T. A. EDISON.

Thermal-Regulator for Electric-Lights.

No. 214,637. Patented April 22, 1879.

Fig. 1.

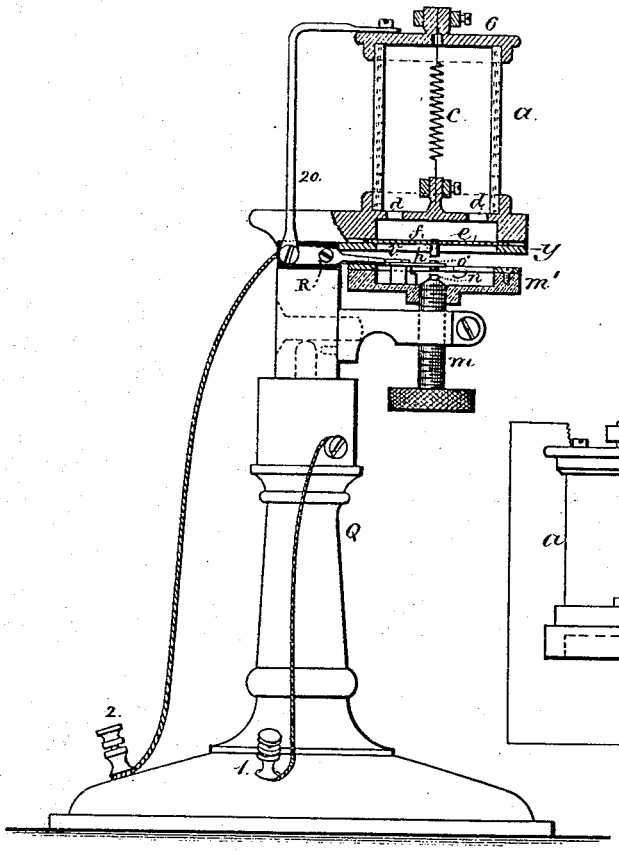


Fig. 2.

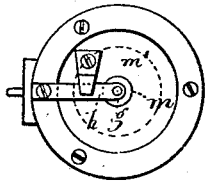


Fig. 3.

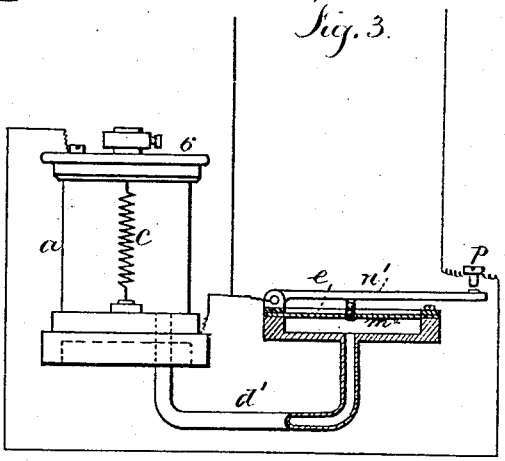


Fig. 6.

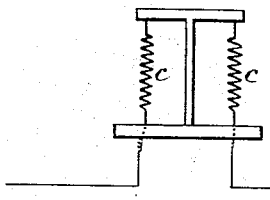


Fig. 5.

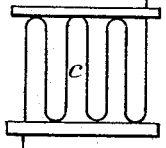
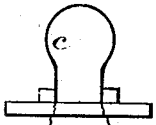


Fig. 4.



Witnesses

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atty

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY

IMPROVEMENT IN THERMAL REGULATORS FOR ELECTRIC LIGHTS.

Specification forming part of Letters Patent No. **214,637**, dated April 22, 1879; application filed November 18, 1878.

To all whom it may concern:

Be it known that I, THOMAS ALVA EDISON, of Menlo Park, in the State of New Jersey, have invented an Improvement in Electric Lights, of which the following is a specification

The object of this invention is to devise a reliable and economical electric lamp, to give light by incandescence due to the passage of the electric current through conductors of electricity, so that a great number of lamps may be used in one electric circuit.

