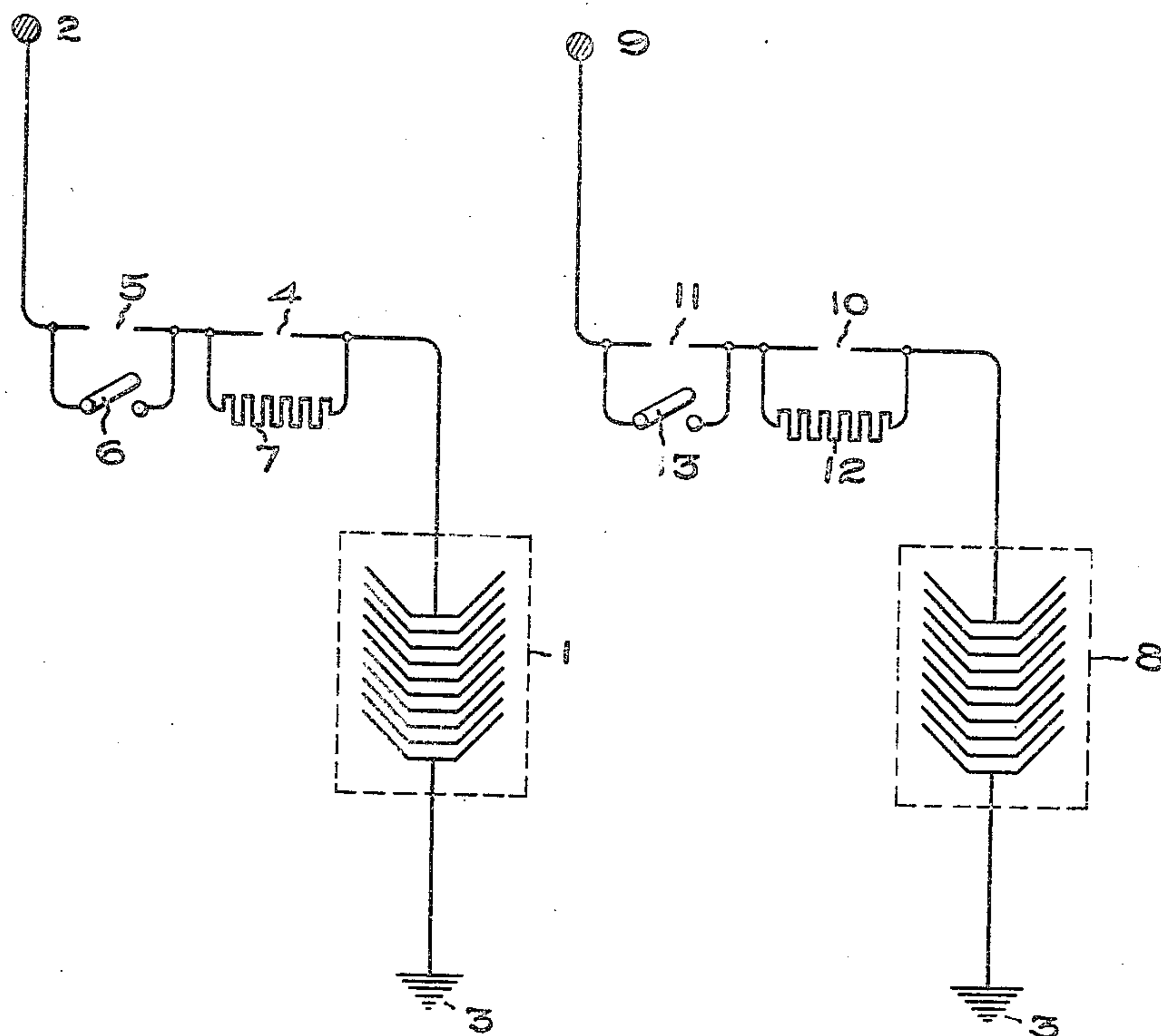


E. E. F. CREIGHTON.
 ADJUNCT FOR ALUMINUM CELL LIGHTNING ARRESTERS.
 APPLICATION FILED AUG. 7, 1907.

933,827.

Patented Sept. 14, 1909.



Witnesses.

Allen Orford
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UNITED STATES PATENT OFFICE.

ELMER E. F. CREIGHTON, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ADJUNCT FOR ALUMINUM-CELL LIGHTNING-ARRESTERS.

