

No. 645,690.

Patented Mar. 20, 1900.

G. R. MAIR.

SECTION INSULATOR AND SWITCH THEREFOR.

(Application filed Dec. 11, 1899.)

(No Model.)

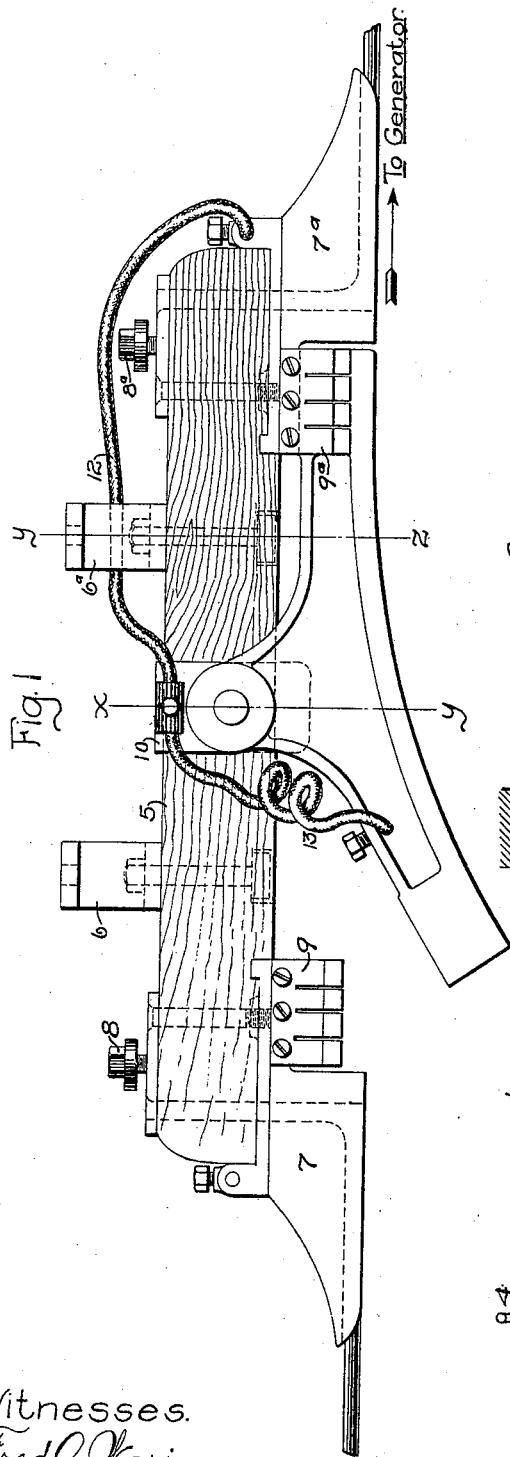


Fig. 1

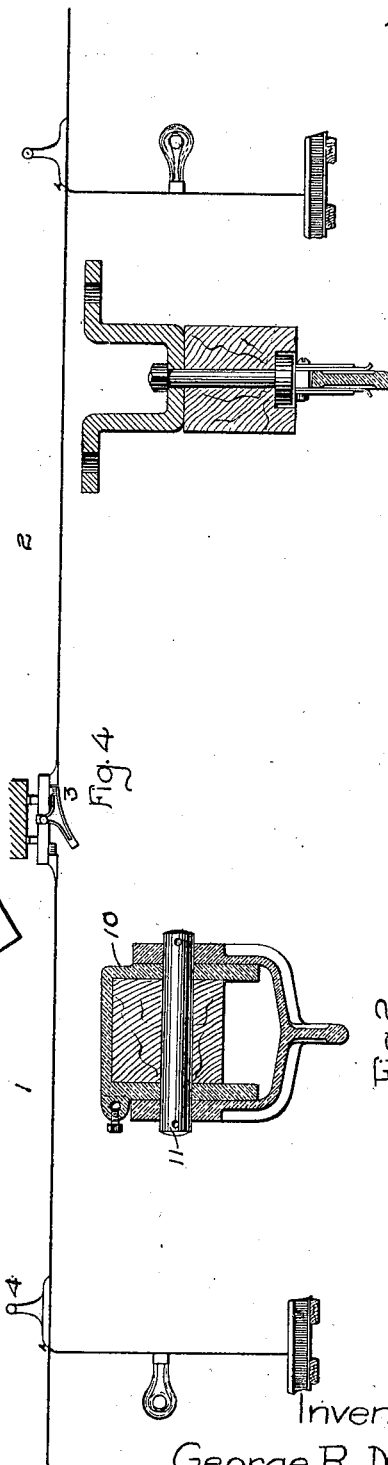


Fig. 2

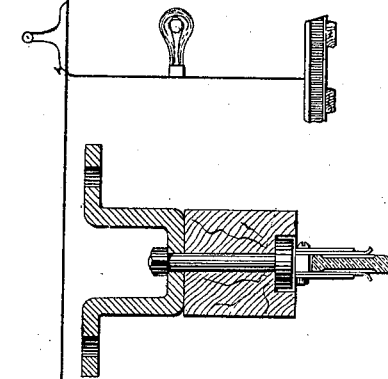


Fig. 3

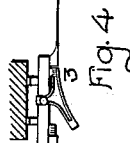


Fig. 4

Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## SECTION-INSULATOR AND SWITCH THEREFOR.

SPECIFICATION forming part of Letters Patent No. 645,690, dated March 20, 1900.

Application filed December 11, 1899. Serial No. 739,878. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE R. MAIR, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Trolley-Sockets and Switches Therefor, (Case No. 1,178,) of which the following is a specification.

This invention relates to supply-circuits for electric railways, the object being to render alive only those portions of the circuit between the generator and the locomotive or other traveling vehicle.

The invention is particularly adapted for service in mines, where exposed live conductors are dangerous to the movements of workmen or animals.

It is a further object of my invention to provide an indication by which the miners may be warned when the trolley-wire is alive.

In carrying out my invention I subdivide the trolley-wire into a number of insulated sections and provide a switch at the adjacent terminals of successive pairs of sections, by which the trolley may successively cut in the section ahead as it moves through the mine and on its return may successively cut out the several sections as it leaves them, thus leaving the wire in all parts of its course dead behind it as it proceeds toward the generator. I so construct the switch that no arcing will occur at the contact-points when a section is cut in or out. To these ends I provide for the junctions of the several sections a rocking switch-blade mounted upon a long bearing supported on an insulating-block and provide switch clips or contacts in conductive relation to the adjoining trolley-sections and in coöperative relation