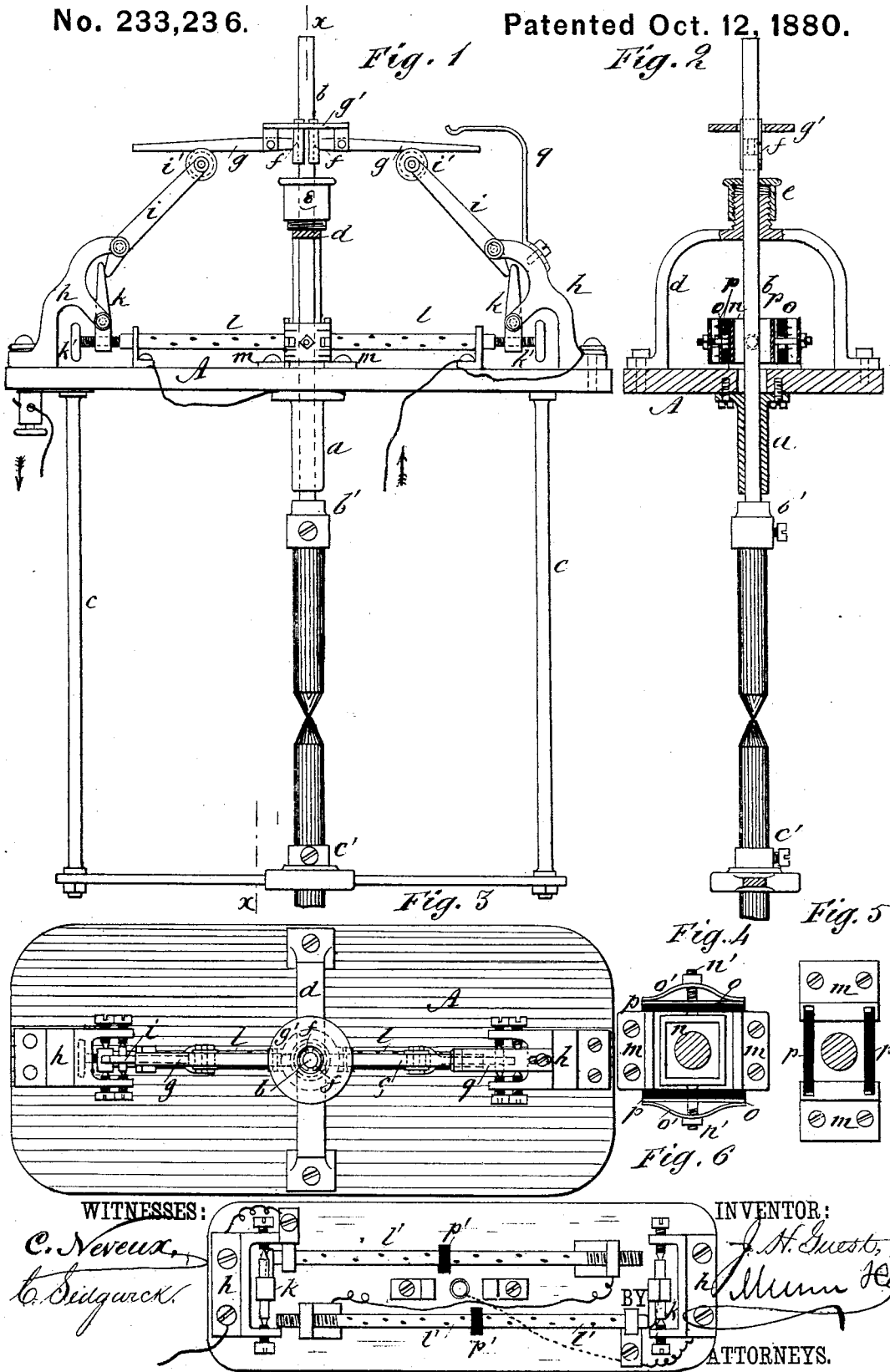


(Model.)

J. H. GUEST.
Electric Lamp.

No. 233,236.

Patented Oct. 12, 1880.



UNITED STATES PATENT OFFICE.

JOHN H. GUEST, OF BROOKLYN, NEW YORK.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 233,236, dated October 12, 1880.

Application filed July 7, 1880. (Model.)

To all whom it may concern:

Be it known that I, JOHN H. GUEST, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Regulators for Electric Lamps, of which the following is a specification.

The object of my invention is to furnish means for automatically regulating the length of the arc in electric lamps, and to prevent fluctuations in the light by changes in intensity of current.

My invention consists, primarily, in a thermoscopic rod combined with an electric lamp for expansion according to the intensity of the current and resistance in the circuit. The linear expansion is multiplied by levers, which act by clamps to separate the carbons.

The invention also consists in the combination, with the expansion-rod, of a section of carbon or metal of low conductivity, whereby the heat due to resistance is rapidly generated and dissipated; also, in a shunt for dividing the current when the carbons are separated to a definite point, and in certain other details of construction which render the action more perfect and adjustable.

The construction and operation will be described in detail with reference to the accompanying drawings, wherein—

Figure 1 is side elevation of a lamp fitted with my improvements. Fig. 2 is a vertical section of the same on line *x x* of Fig. 1. Fig. 3 is a plan view. Figs. 4, 5, and 6 represent modifications in the construction of the expansion-tube.

Similar letters of reference indicate corresponding parts.

