(No Model.)

A. C. GOETZ.

ELECTRIC RAILWAY SWITCH.

No. 489,944. Patented Jan. 17, 1893.

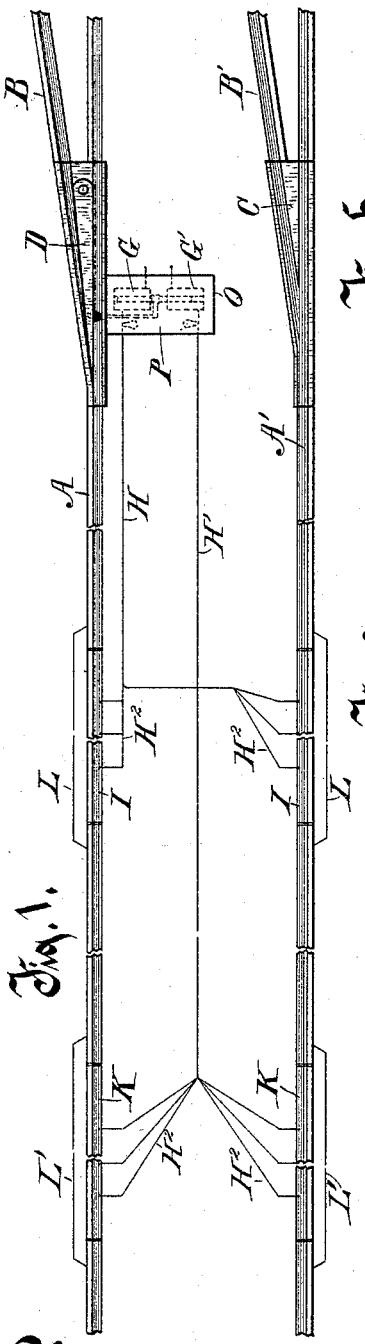

Fig. 1.

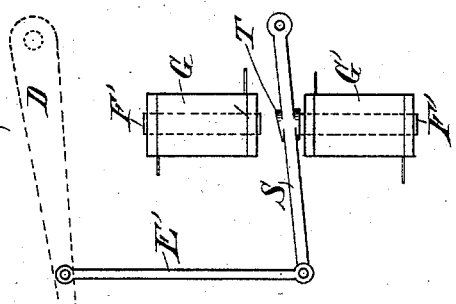

Fig. 5.

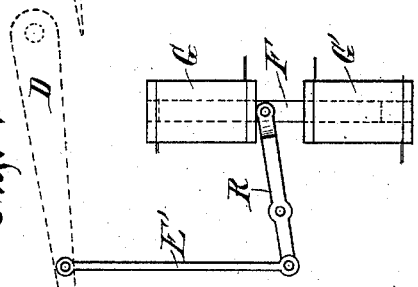

Fig. 4.

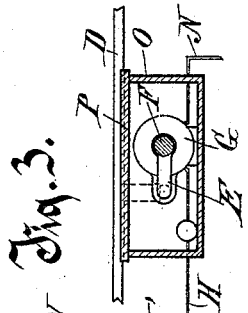

Fig. 3.

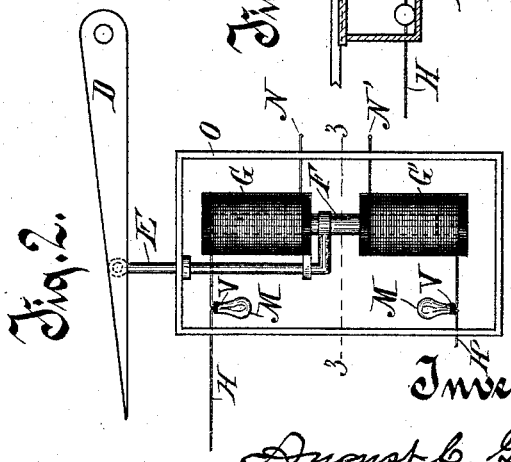

Fig. 2.

Witnesses.

