

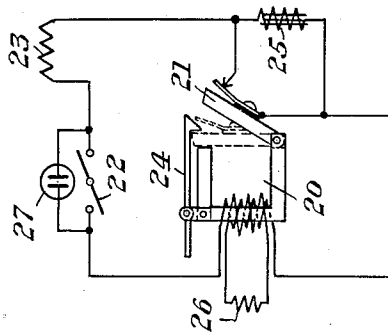
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ELECTRIC SIGNAL AND CONTROL DEVICE

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# UNITED STATES PATENT OFFICE

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## ELECTRIC SIGNAL AND CONTROL DEVICE

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2 Claims. (Cl. 175—294)

My invention relates to a system for indicating the condition of an electric circuit and for controlling the circuit under certain conditions.

5 One object of my invention is to provide an improved form of pilot signal for indicating the location of a control switch, as well as the condition of a circuit controlled thereby.

10 A further object of the invention is to provide load-limiting means in the form of a circuit interrupter for opening a circuit upon the occurrence of a fault therein and maintaining the circuit open until manually reclosed.

15 A still further object of the invention is to provide a novel form of interrupter device embodying a current transformer and circuit interrupter in one unit.

20 For a complete understanding of the invention, reference is made to the accompanying drawing illustrating a preferred embodiment thereof. The single figure of the drawing is a diagrammatic showing of the invention. As shown in the drawing, a current transformer 20 has a core of C or U shape, that is, with one leg open. The air gap across this opening is adapted to be closed by a leg 21 pivoted to the core of the transformer and having contact members cooperating therewith. The transformer 20 has a primary winding connected in series with a switch 22 and a load device 23. The contacts on the pivoted leg 21 are also in circuit with the load device.

25 A latch 24, is provided on the transformer core for locking the pivoted leg 21 in closed position, although this is not essential.

30 Across the contacts of the leg 21, which constitute a circuit interrupter, I connect a choke coil 25 having a high impedance, the function of which will appear presently. The secondary winding of the transformer 20 is connected to a current consuming device 26.

35 Normal operation of the device 23 may be initiated by closing the switch 22. Current is thus supplied from a source to the device 23 through the switch 22 and the contacts of the circuit interrupter 21. A glow-discharge device 27 is employed to indicate the condition of the circuit and the position of the switch 22. The glow lamp 27 may be placed at any desired position to indicate the condition of the circuit including the device 23. The lamp may be placed adjacent the transformer switch to indicate the location thereof or may be positioned at any other desired point. If the lamp is positioned adjacent the switch, it serves not only

to indicate the condition of the circuit but the position of the switch. As long as the circuit, including the device 23, is complete, the lamp 27 will glow if the switch 22 is open. When the switch 12 is open, therefore, the energization of the lamp 27 indicates that the circuit, including the device 23, is in normal operative condition. When the switch 22 is closed, the lamp 27 is shunted and extinguished. Under normal operating conditions, the air gap in the magnetic circuit of the transformer 20, which exists when the leg 21 is in the position shown, is sufficient to prevent the primary winding of the transformer from setting up sufficient flux in the magnetic core to introduce any appreciable reactance in the circuit of the device 23.

5 If an excessive current is drawn by the device 23, however, the flux induced in the transformer 20 will be sufficient to attract the pivoted leg 21 and thereby open the circuit. The latch 24 becomes effective to hold the circuit open until manually reset. When the leg 21 is attracted to the dotted line position, the reluctance of the magnetic circuit in the core 20 is very much decreased and the flux produced in the primary winding is likewise increased. This causes the transformer 20 to have a greater reactance and so effect a choking action on the over-load current. It also holds the leg 21 closed until the overload is removed, so that the latch 24 may be dispensed with, if desired. The choke 25 prevents excessive arcing at the contacts opened by the movement of the leg 21 and has a sufficiently high impedance to prevent flow of appreciable current through the device 23 when the circuit has been opened at the circuit breaker 21. The current consuming device 26 may be so selected or adjusted that the desired operation of the pivoted leg of the transformer 20 will result. The secondary winding of the transformer exerts a demagnetizing effect on the core thereof, so that by adjusting the value of the impedance of the device 26, the exact value of the current at which the circuit interrupter will open may be varied.

40 Numerous advantages characterize the invention described herein. In the first place, an inexpensive pilot signal is provided to indicate the condition of a circuit or the position of a switch. This signal consumes an almost negligible current and provides an effective indication at all times. The current transformer and the load-limiting device or circuit interrupter provides simple but efficient means for opening a circuit in case of over-load and interrupting the

current therein with a minimum of arcing. This device can be built so as to fit inside the ordinary switch box. By incorporating the circuit interrupter and the pilot lamp in the same unit, the cost of manufacture and installation is further reduced and the efficiency and utility of the unit are enhanced.

Although I have illustrated hereinabove certain preferred embodiments of the invention, with modifications thereof, the invention may be practiced in other forms than those shown. For this reason, the scope of the invention is not to be limited by the disclosure since any changes in the latter may be made within the scope of the following claims.

I claim:

1. A device for protecting a circuit from excessive overload comprising a magnetic core having a movable armature adapted to close the core, a primary exciter winding on said core adapted to be connected in series with the load on said circuit, said movable portion normally

shutting a circuit adapted to be connected in series with the primary and load on movement of said portion, and a secondary winding on said core connected to a resistor of such value as to cause the primary winding to maintain sufficient excitation of said core to hold said movable portion attracted after it is once actuated by the building up of flux in the core due to increased current through said load.

2. A device for protecting a circuit from excessive overload comprising a magnetic core having a movable portion adapted to close the core, a primary exciting winding on said core adapted to be connected in series with the load on said circuit, and a secondary winding on said core connected to a resistor of such value as to cause the primary winding to maintain sufficient excitation of said core to hold said movable portion attracted after it is once actuated on the building up of flux in the core due to increased current through said load.

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