

986,382.

WITNESSES:

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THERMAL CIRCUIT-CLOSER.

986,382.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Original application filed November 9, 1908, Serial No. 461,681. Divided and this application filed May 22, 1909. Serial No. 497,752.

To all whom it may concern:

Be it known that I, FREDRICK C. GUPTILL, a citizen of the United States, and a resident of Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Thermal Circuit-Closers, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This application is a division of application No. 461,681, (now Patent No. 943,931), and the invention relates to thermal circuit closers, that is, to circuit closers which are actuated by changes in temperature of the fluid in which such devices are immersed, (whether fluid or gas) and consequent changes in the temperature of the expansible member of the device.

The primary object of the invention is to provide a thermal circuit closer in which a comparatively slight change in the temperature of the fluid in which it is immersed (whether liquid or gas) will produce sufficient movement of the member which alternately closes not less than two electric circuits, to perform the functions desired therefrom.

A further object of the invention is to provide thermal circuit closers which automatically clean the contacting surfaces of the parts thereof which alternately form elements in a plurality of electric circuits.

A further object of the invention is to provide a thermal circuit closer, of the character described, which is simple in construction, inexpensive to manufacture, and wherein the movement of the expansible member because of the variations in temperature thereof will be the same at whatever degree the device is set to operate.

The invention, described in general terms, consists of a base, an expansible or thermostatic member which is rigidly attached at one end to the base and at the other end is provided with spring contacts arranged to move between adjusted terminals, and which terminals are mounted on and near to one end of a pivoted lever, with the other end of said lever prolonged to form a

pointer arranged to be moved, for setting, over a gage.

In the drawing referred to Figure 1 is a front elevation of a device embodying the invention, said figure also showing, on a small scale, a heat generator, a device to control the dampers of the heat generator and an electric generating device, with suitable connections, all arranged so that the relation of the device embodying this invention to said parts is shown. Fig. 2 is a side elevation of the device embodying this invention.

A reference letter applied to designate a given part is used to indicate such part throughout the several figures of the drawing wherever the same appears.

A is the base of a device embodying this invention and is made of wood, fiber, hard rubber or other non-electric conducting material.

B is a pivot secured on base A, and C is a lever made of spring metal, pivotally mounted on pivot B.

D is one end of the lever C.

E is a pin in end D of lever C. F is the other end of such lever C and is provided with adjustable terminals G, g.

H is a wire attached to terminal G and h is a wire attached to terminal g.

I is insulating material by means of which the terminal g is insulated from lever C.

J is a gage provided with holes or recesses j with which the pin E on the end D of lever C yieldingly engages.

K is a thermostatic member consisting of a strip of metal k, and hard rubber k', riveted together by rivets k'', and mounted on the base A by attaching end K' thereof to base A, as by screws L, and arranged so that the other and free end thereof is between terminals G, g. The strip k and hard rubber k' are made of sufficient thickness to obtain a substantially non-resilient thermostatic member. Variation in temperature causes movement of the free end of the thermostatic member K so alternately moving springs M, m, which are mounted on such end, into mechanical contact with terminals G, g, to close the circuit in which the terminal and spring so contacted are elements.

The several holes or recesses j, or a sufficient number thereof, are marked with a

number corresponding with the degree of temperature required, when pin E on end D of lever C is in a given one of such recesses to cause such contact of one of the springs

5 M, *m*, with the corresponding terminal G, *g*, to close the circuit of which such spring and terminals are elements.

The wires H, *h*, extend to terminals in the damper controlling device N.

10 X is a heat generator.

Y, *y*, are dampers to heat generator X.

O, O', are crank arms on a rotatable shaft of the damper controlling device N, and P, *p*, are flexible connections from crank arms

15 O, O', respectively, to dampers *y*, Y, respectively.

Q is a wire connected at one end to a terminal in the damper controlling device N and at the other end to the end K' of the thermostatic member K.

20 R, R, are primary batteries connected as by wires *r*, *r*, to suitable terminals in device N.

The device N forms no part of this invention and for that reason is not specifically described.

The springs M, *m*, are of electric conducting material and are arranged to permit continued movement of the thermostatic member K after electrical contact of such spring with the respective terminals G, *g*, has been made and movement of said springs M, *m*, on terminals G, *g*, after contact is made, tends to wipe any non-electric conducting material, as dust, from between said springs and terminals, so that a good contact for the conduction of electricity is at all times obtained. The change of temperature of the expansible member is effected so slowly that after contact of the springs with the terminals, as above described, further movement of said springs is almost always obtained after sufficient contact to close the circuit is made, so that the wiping effect referred to is, in practice, frequently secured.

45 It will be observed that when the lever C is turned on pivot B the adjustment of the terminals G, *g*, relative to each other is not changed, but that said movement of the le-

ver C does change the position of such terminals relative to springs M, *m*. By said change of the relative position of the terminals and springs, electric contact is made between them at the temperature indicated by the end D of lever C on gage J, determined by the engagement of pin E with a given hole or recess *j*. One or the other of the circuits of which wires H, *h*, are elements will be closed when the corresponding one of springs M, *m*, is in contact with the terminal thereof: at such terminal; and provided the same circuit is closed in the damper controlling device N, the entire circuit will be closed, and the device N will be operated.

This device pertains simply to the means of closing the circuits by automatic thermal operation of springs M, *m*, at the terminals G, *g*, and by means of the forcing of springs M, *m*, into contact therewith, as described.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is;—

In a thermostatic member, a thermostatic ribbon consisting of a plurality of rigid members joined together, said ribbon mounted so that one end thereof is movable, and a plurality of electric contact members of great flexibility connected to said ribbon at an acute angle, in combination with electric terminals adjacent to the movable end of said thermostatic ribbon, said electric contact members arranged so that movement of the thermostatic ribbon will force one of said contact members into electrical connection with one of the terminals, and continued movement of said thermostatic ribbon will force said contact member which is in electric connection with a terminal into position lessening the angle of its connection, whereby a rubbing contact is obtained between said contact member and terminal which are in electric connection.

FREDRICK C. GUPTILL.

In the presence of—

CHARLES TURNER BROWN,
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