A is the table of the lamp, which is to be suitably supported or suspended, and may be of wood, slate, or other non-conducting material. To the under side of table A is attached a tubular guide, *a*, for the rod *b* of the upper carbon-holder, *b'*, and from the table depend rods *c*, that carry a cross-rod to which is fixed the holder *c'* of the lower carbon. The rod *b* of the upper holder, *b'*, passes through an aperture in table A, and on the upper side of the table the regulating devices next described are placed. Any suitable supporting-

frame may be used, whereby the parts are brought into proper relation, as described.

d is a fixed bridge supporting a tubular guide for the rod *b*, which guide is formed with an external thread to receive a screw-cap, *e*, so that the cap is sustained by the bridge and may be adjusted vertically.

ff are the clamps consisting of half-tubes attached to the short arms of levers *g*, that are hung from opposite sides of a ring, *g'*, which encircles the clamps, the aperture of the ring being large enough to allow free movement of the clamps in closing upon or releasing the rod *b*.

h h are brackets fixed on table A, and supporting the levers *i i* and *k k*. The longer arms of levers *i* extend beneath the outer ends of the levers *g* and carry friction-rollers *i'*, of non-conducting material, that are flanged to receive the levers *g* and prevent them turning with clamps on rod *b*. The shorter arms of levers *i* are in contact with the longer arms of levers *k*, which latter are fitted at their shorter ends with screws *k'*, that bear upon the outer ends of the expansion-rods *l l*. The expansion-rods *l*, in the form shown in Fig. 1, consist of tubes perforated at intervals to permit passage of air, and secured rigidly by one end to a central support that is attached rigidly to table A. The support, as shown most clearly in Fig. 4, consists of two brackets, *m m*, between which is a yoke, *n*, that is provided with screw ends *n'* and nuts, by which pressure may be given to plates *o*, of mica or other non-conducting and infusible material, that are upon the screws *n*. Between the plates *o* and brackets *m* are strips *p*, of carbon or other suitable resisting medium, and between plates *o* and the clamping-nuts are springs *o'*, so that the carbon will be pressed upon the brackets by spring-pressure.

Other devices may be used for connecting the two tubes by the carbon, and I have shown in Fig. 5 the brackets as slotted to receive the ends of carbon rods or strips.

By this construction the expansion of the rods *l* under heat is from the fixed central support outward, so that the levers *i k* are simultaneously moved, and the movement by expansion multiplied by the levers.

The electrical connections are to one bracket, *h*, through lever *k* and rod *l* to the other bracket *h*, and from thence to the upper carbon-holder. Upon the bracket *h*, that is connected with the entering-wire, is fixed a spring-arm, *g*, which is bent over the lever *g* at that side, so that when said lever rises to a certain point it makes contact with arm *g*, and shunts the current directly to the carbons by rod *b*. The arm *g* is adjustable by bending or otherwise, so that the current shall be shunted before the tubes *l* become too intensely heated.

The operation is as follows: The parts should be adjusted by the screws *k* and screw-cap *e* so that the clamps *f* rest on cap *e*, and the outer ends of levers *g* dropped to release the upper carbon-holder, the rollers *i* being in contact, or nearly so, with levers *g*. The circuit being then closed the resistance strips or sections *p*, connecting tubes *l*, quickly heat, the tubes expand, levers *g* are raised, and the clamps *f*, binding on rods *b*, raise the same and separate the carbons. This movement is instantaneous, and continues until the resistance in the arc prevents further heating of the tubes. As the arc increases in length by waste of the carbons the tubes *l* cool and contract, levers *k* drop, and the rod *b* of the upper carbon-holder is released so that it may drop until the tubes again expand and raise it as before.

The effect of the resistance-sections of carbon or other material is to insure a quick heating and cooling, and to equalize the effect of the heat on tubes *l*, so that levers *g* shall rise and fall alike. A rod of German-silver or other metal of low conductivity may be used without the resistance-sections.

Two expansion-rods placed parallel may be used, as shown in Fig. 6. In this case the rods *l'* are secured adjustably by one end to fixed brackets, and their opposite ends are in contact with the shorter arms of levers *k*. One rod thus moves the lever at one side and the other the lever at the other side. The rods are

separated at their mid-length and connected by an inserted section, *p'*, of carbon.

A single lever may be used in place of levers *k*, and other details of the construction shown may be varied within the scope of my invention.

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

1. The combination, in an electric lamp, of a thermoscopic rod fitted for lineal expansion by the heat induced by its resistance to the current, a lever or levers for multiplying the movement, and clamps arranged in connection with the upper carbon to raise the same by movement of the levers, all substantially as shown and described.

2. In electric lamps, the expansion rod or rods *l*, levers *k*, levers *g*, carrying clamps *f*, and rod *b*, supporting the upper carbon-holder, combined for operation substantially as and for the purposes set forth.

3. In electric lamps, the adjustable supporting-cap *e*, combined with rod *b*, clamps *f*, and levers *g*, substantially as and for the purposes set forth.

4. In electric lamps, the expansion-rods fitted for regulating the distance between the carbons, and provided with sections of carbon or other material of low conductivity, substantially as shown and described.

5. In electric lamps, the yoke *n*, provided with screws *n'*, plates *o*, and resisting medium *p*, combined with the brackets *m*, and rods *l*, substantially as and for the purposes set forth.

6. In electric lamps, the arm *g*, combined with levers *g*, carbon-holder *b*, circuit connections and mechanism for raising levers *g*, substantially as described, for the purpose set forth.

J. H. GUEST.

Witnesses:

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