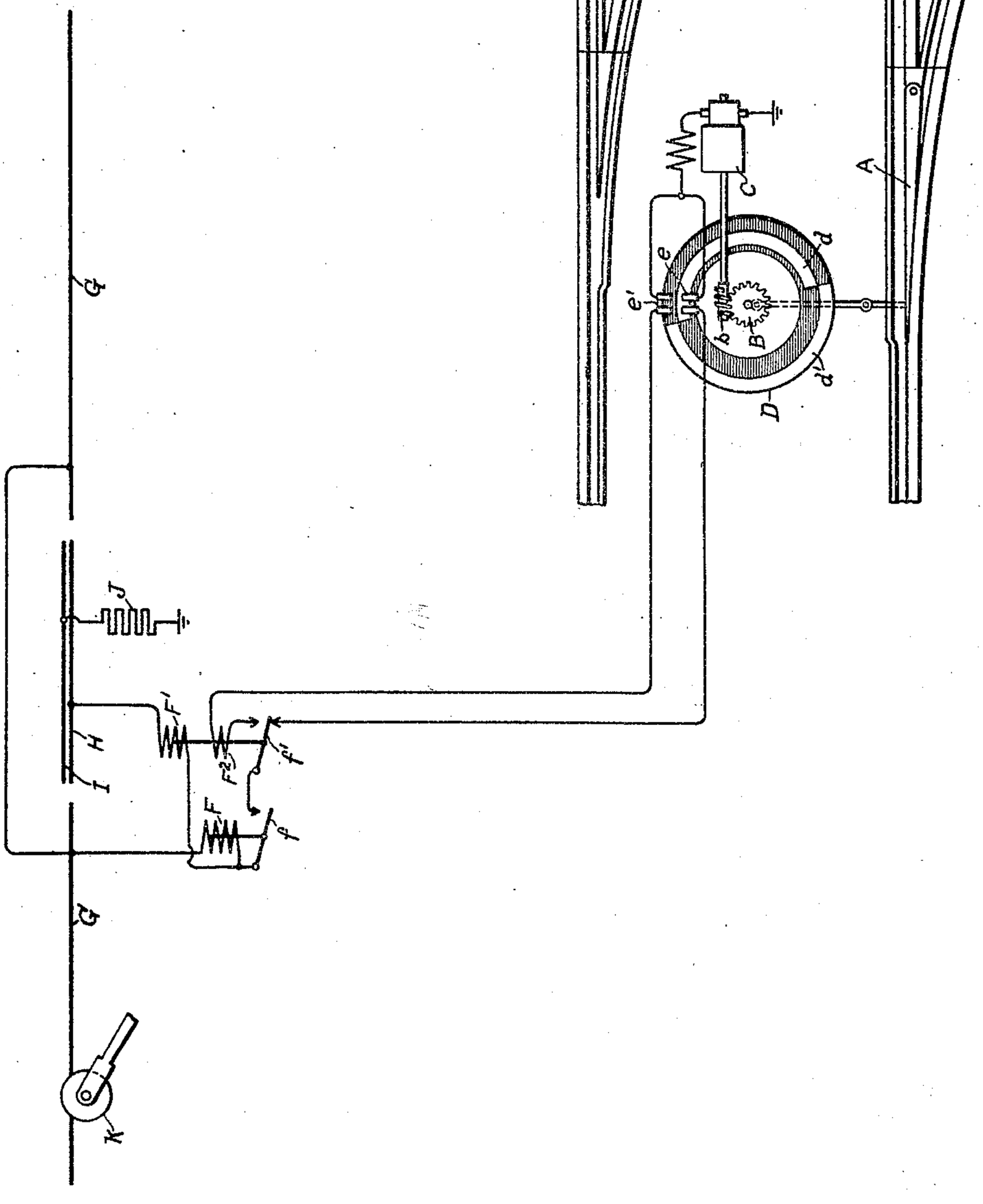
F. B. COREY.

ELECTRICALLY OPERATED TRACK SWITCH.

APPLICATION FILED DEC. 24, 1908.

969,526. Patented Sept. 6, 1910.



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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-OPERATED TRACK-SWITCH.

969,526. Specification of Letters Patent. **Patented Sept. 6, 1910.**

Application filed December 24, 1908. Serial No. 469,068.