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UNITED STATES PATENT OFFICE.

AUGUST C. GOETZ, OF MILWAUKEE, WISCONSIN.

ELECTRIC-RAILWAY SWITCH.

SPECIFICATION forming part of Letters Patent No. 489,944, dated January 17, 1893.

Application filed September 27, 1892. Serial No. 447,000. (No model.)

To all whom it may concern:

Be it known that I, AUGUST C. GOETZ, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Electric-Railway Switches, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The object of my invention is to provide means for automatically shifting a point or switch in the track of a railway on which cars are run by electricity.

In the drawings, Figure 1, is a plan view of my device in connection with so much of the rails of a railway track as is necessary to illustrate the invention. Fig. 2, is a top plan view of a portion of the device shown in Fig. 1 but on an enlarged scale showing the details of the construction more fully. Fig. 3, is a vertical, transverse section of the device shown in Fig. 2 on line 3—3 thereof looking toward the top of the figure. Figs. 4 and 5 are plans showing modified forms of a portion of the device.

In the drawings, A A′ are the rails of a railway substantially in the form in common use in the streets of our cities for the travel of electric cars thereon. B and B′ are branches of the rails A A′ diverging therefrom. The rail B′ diverges from the rail A′ at its junction therewith in and by the frog C. The branch rail B at its junction with the rail A diverges therefrom in and by the pivoted and swinging point or switch D.

My invention relates particularly to the devices provided for automatically shifting this point or switch D. The shifting of the switch is accomplished through my improved device by electricity from the source and through the mechanism that drives the car.

Electric cars on street railways are driven by electricity supplied to the motors on the cars from primary or secondary batteries on the cars or from a source of supply distant from the cars to which they are suitably connected and in all cases in such manner that the wheels of the car are in the electric circuit completed by their contact with the rails of the track through which the electricity is grounded or is transmitted more directly by a metallic circuit continuous with the rails to the source of supply. These are matters of common knowledge.

To accomplish the shifting of the switch D automatically by means of the electricity supplied to drive the car I provide a rod E pivoted advisably in the under surface of the switch D which rod is reciprocable endwise in suitable supports therefor and is attached rigidly to a metal core F arranged to move freely in the central longitudinal apertures of the oppositely arranged helices or solenoids G G′. This core F is of somewhat less length than the length of the helices G G′ and the distance between them, so that when the core F passes entirely through the helix G it extends only partially through the helix G′ and reversely when the core has been shifted so that it passes entirely through the helix G′ it will extend only partially through the helix G.

It will be understood that when the core F is in the position shown in Fig. 2 if the helix G′ be energized electrically, the other helix being inactive, the core will be shifted thereby so as to pass entirely through the helix G′ thereby shifting the switch D to the extent necessary to shunt the car on to the branch or side track. To now reverse the switch D it is only necessary to energize the helix G electrically, the other helix G′ being inactive to draw the core F again to the position shown in Fig. 2 thus returning the switch to its initial position. For transmitting the required electricity to one of these helices as desired they are respectively connected by the insulated metallic circuit wires H H′ to the otherwise insulated sections I, I and K, K of the track. The insulated sections I, I are located at such distance in front of the switch D as is convenient or desirable but advisedly thirty or more feet therefrom and the sections K, K are located at some little distance in front of the sections I, I, which should at least be so far that the wheels of a car will not at the same time contact with the sections K and I. Preferably the distance between these sections should be greater than the length of a car. These sections I, I and K, K, are insulated, in any suitable manner as by bedding them in rubber or glass and inserting rubber

or glass between their ends and the adjoining ends of the railway rail. The adjoining ends of the rails are connected by extrinsic metallic or shunt circuits L L'. The circuit wires or conductors H H' are also preferably connected to their respective sections of the rails I and K through branching wires H^2 H^2 for insuring perfect electrical contact.

