direct-current.

5. In combination, a reversible electric motor, a pair of control-wires through which respectively current is supplied to the motor for opposite directions of rotation, a traffic-controlling device, a small electric generator having its elements mechanically connected to the motor and to the device respectively, a magnetic clutch for connecting the motor to said device to drive it, contacts controlled by the device for deënergizing said clutch and for connecting the generator-armature to the other control-wire than that through which current is then being supplied to the motor, and an electro-magnetic device responsive to current produced in the control-wires by said generator but not to the motor current.

6. In combination, a reversible direct-current motor, a pair of control-wires through which respectively direct-current is supplied to the motor for opposite directions of rotation, a traffic-controlling device, a small alternating-current generator having its elements mechanically connected to the motor and to the device respectively, a magnetic clutch for connecting the motor to said device to drive it, contacts controlled by the device for deënergizing said clutch and for connecting the generator-armature to the other control-wire than that through which current is then being supplied to the motor, and an electro-magnetic device responsive to alternating-current in the control-wires but not to direct-current.

7. In combination, a traffic-controlling device, an electric motor, an electric generator having its elements mechanically connected with the device and with the motor respectively, means for connecting said motor with and disconnecting it from the said device, and an electromagnetic device responsive to current produced by said generator.

8. In combination, a traffic controlling device, an electric motor, an electric generator having its elements mechanically connected with the device and with the motor respectively, and a magnetic clutch for connecting the motor and the traffic-controlling device, means controlled by the movement of the device to a predetermined position for deënergizing the clutch, and an electromagnetic device responsive to current produced by said generator.

9. In combination, a traffic-controlling device, a motor, a clutch device for connecting the motor and the traffic controlling device, an electric generator having its elements connected with the motor and with one clutch member respectively, means controlled by the movement of the traffic-controlling device to a predetermined position for disconnecting the clutch device, and an electromagnetic device responsive to current produced by said generator.

10. In combination, a traffic-controlling device, a motor, a clutch device for separably connecting the traffic-controlling device and the motor, an electric generator having its elements connected with the motor and with one clutch member respectively, and an electromagnetic device responsive to current from said generator.

11. In combination, a traffic-controlling device, a motor, a clutch device for separably connecting the traffic-controlling device and the motor, an electric generator having its elements connected with the two clutch members respectively, and an electromagnetic device responsive to current from said generator.

In witnesses whereof, I have hereunto set my hand this 15th day of July, 1908.

FRED B. COREY.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.