

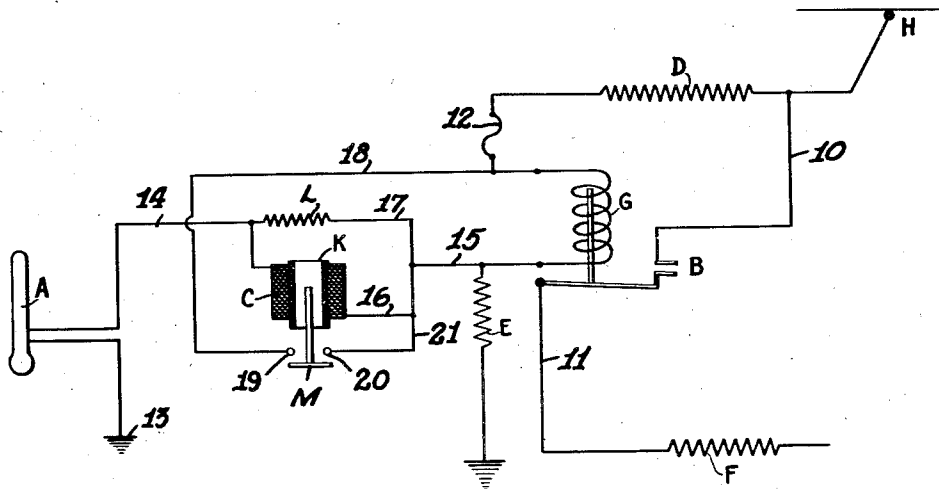
March 5, 1935.

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1,993,522

THERMOSTAT CONTROLLED CIRCUITS

Filed Sept. 30, 1932



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1,993,522

THERMOSTAT-CONTROLLED CIRCUITS

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Application September 30, 1932, Serial No. 635,671

2 Claims. (Cl. 175—320)

For a detailed description of the present form of my invention, reference may be had to the following specification and to the accompanying drawing forming a part thereof, said drawing being a diagrammatic illustration of a circuit modified to conform to the invention.

My invention arose from experience with a standard thermostatic equipment which gave trouble because of the frequent giving out of thermostat tubes constantly requiring their replacement. The reason for such trouble was not apparent, but, by a series of tests the cause was finally ascertained, and the device of the present application has proved to be an effective remedy therefor. I speak of the trouble as a giving out of the thermostat. By this I do not limit myself to the breakage of its glass tube but include as more important the formation of a scum or oxide on top of the mercury causing the mercury to stick in the bore of the thermometer.

This mysterious failure of the thermostat to properly function necessitated constant close inspection, and involved the expense of frequent replacements of the defective instruments. In the course of experiments initiated to discover the cause of said failing, I ascertained that it was due to inductive disturbances at the relay coil controlled by the thermostat which occurred when the trolley passes under a section insulator in the trolley wire, or when the line-breaker on the car was tripped by excessive speed. My invention lies in the discovery of the cause of the trouble and the application of certain remedial expedients to the cause, to-wit, the employment in the relay which the thermostat controls of a copper tube on which the coil thereof is wound, and a rearrangement of its connection in a way to reduce the amperes and volts of the relay.

Referring to the drawing, F designates the heater which receives current from the trolley H through the conductor 10, line breaker B and conductor 11. The circuit breaker is controlled by a circuit from the trolley H, which includes resistor D, fuse 12, coil G having a core connected with the movable member of the circuit breaker, and resistance E, which latter is grounded. The thermostat A has one terminal grounded in the usual manner at 13, the other terminal being connected with the conductor 14 which is connected with one end of coil G by means of a conductor 15, and intermediate branches 16 and 17. The branch 16 includes a

resistor L, which by-passes the coil C. It will be observed that the grounded resistance E is connected to the circuit between the coil G and the branch wires 16 and 17. The coil C controls a circuit closer M which is included in a branch circuit comprising conductor 18, so connected with the circuit through resistor D as to by-pass the coil G, and also includes contacts 19 and 20, and conductor 21 which joins the branch wires 16 and 17 at a position between the coil C and the grounded resistor E. The coil C is wound upon the tube K of heavy copper.

From the foregoing, it will be noted that the relay C is connected to the circuit at a point between the circuit breaker G and the thermostat A, while a 250-ohm resistor L, which shunts the coil C is also permanently connected in the circuit.

In operation, assuming the space that is to be heated is cold, the circuit from trolley H will be through resistor D, coil G, and resistance E to ground. When the coil G is energized the circuit breaker is operated to close the circuit directly from trolley H to heater F. As the temperature rises, the thermostat A will eventually close its circuit, whereupon current will first flow from coil G through the branch circuit indicated by wire 15, branch wires 16 and 17 (including coil C and resistance L), conductor 14 and thermostat to ground. The instant that coil C is energized, the circuit is closed at M, whereupon the current from trolley H will by-pass the coil G and will flow through wire 18, circuit closer M to the branch wires 16 and 17 and thence to the thermostat and ground, through the course already described. As long as coil C is energized, the circuit which by-passes coil G will be maintained, but upon breaking of the circuit at the thermostat, the coil C becomes deenergized, thereby breaking the by-passing circuit at the circuit closer M, and re-energizing the coil G, so as to again close the circuit to the heater F.

While it has not been definitely ascertained just why this circuit arrangement corrects the above described conditions which impair and in fact actually prevent the proper functioning of the thermostat, it is believed to be due to the reduction of inductive kick in the coil C produced by the absorption of self-inductive effects in the coil by the copper tube K, and by the reduced voltage of the coil C upon the thermostat contacts produced by these aforesaid connections. The said voltage is reduced to ap-

proximately 22 volts in the new organization as compared with 100 volts in the old one. This theory, as above expressed, is subject to modification and therefore is not intended to be binding.

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

1. In a thermostatic relay circuit, a relay magnet consisting of a coil wound upon a tubular metallic core capable of absorbing self-inductive effects of said coil, a grounded thermostat connected with one end of the coil, means connecting the other end of the coil with a source of electrical energy, and voltage reducing means

by-passing the coil and also in circuit with said thermostat and in series with said source of electrical energy.

2. In a thermostatic relay circuit, a relay magnet consisting of a coil wound upon a tubular metallic core capable of absorbing self-inductive effects of said coil, means providing a source of electrical energy, means connecting said coil in series with said thermostat and said source of electrical energy, and a branch circuit also in series with said source of energy and said thermostat and by-passing said coil, said branch circuit including a resistance.

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