

(No Model.)

S. H. SHORT.

ARC EXTINGUISHER FOR ELECTRIC SWITCHES.

No. 478,718.

Patented July 12, 1892.

FIG. I.

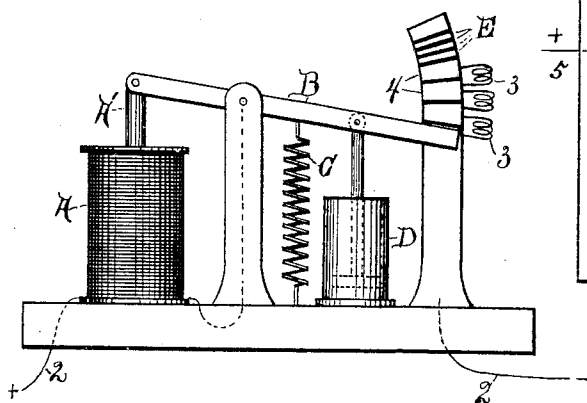


FIG. II.

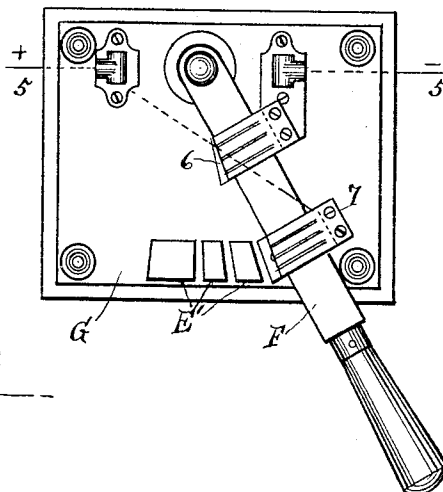
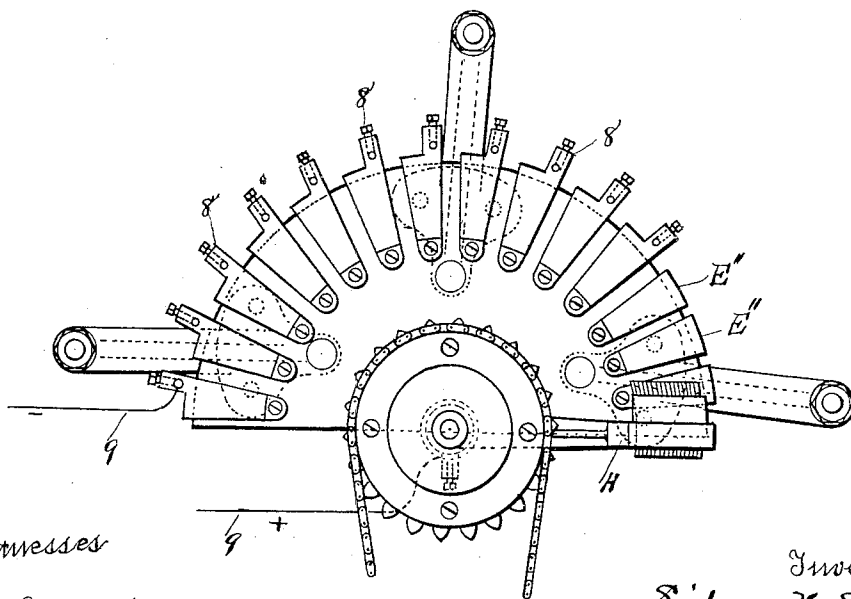


FIG. III.



Witnesses

R. E. Cull.

G. F. Downing

Inventor

Sidney H. Short

By H. A. Seymour

Atty

UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO.

ARC-EXTINGUISHER FOR ELECTRIC SWITCHES.

SPECIFICATION forming part of Letters Patent No. 478,718, dated July 12, 1892.

