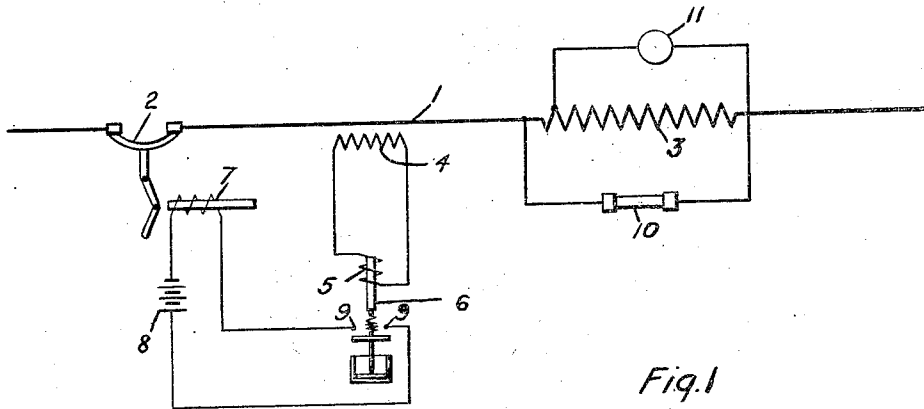
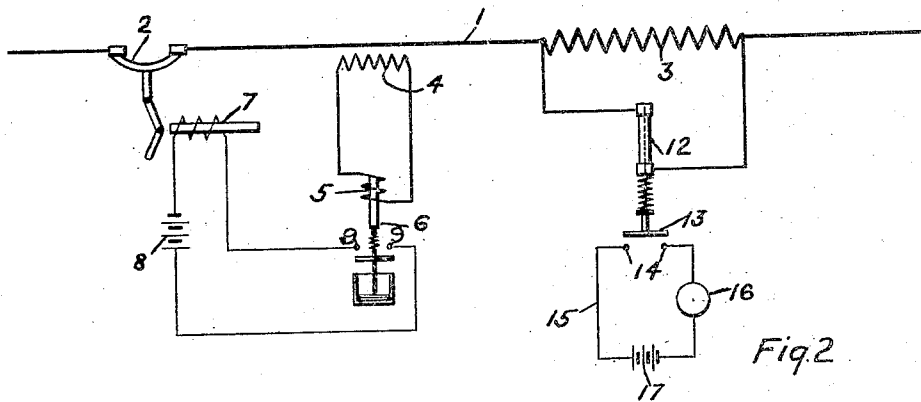
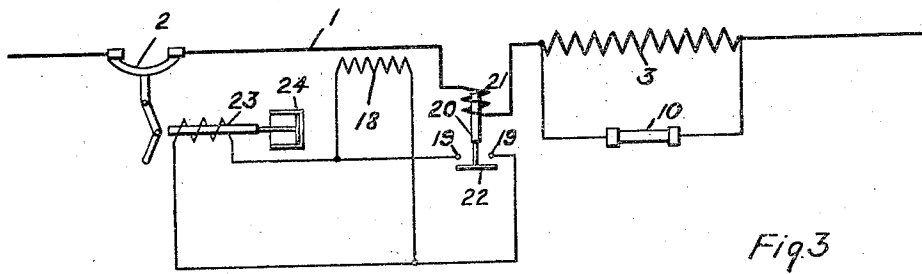


K. C. RANDALL.
CIRCUIT INTERRUPTER.
APPLICATION FILED NOV. 19, 1917.

1,327,777.

Patented Jan. 13, 1920



WITNESSES:
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CIRCUIT-INTERRUPTER.

1,327,777.

Specification of Letters Patent.

Patented Jan. 13, 1920.

Application filed November 19, 1917. Serial No. 202,735.

To all whom it may concern:

Be it known that I, KARL C. RANDALL, a citizen of the United States, and a resident of Edgewood Park, 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 means for limiting the current traversing the same.

One object of my invention is to provide an independent means for limiting the current traversing a circuit interrupter when a predetermined excessive overload traverses the circuit to which it is connected.

Another object of my invention is to provide means for so limiting the current traversing a circuit, when an excessive overload obtains thereon, that an interrupter having a relatively small capacity may be used therein.

A further object of my invention is to provide a device of the above indicated character that shall be simple and inexpensive to construct and effective in its operation.

In practising my invention, I provide a circuit interrupter, an overload tripping device therefor, a current-limiting resistor and a fuse for normally short circuiting the resistor. The fuse is of such characteristic that it will rupture when a relatively large overload traverses the circuit to thereby permit the interrupter to safely interrupt the circuit. Visible or audible means is also provided for indicating the rupture of the fuse.

In the accompanying drawings, Figure 1 is a diagrammatic view of an electrical circuit embodying my invention; and Figs. 2 and 3 are diagrammatic views of electrical circuits embodying modified forms of my invention.

