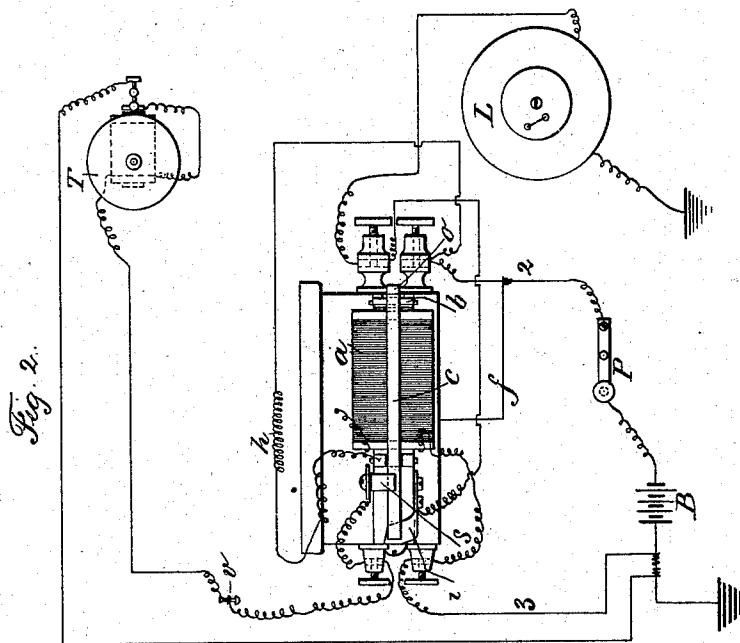
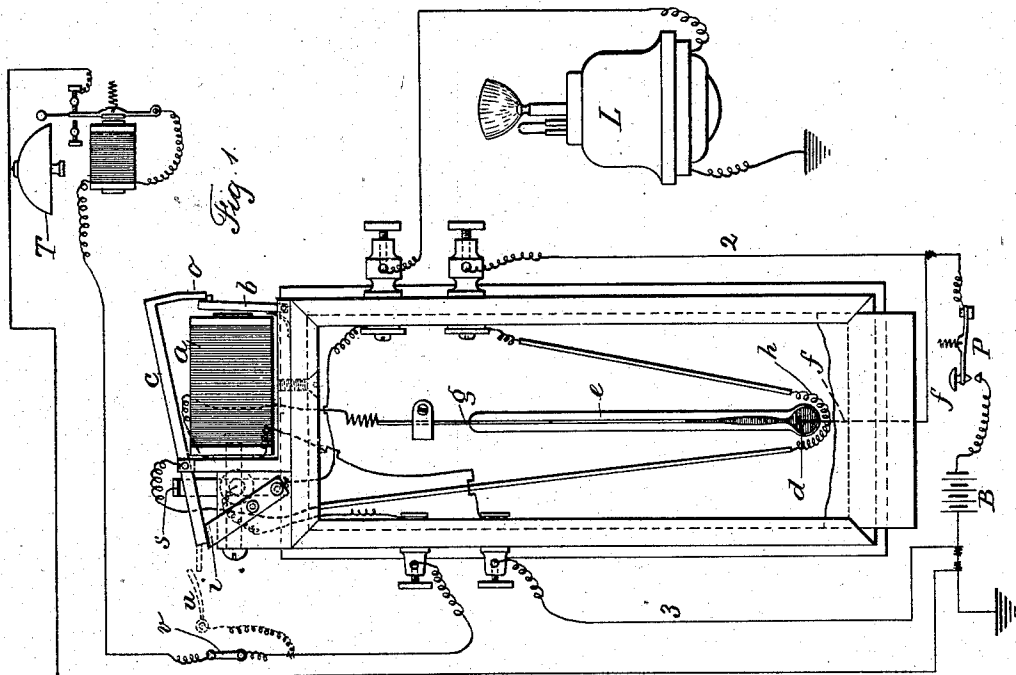


(No Model.)

T. H. RHODES.
ELECTRIC CUT-OUT.

No. 276,286.

Patented Apr. 24, 1883.



Witnesses:
J. Hall
Chas. H. Smith

Inventor:
Thomas H. Rhodes
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UNITED STATES PATENT OFFICE.

THOMAS H. RHODES, OF BROOKLYN, NEW YORK.

ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 276,286, dated April 24, 1883.

Application filed November 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. RHODES, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Electric Cut-Outs, of which the following is a specification.

Electric circuits are extensively employed in buildings, especially for lighting gas, for burglar-alarms, and for annunciators. In these instruments the circuit in its normal condition is broken, hence the battery is not consumed; but if a circuit is closed accidentally, and so remains for any length of time, there is great waste of battery, and its power runs down so that it is not in condition for use.