933,827.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed August 7, 1907. Serial No. 387,437.

To all whom it may concern:

Be it known that I, ELMER E. F. CREIGHTON, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Adjuncts for Aluminum-Cell Lightning-Arresters, of which the following is a specification.

This invention relates to lightning arresters of the electrolytic condenser type, such for instance as the one invented by me in which aluminum electrodes are immersed in an electrolytic such as ammonium borate. In an arrester of this type the resistance to the flow of the dynamic current which tends to follow a discharge of high potential, is due to the formation on the electrodes of a thin film of aluminum oxid or hydroxid. Ordinarily this film is initially produced on the aluminum plates by a "forming" process which consists essentially in subjecting the plates in a suitable electrolyte to the prolonged action of an electric current, usually an alternating current. After the films have once been formed and the apparatus has been assembled ready for use the electrolyte seems to act some way on the film and weaken or break it down in places. Therefore, when a circuit is established through an electrolytic cell, as by a high potential discharge, the cell may constitute more or less of a short circuit because of its deteriorated film, and a very undesirable surge may result. In order to maintain the high resistance qualities of the film, it is desirable for the station attendant to cut the cell into circuit periodically for a brief interval, in order to build up or re-form the film. However, unless some special provision is made, an undesirable surge may result by this very act, before the film can reform, which as will be understood, requires an appreciable interval of time. In order to avoid this possibility of disturbing the system while repairing films, I place a small resistance in series with the aluminum electrode arrester, and so cut down the high initial current when the circuit is established by the operator when closing the switch. The resistance need not be very great and is not objectionable for the passage to ground of a large percentage of the high voltage effects which the arrester is ordinarily called on to carry away or dissipate. But to provide for those occasional

discharges of great quantity for which the resistance would offer an objectionable impedance, I place a spark gap in parallel with the resistances. Such discharges can then ground without going through the resistance.

The accompanying drawing is a diagram illustrating my invention in connection with a single phase distribution circuit.

The aluminum electrode lightning arrester 1, is connected between line 2 and ground 3 in series with a short spark gap 4 and a somewhat longer gap 5. A switch 6 is placed in shunt with the spark gap 5. The spark gap 4 is shunted by the non-inductive resistances 7. The arrester 8 is similarly connected between line 9 and ground 3, through gaps 10 and 11, which are shunted by resistance 12 and switch 13 respectively. It will be seen that by the simultaneous closure of the switches 6 and 13, a complete circuit exists from line to line, through switch 6, resistance 7, arrester 1, ground, arrester 8, resistance 12 and switch 13. The resistances 7 and 12 prevent a surge on the line when the switches are closed and before the films have had time to reform on the aluminum plates. As before explained, a large percentage of lightning strokes will discharge without difficulty through the resistances 7 and 12 in the ordinary operation of the lightning arrester, while the spark gaps 4 and 10 insure alternative paths capable of taking care of discharges of high frequency or of great quantity.

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

1. The combination with an electrolytic condenser lightning arrester, of a resistance in series therewith, and a high-resistance shunt in parallel with said resistance.

2. The combination with an electrolytic condenser lightning arrester, of a resistance in series therewith, and a spark-gap in parallel with said resistance.

3. The combination with an electrolytic condenser lightning arrester, of a switch for connecting it to line, a resistance in series with said arrester, and a spark-gap in shunt to said resistance.

4. The combination of a line conductor of a transmission system, an electrolytic lightning arrester, a resistance arranged to be included at will in circuit with the arrester between the line conductor and ground, and a

low inductance path in parallel with said resistance.

5 5. In combination with line conductors of a transmission system, an electrolytic lightning arrester, a resistance, a low inductance path in parallel with said resistance, and switching means for including the resistance in circuit with the arrester between line and line.

10 6. The combination of line conductors of a transmission system, an electrolytic lightning arrester connected to each of said conductors in series with a spark gap, ground connections for each of said arresters, a re-
15 sistence in the path through the arresters

between line and line, a low inductance path in parallel with said resistance, and means for bridging the spark gaps in the circuits of the arresters between line and line.

7. The combination with an electrolytic lightning arrester, of an impedance in series therewith, and a path of low inductance in parallel with said impedance.

In witness whereof, I have hereunto set my hand this 30th day of July, 1907.

ELMER E. F. CREIGHTON.

Witnesses:

LEONARD WILSON,
J. M. DE LANDER.