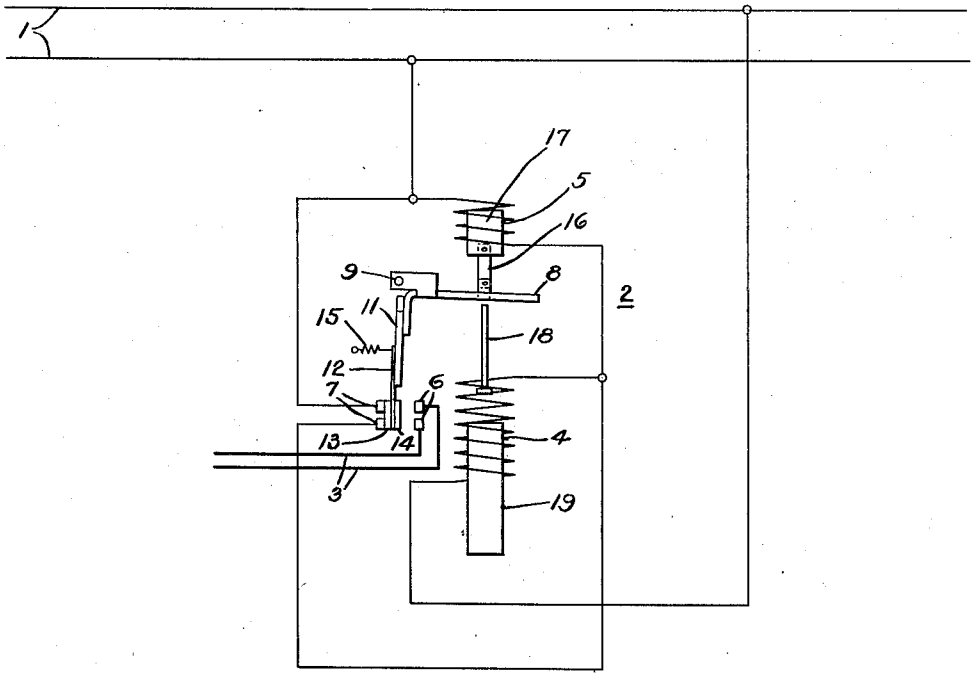
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ELECTRICAL PROTECTIVE DEVICE

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UNITED STATES PATENT OFFICE.

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ELECTRICAL PROTECTIVE DEVICE.

Application filed February 1, 1924. Serial No. 690,016.

My invention relates to electrical protective devices and particularly to relays.

One object of my invention is to provide a relay that shall commence to operate at voltages relatively lower than the normal operating voltage thereof.

Another object of my invention is to provide a relay that shall be initially operated by a coil of relatively low resistance and that shall be held in its operative position by a coil of relatively high resistance.

A further object of my invention is to provide a relay mechanism having a contact member that shall be actuated to its closed position to complete a holding circuit when the relay is actuated.

In the operation of distribution circuits, conditions frequently arise under which it is desirable to commence certain operations when a relatively low voltage is impressed upon the transmission line in order that such operations may be properly completed before the normal operating voltage is impressed upon the distribution circuit. An example of this condition is that of a periodically reclosing circuit interrupter that operates in accordance with the return of voltage to a transmission line after the voltage collapses incident to a short-circuit by reason of the clearance of the short-circuit. The structural details of a relay suitable for these purposes are shown and described in co-pending application of L. N. Crichton, Serial No. 672,828, filed November 5, 1923, and assigned to the Westinghouse Electric & Manufacturing Company.

The single figure of the accompanying drawing is a diagrammatic view of apparatus and circuits embodying my invention.

My invention comprises, in general, a transmission line 1, a voltage relay 2 and a controlling circuit 3 extending to any suitable translating device (not shown). While I have shown the circuit 1 as a single-phase circuit, it is obvious that my relay may be used in connection with any polyphase circuit.