As the voltage of the electric current commonly used for driving street cars is much greater than is required to energize a helix in my improved device for shifting a switch, I preferably introduce a carbon filament or incandescent lamp M into the circuit in front of the helix to resist the energy and modify the voltage of the current before it reaches the coil of my helix. This is a permissible device and it may be used for the purpose suggested if required.

The helices may be constructed to take the full voltage used in running the car and in such case no resistance or modifying device will be required. The helices are grounded or connected with a return circuit through the wires N N' which are a continuation from the coils. The helices are conveniently located below the surface of the ground and are preferably inclosed in a case or box O having a removable cover P which is adapted to serve as a manhole or means of conveniently examining and repairing the structure.

In the modified form shown in Fig. 4 the switch is connected to the reciprocable core F by means of a medially pivoted lever R, pivoted at one end to the core F and at the other extremity to the rod E' connecting it with the switch.

In the modified form shown in Fig. 5, the cores F' F' are fixed in the helices and a lever S provided with an armature T is pivoted at one extremity so that its armature may swing from contact with the core in one helix to contact with the core in the other helix, which lever at its other extremity is connected to the switch D by the rod E'.

It will be understood that the action of my improved device is entirely within the control of the motor man on the car, thus if when coming toward the switch D it is in the position shown in Fig. 1 and it is desired to shift the switch so as to shunt the car on to the branch rails it is only necessary that the motor man should allow the electric current passing through the car to continue to pass through it as the wheels travel over the sections K K whereby the helix G' will be energized electrically and thereby the core drawn into the energized helix whereby the point or switch will be shifted correspondingly and sufficiently to shunt the car on to the branch track. Thereupon while the car is passing over the sections I the motor man must shut off the electric current so as not to energize the helix G or otherwise the switch would be shifted back to its initial position. If now the succeeding car is to continue on the main track and therefore the switch is to be shifted to the initial position shown in Fig. 1, the motor man must continue the electric current actively while the car passes over the sections I I whereby the core will be drawn again into the helix G and the switch correspondingly shifted. In this latter case it would be better that the electric current should be shut off while passing over the sections K K thus obviating the use of the current when not required.

The insulated rail sections I I and K K are of sufficient length to receive thereon at the same time all the wheels of a car through which the electric current passes to the rails in running the car. This construction provides for transmitting the entire electric current from the wheels of the car through the insulated sections and a conductor to one or the other of the helices.

A switch V at the base of the loop in the incandescent lamps M is adapted for short circuiting the electric current and shutting out the carbon loop when there is no need for reducing or modifying the voltage of the current.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. The combination with a railway track having a branch track and a movable switch point therein, of two sets of electrically insulated sections of the rails on the same side of the switch point but at a greater and a less distance therefrom respectively, helices severally connected electrically to a set of the insulated sections of the track, and a device connected to the switch point adapted to be reciprocated by the energizing of one or the other of the helices electrically and by its reciprocation to shift the switch, substantially as described.

2. The combination with a railway track for electric cars, the track being composed of metal rails having branch tracks a movable switch point and corresponding frog and electrically insulated sections of the rails, on the same side of the switch point at unequal distances therefrom, of helices located opposite to but at a little distance from each other, metal conductors connecting the helices electrically severally to the insulated sections of the rails respectively at a greater and less distance from the switch point and other conductors connecting the helices to the ground or to return circuits, a reciprocable metal core of such length and so arranged as to extend only partially through one helix when it passes entirely through the other helix, such core being connected to the switch point in such manner that the reciprocation of the core correspondingly shifts the switch point, substantially as described.

3. The combination in a railway track adapted for the use of electric cars, of metallic rails adapted to serve as a return circuit for the electric current, a movable switch in one of the rails, sections of the rails opposite

each other insulated electrically from the adjoining portions of the rails and from the ground, metallic wires or conductors connecting the adjacent ends of the track electrically around the insulated sections and devices connected with the insulated sections of the rails and with the movable switch for shifting the switch by the energy of an electric current delivered to the devices through the insulated sections of the rails, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST C. GOETZ.

Witnesses:
C. T. BENEDICT,
ANNA V. FAUST.