Application filed March 10, 1891. Serial No. 384,446. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Arc-Extinguishers for Electric Switches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to arc-extinguishing means for automatic cut-outs for rheostats, for switches of any ordinary or suitable description, or, in fine, for any appliance adapted to break an electric circuit. It has special reference to electric railways where currents of great intensity are employed and where, consequently, the sparks are apt to be "fat" and hot; but each of the improvements is included for all the uses to which it may be adapted.

I have discovered that the electric arc—such as tends to form on opening a circuit—requires a certain amount of heat for its maintenance or formation, and that by conducting the heat rapidly from the contacts or conductors between which the opening in the circuit is made the arc can be extinguished or its formation prevented and the injurious effects of the sparks lessened or avoided. To accomplish this object, the said contacts or one (at least) of said contacts is made comparatively massive and of a material which is a good conductor of heat, and, further, this contact or these contacts are separated into a number of parts suitably insulated from each other, so that the arc or spark is exposed at two or more points to the heat-conducting (or cooling) influence of the material composing the contacts.

In the accompanying drawings, which form part of this specification, Figure I is a view of an electro-magnetic cut-out, which after it has been operated to break the circuit restores the said circuit automatically after an interval and which is provided with an arc-extinguisher in accordance with the invention. Fig. II is a view of a simple switch similarly provided; and Fig. III is a view of the contact-board of a car-rheostat, likewise similarly provided.

Referring to Fig. I, the electro-magnet A is included in a circuit—say in the main supply-wire 2—of an electric-railway line. The switch-lever B is connected with the movable core A' of the magnet A and also with a retracting-spring C and a dash-pot D, adapted to allow the switch-lever B to move rapidly when sufficiently attracted by the magnet A, but to check and delay its return under the influence of the spring C. A rheostat is combined with the cut-out, said rheostat comprising a number of coils 3 and contacts 4; but this rheostat could be omitted. Its effect is that the circuit is made to include the resistance-coils 3 as it is opened and closed.

At E is the arc-extinguisher or spark-extinguishing contact, which comprises a number of pieces or blocks of a metal like copper, which is a good conductor of heat, as well as a conductor of electricity, insulated from each other (by an air-space or by insulating material) and so arranged that the sparks, which are formed where the switch-lever B leaves the last contact 4, leap across the spaces between the said blocks or pieces, which may conveniently be designated as the "electrodes" of the arc or spark. These latter should be adapted to convey away the heat so fast that the spark or arc is cooled or refrigerated by the conduction out of existence. Blocks of pure copper, each three by one-half by one-half inches, separated each from those adjoining by an air-space or insulation of one-fourth inch across will answer, although the invention is not restricted to these numbers, but extends generally to an arc or spark extinguisher or extinguishing-contact, as above explained.

In Fig. II the circuit 5 is closed between the contacts 6 and 7 by means of the metallic switch-lever F, provided with an insulating-handle.

At E' is the arc-extinguisher or extinguishing-contact, substantially as before described. The blocks or pieces composing it are mounted on the base G of the switch, and the metallic lever F sweeps over and in contact with said blocks or pieces E'.

In Fig. III the contacts 8 are connected with the artificial resistances and the arm H travels over the said contacts 8, so as to include

more or less of the said resistances in the circuit 9. When the arm H leaves the last resistance-contact and opens the circuit 9, it travels over the blocks or pieces of the arc or spark extinguisher E'' of good heat conductivity, like copper, and adapted to cool or refrigerate the spark or arc by their good conduction.

Each of these appliances may be designated as a "switch" or "circuit" changer, as well as other appliance of the same general description. The designation of a "switch" or "circuit" changer is therefore, as hereinafter employed, intended to include such appliances generally as well as the particular forms described.

Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

In a switch or circuit controller, the combination, with a switch-lever and a series of contacts and resistances, of an arc-extinguisher consisting of a series of supplemental contacts, each being a good conductor of heat and electricity and arranged in the path of the switch-lever, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SIDNEY H. SHORT.

Witnesses:

E. H. MORRISON,
A. B. CALHOUN.