The voltage relay 2 comprises a shunt coil 4 of relatively low resistance and a holding coil 5 of relatively high resistance, pairs of stationary contact members 6 and 7 and a bell-crank lever 8 that is pivotally mounted at 9. One arm of the bell-crank lever 8 carries insulating strips 11 and 12 on opposite sides of which are mounted a pair of bridging contact members 13 and 14. The bridging contact member 13 co-operates with the stationary contact members 7 in the de-energized position of the relay, and the bridging contact member 14 co-operates with the stationary contact members 6 in the operative position of the relay. The position of the several parts of my relay shown in the drawing correspond to the de-energized position of the relay. Under these conditions, the coil 4 is bridged across the conductors of the circuit 1 and the coil 5 is short-circuited by the contact members 7 and 13.

A spring 15 normally biases the lever 8 to its de-energized position. A link mechanism 16 connects one arm of the lever 8 with the core or armature member 17 of the holding coil 5. A plunger 18 is actuated into engagement with the lever 8 by the core member 19 of the coil 4.

When voltage is impressed upon the circuit 1, the coil 4 is energized. When the current traversing the coil 4 reaches a predetermined value, the core member 19 moves upwardly to strike the plunger 18 which, in turn, causes the lever 8 to turn against the action of the spring 15. This movement results in the interruption of the above-described circuit between the stationary contact members 7 and the bridging contact member 13. Coils 4 and 5 are thereupon energized by a circuit extending from one of the conductors of the circuit 1 through the coils 4 and 5 in series, and the coil 5 is sufficiently energized to retain the lever 8 in its advanced position by reason of the upward movement of the core member 17. The insertion of the resistance of the coil 5 in circuit with the coil 4 reduces the current traversing the latter coil by an amount sufficient to prevent destructive heating effects therein even though the relay is subjected to several times the initial operating voltage.

The movement of the arm 8 completes the circuit 3 between the stationary contact members 6 and the bridging contact member 14, whereby the desired operations are imparted to the connected translating devices (not shown). Since the contact member and arm 8 are independently movable with respect to the armature member 19 of the coil 4, they are held in the actuated position even after the armature member is restored to normal.

Upon the de-energization of the relay 2, the coil 5 becomes de-energized, permitting

its core member 17 to drop under the influences of the force of gravity and the spring 15 to thereby interrupt the circuit 3 and restore the circuit in shunt relation to the coil 5.

It is to be observed that by the use of my improved relay, an initial operation may be had at a voltage materially lower than the normal operating voltage without danger of subsequently destroying the low-voltage operating coil when it is subjected to the normal operating voltage. In practice, I may so design my relay that the initial operating coil will operate at 10 volts, while the normal operating voltage may be 120 volts.

While I have shown and described a specific embodiment of my invention, it is to be understood that such changes and arrangements may be made in the apparatus as here shown as fall within the scope of the appended claims.

I claim as my invention:

1. A voltage relay adapted to operate at a voltage considerably lower than the normal applied voltage comprising a shunt winding of relatively low resistance, a magnetizable armature member therefor, an auxiliary holding winding of relatively high resistance connected in series relation with said shunt winding, a second magnetizable armature member therefor, a low-resistance shunt for said holding winding, a movable contact member secured to the second armature member and arranged in the path of travel of the first-mentioned armature member but independently movable with respect thereto, and means whereby the actuation of said movable member opens said low-resistance shunt to render said holding winding effective.

2. A voltage relay adapted to operate at a voltage considerably lower than the normal applied voltage comprising a shunt winding of relatively low resistance, a magnetizable armature therefor, an auxiliary holding winding of relatively high resistance, a second magnetizable armature member therefor, a movable contact member having initial and operated positions, said contact member being secured to the second armature member and arranged in the path of travel of the first-mentioned armature member but independently movable with respect thereto, and means for rendering said holding winding effective and said shunt winding substantially de-energized when said contact member is actuated from the initial to the operated position.

In testimony whereof, I have hereunto subscribed my name this 28th day of January, 1924.

JOHN S. PARSONS.