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 and State of New York, have invented certain new and useful Improvements in Electrically-Operated Track-Switches, of which the following is a specification.

My invention relates to electrically-operated track switches controllable from an approaching car in such manner that the motorman before reaching the switch can throw it in either direction, and its object is to provide a positive and reliable device, which is cheaper and more compact than those heretofore used.

Various combinations of solenoids and contact devices for controlling them have been suggested heretofore for operating track switches. A solenoid is a comparatively inefficient piece of apparatus, and since its effective range of movement is small, it must exert considerable power to move a track switch through the necessary distance. Track switch solenoids are, therefore, large and expensive. By my invention I substitute for the solenoid a rotary electric motor which may be connected to the track switch through speed-reducing gearing, so that the motor may make as many revolutions as desired in moving the guide-switch. Thus a small, compact and inexpensive motor may be employed.

When a rotary motor is used, it is not possible to use contact devices of the type which have been used with solenoids; since those contact devices close the circuit only momentarily, as the car passes over them. I, accordingly, so arrange the controlling means of the motor that when the motor is energized to shift the track switch it is maintained and energized until the switch has completed its movement. Furthermore, I so arrange the controlling means that it is selectively operated for one route or the other without regard to the position of the track switch; that is, the motorman of a car, approaching the switch and wishing to take a certain route, selectively actuates the controlling means in a certain manner. If the switch is already in the proper position, it is not actuated, while if it is in the other position, it is moved to the proper position. Thus, it is unnecessary for the motorman to see the switch or to know its position in order to know how to operate his controller properly. The operation of the controller is determined entirely by the route which he wishes to take and not by the position in which the switch may happen to be. With such an arrangement it is possible to put the controlling means back from the switch any desired distance.

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

In the drawing, A represents the movable member or tongue of a track switch, which is driven through a gear B and worm *b* by the rotary electric motor C. The connection between the gear B and the switch tongue A is so arranged that a movement of the gear through 180 degrees shifts the switch tongue from one extreme position to the other, while a continued movement of the gear-wheel B in the same direction will return the switch toward its original position. The motor therefore does not need to be reversible, so that the wiring and contacts are simplified. The gearing between the motor and switch may be designed to give any speed reduction desired.

D represents diagrammatically a contact disk carried by the gear B and comprising two insulated arc-shaped contacts *d* and d^1. In the path of these two contacts are placed two sets of stationary contacts *e* and e^1, respectively. These two sets of contacts are connected to the motor and to contacts *f* and f^1, which are electromagnetically actuated and are selectively controllable from an approaching car. The contact *f* is actuated by a magnet F, while contact f^1 is provided with two windings F^1 and F^2. The two windings F and F^1 are connected in series between the working conductor G, from which current is derived for operating the cars, and the insulated contact strip H, which is inserted in the line of the working conductor. A second contact strip I lies parallel with but insulated from the strip H, and is connected to ground through a resistance J. The contacts H and I are adapted to be connected to each other by the trolley-wheel K of a car approaching the track switch.

The operation is as follows: The magnet windings are so arranged that if a car approaching the switch is to continue on the