The invention consists in causing the heat generated by the incandescent conductor to expand the air or fluid in the containing-chamber as its temperature rises, the pressure thus created serving to move outwardly a yielding material—such as a diaphragm—which, in its turn, serves to control the passage of the electric current through the incandescent body by means of contact-points or circuit-regulators, and thus the temperature of the incandescent conductor will be regulated automatically.

In the drawings, Figure 1 is a sectional elevation of the electric lamp, and Fig. 2 is a plan of a portion of the same. The other figures are separately referred to.

a is a glass tube or vessel, containing spiral or strip *c*, of iridium or equivalent metal, through which the current passes. *b* is the top plate, to which the spiral *c* is connected. The glass tube is secured to the metallic standard Q. *e* is a diaphragm closing the bottom of the lower chamber. There is a partition between the chamber containing the spiral *c* and the chamber of the diaphragm; but air circulates freely between the chambers through the holes *d d d d*.

When the spiral is heated by the passage of the current, the air in the chambers expands and bulges the diaphragm outwardly. On the center of the diaphragm is a platina point, *f*, immediately opposite another platina point, *g*, on a spring, *h*. This again is opposite another platina point, *n*, on the screw *m*. *m'* is a disk of insulating material, on the top of which is a brass ring in electrical connection with the spring *h*. A rubbing contact-spring, *v*, connects this ring to the insulated plate R and the binding-post 2 on the base. The frame Q is connected to the other binding-post, 1. A wire, 20, connects the spiral of the light with the plate R and binding-post 2.

When no current passes in the circuit containing this instrument, the air in the chamber is of the same pressure as the atmosphere, and the points *f* and *g* and *n* are not in contact. If, now, the current is allowed to circulate in the line, it passes, say, from binding-post 2 to R, thence through wire 20 to the top *b*, down through spiral *c* to base Q, to the other binding-post, 1.

When the spiral *c* reaches within a few degrees of its melting-point, the expansion of the air will have bulged out the diaphragm *e* and brought the points *f* and *g* together, thus short-circuiting the current from the spiral, as it now must nearly all pass from binding-post 2 to R, thence through spring *v* to the ring *y*, through spring *h* to *g*, through *f* to diaphragm *e*, to Q, and back to binding-post 1. When thus short-circuited the temperature of both the air and spiral fall by radiation, and when it reaches a certain point the diaphragm and point *f* leave *g*, and the current again passes through *c* and raises its temperature, and the same action takes place. This regulation is so rapid that the eye does not perceive any diminution in the strength of the light. The object of the contact between *g* and *n* is, that in case *f* and *g* should fail to make contact the short circuit would still take place, as *n* and *f* are both connected to Q.

It is obvious that this method may be applied in many ways. For instance, the diaphragm might give motion to a lever or spring through which the contacts might be made, and this second chamber may be separated from the one containing the spiral *c*, as shown in Fig. 3. A tube, *d'*, leads from the chamber containing the spiral to the second chamber, m^2, closed by the diaphragm *e*. *n'* is a lever, which is moved by the movement of the diaphragm, and serves to short-circuit the spiral *c* when it comes in contact with the point *p*.

Mercury may replace air in the tube *d* and chamber m^2, the pressure of the air or gas in *a* acting through such mercury on the diaphragm *e*; or the mercury may come into contact with the point *p* to make direct circuit through the mercury.

The incandescent conductors may be made

in either of the forms shown in Figs. 4, 5, or 6.

In my application No. 156, filed October 14, 1878, I have shown a thermostatic circuit-regulator in connection with the electric light. I do not therefore herein claim any feature set forth in said prior application.

I claim as my invention—

The method specified of regulating the temperature of the incandescent light-giving body, by the expansion of the air or gas in the closed vessel containing the light acting automatically in the electric circuit, substantially as set forth.

Signed by me this 14th day of November, A. D. 1878.

THOMAS A. EDISON.

Witnesses:
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CHAS. FATCHELOR.