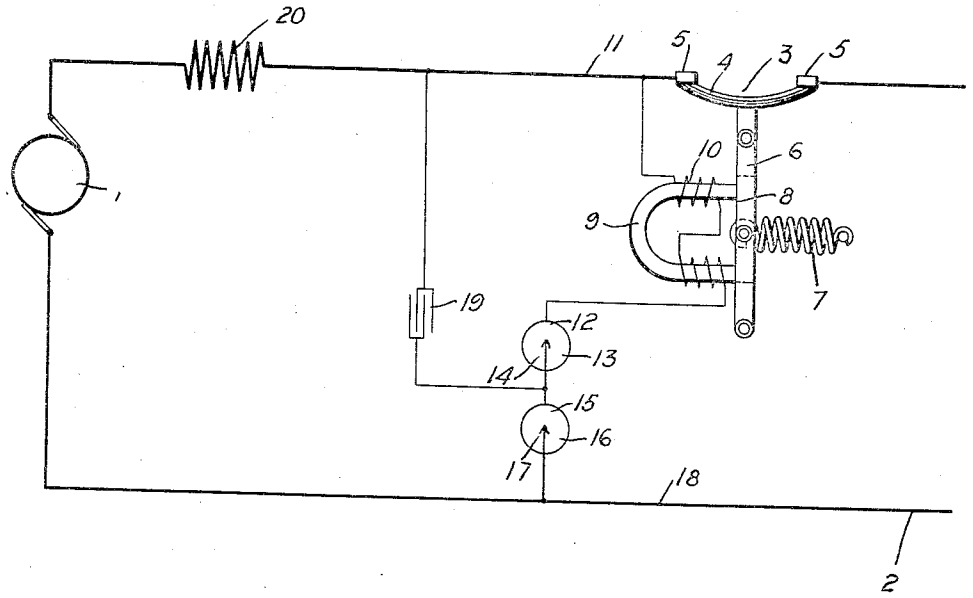
J. SLEPIAN.

CIRCUIT INTERRUPTER.

APPLICATION FILED SEPT. 7, 1917.

1,371,523.

Patented Mar. 15, 1921.



WITNESSES:

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JOSEPH SLEPIAN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CIRCUIT-INTERRUPTER.

1,371,523. Specification of Letters Patent. Patented Mar. 15, 1921.

Application filed September 7, 1917. Serial No. 190,124.

To all whom it may concern:

Be it known that I, JOSEPH SLEPIAN, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Circuit-Interrupters, of which the following is a specification.

My invention relates to circuit interrupters and particularly to interrupters of the quick-acting type.

One object of my invention is to provide means for quickly deënergizing the holding electromagnet of a circuit interrupter under predetermined conditions.

Another object of my invention is to provide a device of the above-indicated character that shall have no moving parts, be simple and inexpensive to construct and effective in its operation.

A further object of my invention is to provide a holding device for a direct-current circuit interrupter that shall operate quickly to permit the interrupter to be tripped in a minimum period of time.

In practising my invention, I provide a toggle-operated circuit interrupter, an electromagnet having an armature that is mounted on the toggle mechanism of the interrupter for holding the same in its closed position and asymmetric valves that are connected in circuit with the electromagnet and are adapted to be extinguished for the purpose of releasing the interrupter, under predetermined conditions.

The single figure of the accompanying drawing is a diagrammatic view of an electric circuit embodying my invention.

A direct-current generator 1 is operatively connected to a circuit 2 through a circuit interrupter 3 that is adapted to be tripped when a short circuit obtains on the circuit.

The interrupter 3 comprises coöperating movable and stationary contact members 4 and 5, a toggle mechanism 6, a spring 7 for biasing the toggle mechanism 6 to its open position and a magnetizable member or armature 8 that is disposed on the toggle mechanism adjacent the point of connection between the links of the same. An electromagnet 9 having a winding 10 is adapted to attract the magnetizable member 8 for the purpose of holding the toggle device 6 and, consequently, the interrupter 3, in its set or closed position.

