(No Model.)

W. L. SILVEY.

AUTOMATIC ELECTRIC CIRCUIT SWITCH.

No. 457,483. Patented Aug. 11, 1891.

Fig. 1.

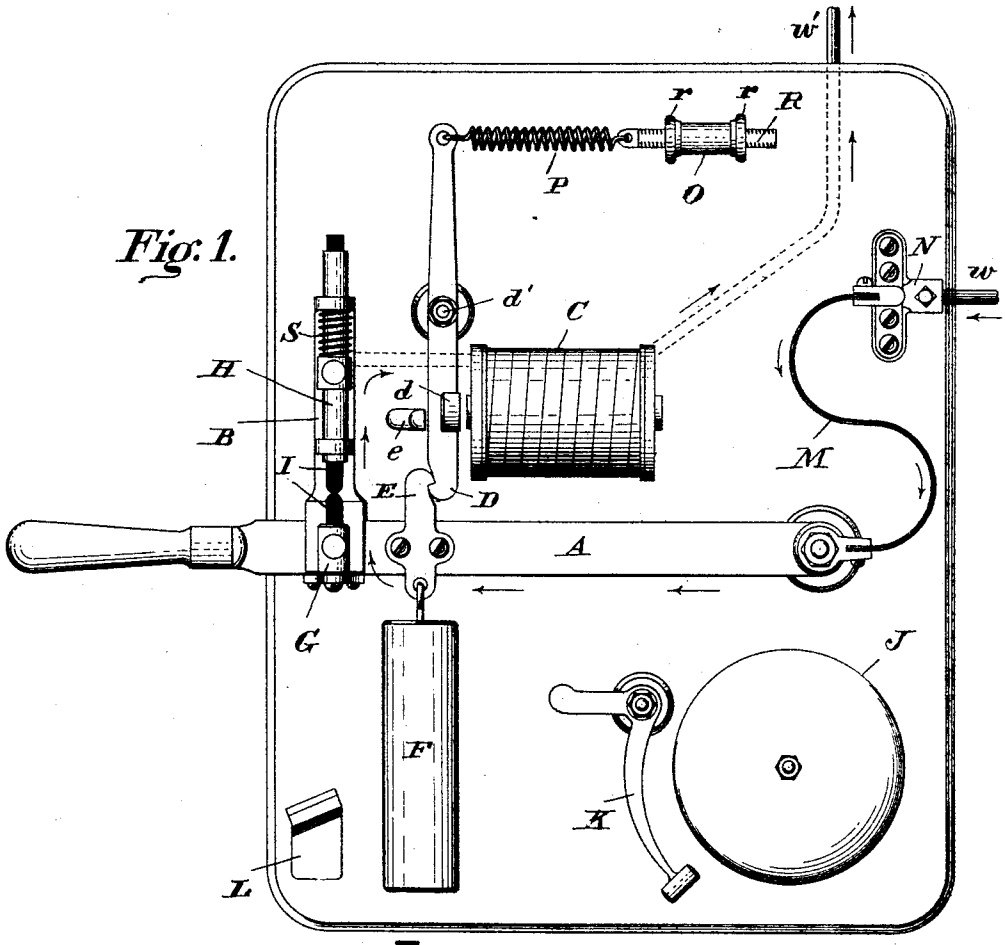


Fig. 2.

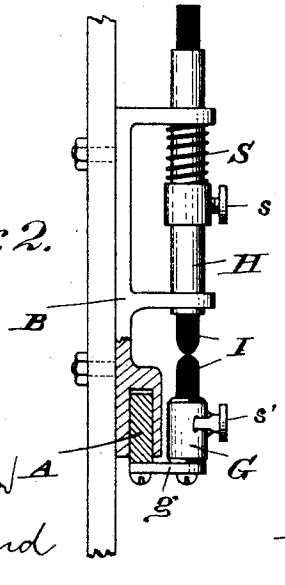
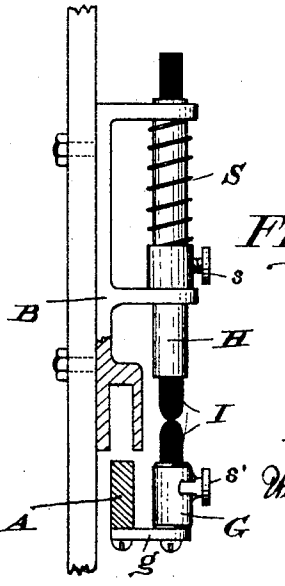


Fig. 3.



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AUTOMATIC ELECTRIC-CIRCUIT SWITCH.

SPECIFICATION forming part of Letters Patent No. 457,483, dated August 11, 1891.

Application filed April 19, 1889. Serial No. 307,737. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. SILVEY, a resident of Lima, in the county of Allen and State of Ohio, have invented certain new and useful Improvements in an Automatic Electric-Circuit Switch, of which the following is a specification.