straight track, it will pass over the contact strips H and I with the power on, while if the car is to run on to the branch track, it will coast over the strips H and I. The switch, as shown in the drawing, is set for the main track. While the trolley wheel or current collector of a car is on the contact strips H and I, it can draw current only through the magnet windings F and F^1 in series. If, in passing over these strips, the motor circuit of the car is kept closed, the current that is drawn is sufficient to cause both windings F and F^1 to draw up their contacts f and f^1, respectively. This establishes a circuit from the working conductor G, through winding F and contacts f and f^1 and winding F^2 to contacts e^1. These contacts, however, are open so that no current flows to the motor. If, on the other hand, the car coasts over contact strips H and I, the only current flowing through windings F and F^1 is that from contact strip H through trolley-wheel, to contact strip I, and thence through resistance J to ground. Resistance J is so proportioned that the current which then flows through windings F and F^1 is much less than that which flows when a car passes over the strips with its motor circuit closed. Winding F is designed so as to respond to the comparatively small current which flows through resistance J, but winding F^1 is designed not to respond to this smaller current. This difference in windings F and F^1 may be brought about by giving the winding F a larger number of turns, as indicated on the drawing, or by any other well-known arrangement. Therefore, if a car coasts over the contact strips, contact f is closed, but contact f^1 is not moved. A circuit is then established from conductor G through winding F, contact f, back contact f^1, contacts e and contact d to the motor, and thence to ground. The motor consequently revolves, driving the gear B and contact disk D in a counterclockwise direction. The motor circuit is not broken when the car leaves the contact devices, because the contact f is held raised by the current flowing through the winding F, which passes to the motor. The connection from the lower terminal of this winding to contact f serves to maintain winding F energized until the motor circuit is broken by contact d leaving contacts e, which occurs when the switch has completed its movement to its other position. A following car coasting over the contact strips again energizes magnet F, but it does not energize the motor, since contacts e are then open. If the following car is to continue on the straight track, and consequently runs over the contact strips with power on, both magnets F and F^1 are energized and a circuit is closed from working conductor G through winding F, contacts f and f^1, winding f^2, contacts e^1 and contact d^1, to the motor. This circuit is maintained closed after the car has passed over the contact strips, since both windings F and F^2 are in circuit with the motor, so that the contacts f and f^1 are held raised until the track switch is returned to the position shown in the drawing, when the circuit of motor C is opened by contact d^1 leaving contacts e^1; the windings F and F^2 being then deënergized.

Other arrangements of the magnet windings for selectively controlling the contacts f and f^1 will be obvious to those skilled in the art. I, accordingly, do not desire to limit myself to the particular connections and arrangements of parts 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 with a track switch, a rotary electric motor geared thereto, two sets of contacts in circuit with the motor arranged to be alternately opened in the two extreme positions of the track switch, contacts selectively controllable by an approaching car for establishing a circuit to either set of contacts, and connections for maintaining the circuit, if it is established to the closed set of contacts, until the motor has driven the track switch to its other position.

2. In combination with a track switch, a rotary electric motor geared thereto, contacts controlled by the track switch and controlling the motor, electro-magnetically actuated contacts selectively controllable by an approaching car and controlling the motor jointly with the first named contacts, and connections for establishing a maintaining circuit for holding the electromagnetically actuated contacts closed when the motor circuit has been closed thereby, said maintaining circuit being arranged to be broken by the contacts controlled by the track switch when the switch has completed its movement.

3. In combination with a track switch, a rotary electric motor geared thereto, two sets of contacts in circuit with the motor arranged to be alternately opened in the two extreme positions of the track switch, electromagnetically actuated contacts selectively controllable by an approaching car for establishing a circuit to either set of contacts, and connections adapted to form maintaining circuits for the actuating windings of the electromagnetically actuated contacts, said maintaining circuits being arranged to be broken by the contacts controlled by the track switch.

4. In an electric railway, in combination with a track switch, a rotary electric motor

geared thereto, two sets of contacts in circuit with the motor arranged to be alternately opened in the two extreme positions of the track switch, a working conductor, a contact device interposed in said working conductor and adapted to be engaged by a current collector on a vehicle, a plurality of magnet windings at least one of which is connected between the working conductor and contact device and responds only when a passing car draws its motor current from said contact device, contacts controlled by said magnet windings for establishing a circuit selectively to either set of contacts, and connections adapted to form maintaining circuits for said magnet windings.

5. In combination with a track switch, a rotary electric motor, connections between motor and switch whereby the continued rotation of the motor in one direction reciprocates the track switch, contacts controlled by the track switch and controlling the motor, electro-magnetically actuated contacts selectively controllable by an approaching car and controlling the motor jointly with the first named contacts, and connections for establishing a maintaining circuit for holding the electromagnetically actuated contacts closed when the motor circuit has been closed thereby, said maintaining circuit being arranged to be opened by the contacts controlled by the track switch when the track switch completes its movement.

6. In combination with a track switch, a rotary electric motor, connections between motor and switch whereby the continued rotation of the motor in one direction reciprocates the track switch, two sets of contacts in circuit with the motor arranged to be alternately opened in the two extreme positions of the track switch, contacts selectively controllable by an approaching car for establishing a circuit to either set of contacts, and connections for maintaining the circuit, if it is established to the closed set of contacts, until the motor has driven the track switch to the other position.

In winess whereof, I have hereunto set my hand this 21st day of December 1908.

FRED B. COREY.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.