Oct. 23, 1928. 1,688,833

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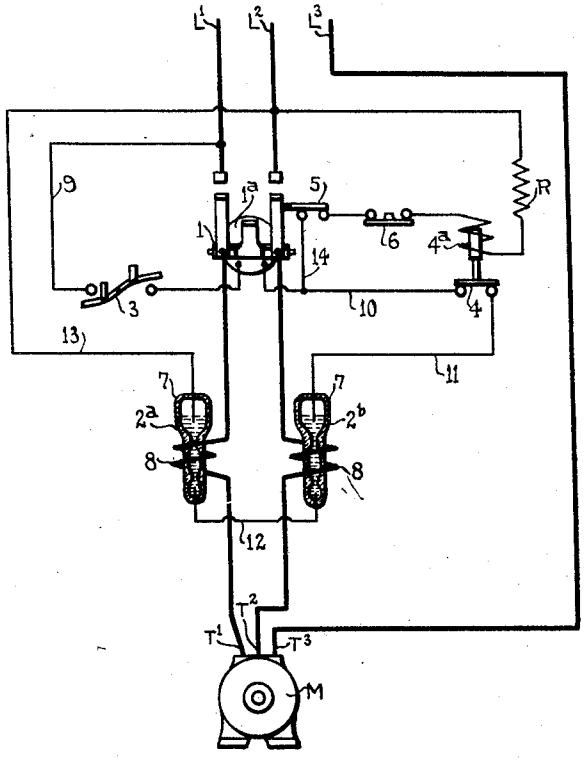
Filed May 18, 1923



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Patented Oct. 23, 1928. 1,688,833

UNITED STATES PATENT OFFICE.

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PROTECTIVE CIRCUIT CONTROLLER.

Application filed May 18, 1923. Serial No. 639,768.

This invention relates to protective circuit controllers.

The invention has among its objects to provide a circuit controller having improved means associated therewith for interrupting the controlled circuit upon the occurrence of overloads and for necessitating a manual operation as a pre-requisite to reclosure of said circuit.

Another object is to provide a circuit controller of the aforesaid character including electro-thermally responsive means for interrupting the controlled circuit upon the occurrence of overloads.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawing diagrammatically illustrates an embodiment of the invention which will now be described, it being understood that the embodiment illustrated is susceptible of modification without departing from the scope of the appended claims.

Referring to the drawing the same illustrates an electromagnetic switch 1 for controlling circuit between a three phase power circuit illustrated by lines L′, L^2 and L^3 and a translating circuit having a motor M connected therein. Switch 1 is of a double pole type, normally biased towards open position and having an operating winding 1^a for effecting closure thereof and said switch is arranged to connect lines L′—L^2 to terminals T^1 and T^2 of the motor, the other terminal T^3 of said motor being directly connected to line L^3. Also the controller includes two electro-thermally responsive overload devices 2^a and 2^b for controlling the energizing circuit of switch 1 through the medium of a master switch 3 and a relay 4, and control means for said relay including normally closed auxiliary contacts 5 associated with switch 1 and a normally closed push button switch 6.

The overload devices 2^a and 2^b are preferably of the type disclosed and claimed in a co-pending application of Erwin R. Stoekle, Serial No. 358,601, filed Feb. 14, 1920, and each comprises an insulating container 7 having electrodes penetrating therein and normally connected by a quantity of mercury. Said container is provided with a reduced portion located between the aforementioned electrodes and said reduced portion is surrounded by or otherwise associated with an electrical heating element 8. The electrodes of the overload devices are connected in series in the energizing circuit of switch 1 while the heating elements thereof are connected in different phases of the translating circuit. The arrangement is such that upon predetermined energization of either of the heating elements for a given period the mercury in the reduced portion of the associated container becomes vaporized to interrupt the energizing circuit of switch 1. Said devices are moreover inherently adapted to reset automatically upon cooling thereof.

The circuit arrangement and operation of the aforedescribed controller will now be more fully set forth. Upon closure of master switch 3 switch 1 responds the same being energized by a circuit extending from line L′ by conductor 9 through master switch 3, through operating winding 1^a, by conductor 10 through relay 4 by conductor 11 through overload device 2^b by conductor 12 through overload device 2^a and by conductor 13 to line L^2. Also immediately upon closure of switch 3 winding 4^a of relay 4 is connected across lines L′ L^2 by a circuit extending from line L′ to and through the operating winding 1^a of switch 1 as already traced by conductor 14 through auxiliary contacts 5 through push button switch 6 and thence through the winding 4^a and a resistance R to line L^2. It will be observed that with the aforedescribed circuit connections overload devices 2^a and 2^b are connected in shunt across contacts 5, push button switch 6, winding 4^a and resistance R and relay 4 thus remains unresponsive as long as circuit is maintained through said devices. In responding switch 1 connects terminals T′ T^2 of motor M to lines L′ L^2 respectively and also effects opening of auxiliary contacts 5. Upon predetermined overload conditions in any phase of the translating circuit, one or the other of the overload devices 2^a and 2^b will respond to interrupt the energizing circuit of winding 1^a of switch 1 to permit opening of the latter. Immediately upon opening of switch 1, auxiliary contact 5 connects the winding 4^a across lines L′ L^2 through the above described circuit connections and said relay in responding insures against ener-