The object of this switch more especially is to open the external or electrical circuit of a street-railway system whenever by any cause the conducting-wires shall become crossed or short-circuited. The object is to prevent an overplus of current in the crossed circuit, thereby endangering the armature of the generators attached to the line by reason of the overplus of current generated on the instant of closing this circuit. To avoid this danger, I have arranged this automatic switch that it will constantly be in the main-line circuit, so that as soon as an abnormal current begins flowing it will instantly energize an electromagnet also included in the circuit, thereby releasing a switch-lever, which is at once drawn out of contact by gravity, and the line-circuit is broken and remains so until restored by hand. Of course this closing of the circuit might be done by electrical means, but I prefer to do it by hand, because it offers more security and prevents arcing at the contacts.

Referring to the accompanying drawings, Figure 1 shows a complete switch, showing all parts in position when closed. Fig. 2 shows a section through the contacts, switch-lever A still in position. Fig. 3 shows the switch partially open, in order to show the manner of breaking contact, or, rather, the succession of breaking contact. In other words, Figs. 1 and 2 show a full contact, and Fig. 3 shows the switch on the instant of breaking contact.

It is to be understood that all the parts of the switch are attached to a base-board. The switch-lever A proper is preferably brass, one end being pivoted. This end is slotted for the reception of a flexible spring M, the other end of the copper spring being attached to a binding-post N, to which the external circuit W connects. The other end of the lever A has a handle for lifting it up into position of contact. This contact is made slightly flexible by slotting the lower end of front contact-plate B. This allows it to spring open, thereby securing a firm but slightly-flexible contact. The top side of this contact-plate has two ears cast upon it. These ears have holes drilled in them, in which the tube H is free to move. This tube has a collar and thumb-screw *s* near its center, and the upper part is encircled by an expansion-spring S, which serves to keep the tube constantly pressing downward. Inside of this tube is inserted a piece of round lamp-carbon I, which is secured in any desired position by means of the thumb-screw *s*. This top carbon presses downward against a second piece of carbon I, secured in carbon-holder G, which is secured to the switch-lever A. On the lever A is secured a hook-plate E, to the lower half of which is suspended a weight F, which serves to break electrical contact between the lever A and plate B whenever it becomes necessary. The upper end of the plate is provided with a hook, which engages with the pivoted latch-bar D. This latch-bar is held in position by the coil-spring P, whose tension is regulated by the threaded bar and jam-nuts R *r r*. By a proper manipulation of this bar and nuts any degree of tension can be secured. To the lower half of the latch-bar an armature *d* is secured, and immediately back of the bar is a stop *e* for limiting the motion of the latch when not engaged with the hook E.

The direction of the current is shown by the arrows in Fig. 1. The current enters at binding-post W, passes thence by the broad flat spring M to the bar A, thence to the plate B, thence by a wire to the magnet-coils C, and thence escapes to the external circuit by the conductor W′. It is to be understood that it is expected the entire current flows through this circuit. By this flow of current through the large magnet-coils C, the core of the magnet becomes energized and consequently attracts the armature *d*. In case of an abnormal flow of current, the armature is more attracted, the spring P is overcome, and the hook at the lower end of the latch is drawn out of engagement with the hook-plate E. As soon as these hooks become disengaged, the weight of the suspended cylinder F causes the lever A to fall out of the slot in the plate B. As the lever falls away the spring S pushes the carbon-tube downward, so that the break-

ing of the contacts is first at the metal parts A B and then at the two carbon points. By this arrangement the metal contacts never become burned or oxidized, all the flashing taking place between the carbon points I. This lever A when disengaged from the hooks falls until it strikes the stop L, where it is stopped. In falling, the lever strikes against the end of the bell-crank K, which by the sudden jar strikes the gong J a powerful blow, thereby giving notice to the attendant that the circuit is open.

Having fully described my invention, what I claim as new, and wish to secure by patent in the United States, is—

1. The combination, in an electric-circuit switch, of the electro-magnet C, the armature and armature-lever *d*, the top part held by a spring P, the bottom part cut away to form a latch, hook E on the switch-lever A, the slotted contacts B, the carbon points I, the top-carbon holder H, the bottom-carbon holder G, springs S M, the weight F, the bell and hammer J K, all operating as and for the purpose set forth.

2. The combination of a pivoted switch-lever, a flexible electric conductor connecting the lever to the main-line circuit, a carbon-holding device, a hook attached to the switch-lever, a pivoted switch-latch engaging the hook on the switch-lever, a spring for holding them in engagement, a screw for regulating the tension of the spring, an electro-magnet whose coils are in circuit with the switch-lever and its contact-points, an armature attached to the switch-latch, a split contact for making electrical connection with the switch-lever, a carbon point mounted on the switch-contact, a carrier therefor, and a forwardly-propelling device for moving the carbon and carbon-carrier, whereby the electric circuit is maintained between the carbon-contacts until the switch-lever and split contact-plate have become entirely separated, as set forth.

3. The combination, as herein set forth, of the lever A, stationary slotted contact-block B, the upper part provided with ears having holes therein, the tube H, the carbon-clamps *s*, the spring S, the carbon points I, the lower-carbon holder G, and the plate *g*, all operated as and for the purpose set forth.

WILLIAM L. SILVEY.

Witnesses:
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R. C. WARNER.