The object of the present invention is to automatically cut out or break the circuit if it remains closed for a longer period than is required for accomplishing the object intended. For instance, in a hotel annunciator or call-bell system, if the push-button is kept closed more than, say, thirty or forty seconds, the circuit is broken automatically. If the spring does not separate the contact-points of the push-button or the burglar-alarm, my cut-out operates. If a wire becomes accidentally grounded by contact with the gas-pipe in electric gas-lighting apparatus, the circuit is broken by my cut-out, and so remains until the defect is hunted up and repaired. In some instances I cause an alarm to be rung by the breaking of one circuit and the establishing of another circuit. Where a fine wire is interposed in a portion of an electric circuit, heat is developed in proportion to the resistance. I avail myself of this heat to operate a thermic circuit-closer, which diverts the current through a magnetic switch or circuit-breaker; hence when the current continues on the line a sufficient length of time to develop heat and act upon the thermic circuit-closer the same will break the circuit; but during the period in which the circuit is properly closed to effect the lighting of gas or the ringing of an alarm—say twenty to forty seconds, more or less—there is not time for the electro-thermic circuit-closer to act, and although heat may be developed in the resistance-coil at the mercury-bulb every time the circuit is closed, there will necessarily be a brief period during which the mercury will be expanding before the thermic circuit is closed, and if the circuit is broken

during this period the mercury contracts again to its normal condition and the electric connections are not disturbed.

In the drawings, Figure 1 is an elevation representing the electric cut-out and the circuits employed therewith to illustrate the mode of using the instrument, and Fig. 2 is a plan view of the same.

The electro-magnet *a* is provided with a spring-armature, *b*, which also acts as a latch to hold up the circuit changing or breaking lever *c*. The electro-thermic circuit-closer is provided with a mercury-bulb, *d*, and column-tube *e*. One of the wires of an electric circuit passes into the bulb at *f* and the other into the column-tube *e* at *g*. This latter wire should be adjustable, so as to be placed with its inner end at the proper place for touching the column of mercury when it has expanded to the given temperature.

The resistance *h* is preferably a helix of platina wire placed so as to draw closely around the bulb *d*. This wire does not require to be very fine, as it should only be moderately heated by the passage of the current of electricity. If it is too fine and becomes incandescent, there is a risk of breaking the thermic bulb. For illustration I have represented a gas-burner at *L* with an electric gas-lighting appliance, a battery at *B*, and a push-button or circuit-closer at *P*. In the normal position the lever circuit-closer *c* will be raised, as shown, and held up by the armature-latch. When the push-button or circuit-closer *P* is operated the current passes from *B* by *P* 2 *h* to *c*, and by contact-spring *i* to spark-points at gas-burner *L*, thence to ground and back to *B*. If the push-button *P* is kept closed or the circuit remains closed by an accidental contact or otherwise long enough for the resistance *h* to heat the mercury in *d* and expand it until the column touches *g*, the circuit by *f d g*, through magnet *a* and return wire or ground 3, is instantly closed, the armature *b* is attracted, the circuit-lever or switch *c* falls, breaking contact with *i*. The helix *h* now cools, and contact between *g* and mercury is also broken, and the apparatus cannot be used until the switch or lever *c* is raised and the parts restored to their normal condition.

Upon the end of the lever-switch *c* there may be a number or sign, at *o*, which, becom-

ing visible when the lever drops, indicates that the circuit has been broken; or the lever *c* may come into contact with the spring *s* and close another circuit through the repeating electric alarm-bell *T*. This will keep ringing until the apparatus is attended to. There may be a spring in the position shown by dotted lines at *u*, for the circuit-closing lever *c* to slide across as it falls and give the alarm-bell *T* one or two strokes before the circuit is again broken.

It is to be understood that numerous push-buttons or circuit-closers may be arranged so that the circuits to the annunciators or electric-lighting devices come together where they pass through the thermostatic cut-out; or there may be a cut-out in each circuit, and the manner of arranging the wires and the construction of the cut-out lever or circuit-breaking switch may vary according to the place where it is to be used.

I do not confine myself to a single cut-out, as my invention can be applied to an annunciator placed in each section, which will cause the section accidentally short-circuited to be cut out, leaving the other sections undisturbed.

The switch at *v* serves to stop the ringing of the alarm-bell after attention has been directed to the improper circuit-connections, as aforesaid.

I claim as my invention—

1. A normally-open main circuit having a circuit-closer and a resistance, in combination with a second or branch circuit, a thermic circuit-closer placed therein, an electro-magnet brought into action by the heat developed by the resistance acting on the thermic circuit-closer, and a switch for changing the circuit-connections, substantially as specified.

2. The combination, with an electric circuit containing gas-lighting or annunciator devices, of a resistance for developing heat, a thermic circuit-closer, and an alarm that is brought into action by the thermic circuit-closer, substantially as set forth.

Signed by me this 6th day of November, A. D. 1882.

THOS. H. RHODES.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.