gization of the operating winding 1^a through the overload devices 2^a and 2^b upon resetting of the latter. The impedance of the energizing circuit of relay 4 is of such value as to insure against response of switch 1, upon response of said relay. In responding relay 4 remains in open position subject to de-energization thereof by opening of push button switch 6.

It is apparent that the invention is not limited to overload devices of the aforedescribed type and that other means can be employed to necessitate a manual operation as a prerequisite to reclosure of relay 4. Furthermore it is apparent that the master switch 3 need not necessarily be manually operated but can be operated in various ways as for example by a float.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a translating circuit of an electro-responsive switch for establishing power connections thereto and control means for said switch including a plurality of control switches connected in series in the energizing circuit thereof, certain of said switches being responsive upon given overload conditions in said translating circuit to interrupt said energizing circuit and another being responsive upon response of said former switches to insure against reestablishment of said energizing circuit by said former switches upon resetting thereof.

2. The combination with a translating circuit of an electro-responsive switch for establishing power connections thereto and control means for said switch including a plurality of control switches connected in series in the energizing circuit thereof certain of said control switches being responsive upon given overload conditions in said translating circuit to interrupt said energizing circuit and another being responsive upon response of said former switches to insure against re-establishment of said energizing circuit by the former upon resetting thereof, said latter second mentioned control switch requiring a manual operation to effect reclosure thereof.

3. The combination with a translating circuit of an electro-magnetic protective switch for establishing power connections thereto and control means for said switch including an electro-responsive relay and an overload device, said device being normally closed and being responsive to open the energizing circuit of said protective switch upon the occurrence of given overload conditions in said translating circuit and said relay being responsive upon response of said overload device to insure against reclosure of the energizing circuit of said protective switch upon resetting of said overload device.

4. The combination with a translating circuit of an electro-magnetic switch for establishing power connections thereto a normally closed overload device included in said translating circuit to effect opening of said protective switch upon given abnormal conditions in said circuit, a relay responsive upon response of said overload device to prevent reclosure of said protective switch upon resetting of said overload device, and means necessitating a manual operation as a prerequisite to closure of said relay.

5. The combination with a translating circuit of an electro-magnetic protective switch for establishing power connections thereto, a device responsive to given overload conditions in said translating circuit for interrupting the energizing circuit of said protective switch, a master switch and a relay included in the said energizing circuit in series with said device and circuit connections whereby said relay responds upon response of said device to prevent energization of said protective switch upon resetting of said device.

6. The combination with a translating circuit of an electro-magnetic protective switch for establishing power connections thereto, a device responsive to given overload conditions in said translating circuit for interrupting the energizing circuit of said protective switch, a master switch and a relay included in the said energizing circuit in series with said device and circuit connections whereby said relay responds upon response of said device to prevent energization of said protective switch upon resetting of said device, said circuit connections necessitating a manual operation as a prerequisite to reclosure of said relay.

7. The combination with a translating circuit of a switch for establishing power connections thereto, an electro-thermally responsive device in said translating circuit for interrupting the energizing circuit of said switch upon given overload conditions and a relay responsive upon response of said device to insure against re-establishment of the energizing circuit of said switch upon resetting of said device.

8. The combination with a translating circuit of an electromagnetic main switch for establishing power connections thereto, a normally closed overload switch in the energizing circuit of said main switch, said overload switch being responsive under given conditions in said circuit, and a normally closed electromagnetic relay in the energizing circuit of said main switch, said relay being responsive upon response of said overload device to insure against reestablishment of the energizing circuit of said main switch upon resetting of said device.

9. The combination with a translating circuit of an electromagnetic switch for establishing power connections thereto, a

normally closed overload device in the energizing circuit of said main switch, said device being responsive under given overload conditions in said translating circuit, a normally closed electromagnetic relay in the energizing circuit of said main switch and contacts associated with said main switch for energizing said relay upon interruption of the energizing circuit of said main switch by said overload device.

In witness whereof, I have hereunto subscribed my name.

EDWIN W. SEEGER.