One terminal of the winding 10 is connected to one conductor 11 of the circuit 2 and the other terminal of the winding 10 is connected to the cathode 12 of an asymmetric valve 13. The anode 14 of the valve 13 is connected to the cathode 15 of an asymmetric valve 16 the anode 17 of which is connected to the conductor 18 of the circuit 2. A condenser 19 is connected, from the conductor 11 of the circuit 2, to a point between the anode 14 of the valve 13 and the cathode 15 of the valve 16. A reactor 20 is connected in circuit with the conductor 11.

Under normal conditions, current traverses the valves 13 and 16 and the winding 10 to maintain the circuit interrupter 3 in its closed position and to charge the condenser 19. However, when a short circuit obtains upon the circuit 2, the quick change in voltage thereacross causes the condenser 19 to discharge and, when the condenser 19 discharges, it so opposes the current traversing the valve 16 as to extinguish the arc of the same. When the arc of the valve 16 is extinguished, the current that traverses the winding 10 tends to become oscillatory by reason of the functioning of the condenser 19. However, upon the first reversal or oscillation of the current, the arc of the valve 13 will be extinguished. Thus, the electromagnet 9 is quickly deënergized to permit the spring 7 to quickly move the magnetizable member 8 and, consequently, the toggle mechanism 6 to such position as to trip the interrupter 3.

I do not limit my invention to the particular device illustrated, as many changes may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:—

1. In an electric circuit, the combination with a circuit interrupter and an electromagnet for holding the same in its closed position, of two mercury-arc valves connected in series with the electromagnet across the circuit, and a condenser connected from the circuit to a point between the valves whereby the arcs in the valves are successively extinguished to quickly deënergize the electromagnet, under predetermined conditions.

2. In an electric circuit, the combination with a circuit interrupter and an electro-

magnet for holding the same in its closed position, of two mercury-arc valves connected in series with the electromagnet across the circuit, and a condenser connected from the circuit to a point between the valves whereby the arcs in the valves are successively extinguished to quickly deënergize the electromagnet when the voltage of the circuit is suddenly reduced a predetermined amount.

3. In an electric circuit, the combination with a circuit interrupter and an electromagnet for normally maintaining the same in its closed position, of a mercury vapor valve connected in circuit with the electromagnet, and means for extinguishing the arc in the valve when the voltage on the circuit quickly drops a predetermined amount.

4. In an electric circuit, the combination with a circuit interrupter and an electromagnet for normally maintaining the same in position, of an asymmetric arcing valve connected in circuit with the electromagnet, and means for interrupting the arc of the valve to quickly deënergize the electromagnet, under predetermined conditions.

5. In an electric circuit, the combination with a circuit interrupter and an electromagnet normally energized to affect the interrupter, of an asymmetric arcing valve connected in circuit with the electromagnet to actuate the interrupter under predetermined conditions.

6. In an electric circuit, the combination with an electromagnet, of two asymmetric valves connected in series with the electromagnet, across the circuit and a condenser connected from a point between the valves to the circuit for extinguishing the arc in one of the valves, under predetermined conditions.

7. In an electric circuit, the combination with a circuit interrupter and an electromagnet for holding the same in its closed position, of two asymmetric arcing valves connected in series with the electromagnet, and means for causing the arcs in the valves to be successively extinguished to quickly deënergize the electromagnet when a short circuit obtains on the electric circuit.

8. In an electric circuit, the combination with a circuit interrupter and an electromagnet for holding the same in its closed position, of two asymmetric arcing valves connected in series with the electromagnet, and means for causing the arcs in the valves to be successively extinguished to quickly deenergize the electromagnet, under predetermined conditions in the circuit.

9. In an electric system, the combination with main and auxiliary circuits and a circuit interrupter for the main circuit, of an actuating electromagnet connected in the auxiliary circuit and an asymmetric valve connected in circuit with the electromagnet to actuate the interrupter under predetermined conditions.

In testimony whereof I have hereunto subscribed my name this 31st day of August, 1917.

JOSEPH SLEPIAN.