to the two arms of the switch-blade. The switch-blade is mounted in a metal frame supported upon the insulating-block and connected by an electric cable with that side of the system nearest the generating-station, a cable connection also being made between the metallic support of the switch-blade and the blade itself to prevent heating of the journal. From suitable points in the several trolley-wires I provide connections with the rails or earth, in which is included an incandescent lamp or other signaling device by which no-

tice is given to the miners of the condition of the circuit.

The novel features of my invention will be hereinafter more fully described and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, Figure 1 is a side elevation of a switch embodying my improvements. Fig. 2 is a section of the same on the line X Y of Fig. 1. Fig. 3 is a section on the line Y Z of Fig. 1. Fig. 4 is a diagrammatic view of a trolley-circuit embodying my improvements.

Referring first to Fig. 4, 1 2 represent two adjacent sections of trolley-wire, which may be directly fed by a generator attached to one end of the system or may be fed from feeders, as desired. In the instalment of my system I make these sections of a convenient length—say one thousand feet—and leading from a suitable point where the generator is installed to a distant part of the mine. Between each adjacent pair of trolley-wires is a rocking switch, (indicated at 3,) adapted to be operated by transit of the trolley, so as to connect up the wire sections progressively as the car proceeds over the track. At any point desired and in some cases at each section I locate a ground branch, which may be connected with one of the wire-hangers, as indicated at 4, Fig. 4, including a signaling device, such as an incandescent lamp, by which when the trolley-wire is alive with current an indication of such fact will be given to the miners. This may be arranged for movable connection, so that the lamp may be installed at any particular part of the mine at which the operators are at work or may be fixed, if desired.