An electrical circuit 1 comprises an interrupter 2 and a current-limiting device, such as a resistor 3. A series transformer 4 is operatively connected between the circuit 1 and the winding 5 of a definite time-limit overload relay 6. A tripping electromagnet 7 is operatively connected to a source 8 of electromotive force and the stationary contact members 9 of the relay 6 and is adapted to be energized a definite interval of time after a predetermined overload traverses the

circuit 1. A fuse 10 is connected in shunt relation to the resistor 3, and a signal device 11 is connected in shunt relation to a portion of the resistor.

The fuse 10 has such characteristics that it will not be ruptured under such ordinary overload conditions as can be adequately handled by the interrupter 2. However, if a relatively large overload traverses the circuit 1, the fuse 10 is adapted to be ruptured to thereby cause the resistor 3 to so limit the current traversing the interrupter 2 that, when the interrupter 2 is tripped, it will not be destroyed by reason of the excessive overload thereon. In order to insure that the interrupter 2 shall not be tripped before the load is limited to a safe value, the relay 6 is provided and adapted to delay the tripping of the interrupter a predetermined definite interval of time after the occurrence of the overload. When the fuse 10 is blown, a sufficient drop in voltage will obtain across a portion of the resistor 3 to effect the operation of the signal device 11 for the purpose of indicating, to a station operator, that the fuse 10 has been blown.

In Fig. 2 of the drawings, a fuse 12 is connected in shunt relation to the resistor 3 and is provided with a spring-actuated movable contact member 13 that is adapted to be released for the purpose of engaging stationary contact members 14 when the fuse is ruptured. The contact members 14 constitute the terminals of a circuit 15 comprising a signal device 16 and a source 17 of electromotive force. The signal device 16 will remain operative irrespective of the tripping of the interrupter 2 and, consequently, serves as a positive indicator of the rupture of the fuse 12.

In Fig. 3 of the drawings, the tripping electro-magnet 23 of the interrupter 2 is operatively connected to a series transformer 18 and to the stationary contact members 19 of a relay 20. The winding 21 of the relay 20 is connected in series with the circuit 1 and is adapted to hold its movable contact members 22 in engagement with the stationary contact members 19 when a predetermined overload traverses the circuit 1. The stationary contact members 19 and movable contact members 22 constitute a short-circuiting device for the electromagnet 23, to thereby prevent the interrupter 2

from being tripped when the overload traversing the circuit 1 exceeds a predetermined value. However, when a sufficiently high overload traverses the circuit 1 to rupture the fuse 10, the resistor 3 will so limit the current traversing the circuit 1 that the movable contact member 22 of the relay 20 will be disengaged from the stationary contact members 19 to permit the electromagnet 23 to trip the interrupter 2 after an interval of time, as controlled by a dash-pot 24. By such an arrangement, an interrupter 2 of such size as to interrupt ordinary overloads may be safely used to interrupt relatively high overloads.

My invention is not limited to the particular structures illustrated, as it may be variously modified 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 overload tripping device therefor, of a current-limiting device connected in circuit with the interrupter, and means for causing the current-limiting device to limit the current through the interrupter only when the load traversing the circuit exceeds the value for which the interrupter is intended.
2. In an electric circuit, the combination with a circuit interrupter having a normal overload interrupting capacity and an overload tripping device therefor, of a resistor connected in circuit with the interrupter, and means responsive to an excessive overload in the circuit for causing the resistor to limit the current traversing the interrupter only under predetermined excessive overload conditions.

3. In an electric circuit, the combination with a circuit interrupter, of independent means for limiting the current traversing the interrupter only when the load travers-

ing the circuit exceeds that value for which the interrupter is intended.

4. In an electric circuit, the combination with a circuit interrupter and an overload tripping device therefor, of means for inserting a current-limiting device in circuit with the interrupter only when a predetermined overload traverses the circuit that is larger than the interrupting capacity of the interrupter.

5. In an electric circuit, the combination with a circuit interrupter and means for tripping the same when an overload traverses the circuit, of a resistor connected in series with the interrupter, and a fuse connected in shunt relation to the resistor and adapted to be ruptured only when a predetermined overload traverses the circuit that is larger than the interrupting capacity of the interrupter.

6. In an electric circuit, the combination with a circuit interrupter and means for tripping the same when an overload traverses the circuit, of a resistor connected in series with the interrupter, a fuse connected in shunt relation to the resistor and adapted to be ruptured only when an overload larger than that intended to be interrupted by the interrupter traverses the circuit, and means for indicating the rupture of the fuse.

7. In an electric circuit, the combination with a circuit interrupter, of independent means adapted to be operatively associated with the interrupter only when a predetermined load traverses the circuit to reduce the load required to be interrupted by the interrupter to a value for which the interrupter is intended.

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

KARL C. RANDALL.