The construction of the switch is indicated in Figs. 1, 2, and 3. It comprises an insulating block or support 5, of wood, secured to a block fastened in the roof by brackets 6 6<sup>a</sup>, firmly bolted to the block. On the ends of the insulating-support are mounted metal clamps 7 7<sup>a</sup> for the ends of the trolley-sections, the latter being carried through grooves in the ends of the clamps and led through the block, as indicated in dotted lines, and fastened by set-screws 8 8<sup>a</sup>. In good conductive relation to the terminal supports for the trolley-sec-

tions 7 7<sup>a</sup> are switch-clips 9 9<sup>a</sup>, each provided with two spring-jaws adapted to be spread apart by a knife-switch. A switch-blade carrying at its ends knife-blades adapted to enter these clips is supported in a casting 10, mounted on the middle of the insulating-block. This casting is in the form of a yoke and straddles the block, to which it is fastened in any suitable way. A pin 11, extending through the yoke, forms a journal for the switch-blade. The latter is formed of a casting forked or bifurcated at its top, the two limbs of the fork being threaded by the pin 11. In this way a firm construction is provided and the switch-blade is supported on a long bearing, which prevents any lateral movement and permits it to accurately engage the clips. The top of the supporting-yoke 10 is provided with a binding-post, in which one end of the cable 12 may be connected, the other end of which is fastened to a binding-post in one of the end clamps, as 7<sup>a</sup>. A flexible cable connection is led from the yoke to the switch-blade, as indicated at 13. Assuming that the generator connects with the clamp 7<sup>a</sup>, it will be evident that on the transit of a trolley toward the left it will pass under the switch-blade and shift it from engagement with the clip 9<sup>a</sup> into engagement with the clip 9, thus rendering alive the trolley-section ahead. It will be noticed that there will be no arc at the point of contact rupture between the switch-blade and clip 9<sup>a</sup>, since a good conductive connection is afforded by the cable 12. Similarly as the car proceeds over its course each trolley-section is cut in progressively and upon its return is cut out by a reverse movement of the switch-blade. In the latter case, the trolley having passed from the trolley-wire to the switch-blade, circuit connection with the generator is completed over the cable 12 during the shifting of position of the switch-blade, and there can be no arcing at the clip 9, because the section connected with it is short-circuited. It will be evident that if a lamp be installed in each section, as indicated in Fig. 4, the condition of the wire section will be indicated by the lighting or extinguishment of the lamp and notice thereby given to the operators, the lamp always burning when the wire is charged, and thereby preventing accidents to men or animals through careless movements.

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

1. A trolley-supply system, comprising a plurality of insulated trolley-sections, mechanically-operated switches controlled by the transit of the trolley for progressively cut-

ting in the sections, and means for preventing an arc at the switch-points when the switch is thrown.

2. A trolley system for railways, comprising a plurality of insulated sections, switches operated by the transit of a car for progressively rendering the sections alive, and a branch connection from a trolley-section at a desired point to earth including a signaling device.

3. A trolley system for electric railways, comprising a plurality of insulated sections, switches operated by transit of a car for rendering the several sections alive, and ground branches including incandescent lamps connected with the several sections.

4. A trolley system for electric railways, comprising a plurality of insulated sections, insulated terminals therefor, a rocking switch-arm in the path of the trolley electrically connected with the terminal on the generator side, means for preserving the motor-circuit unbroken on transit of the trolley over said switch, and a contact coöperating with said switch electrically connected with the other terminal.

5. An overhead switch for trolley-wires, provided with a support of insulating material, clamps for the trolley-wires on the opposite sides of the center, switch-clips in conductive relation thereto, a switch-blade in the path of movement of the trolley, and a fixed conductor connecting the switch-blade and one of the wire-clamps.

6. An overhead switch for trolleys comprising an insulating-support, clamps for the trolley-wire on opposite sides of its center, and a rocking switch-blade between said clamps adapted to be shifted into engagement with switch-clips connected to the respective clamps, said switch-blade being mounted upon the insulating-support upon a long bearing.

7. An overhead switch for trolley-wires, comprising a support of insulating material, clamps for the trolley-wire on opposite sides of its center, switch-clips in conductive relation thereto, a yoke straddling the insulating-support and in fixed electrical connection with one of the clamps, and a rocking switch-blade in the path of the trolley mounted upon said yoke.

In witness whereof I have hereunto set my hand this 7th day of December, 1899.

GEORGE R. MAIR.

Witnesses:

BENJAMIN B. HULL,  
JOSEPH GROTT.