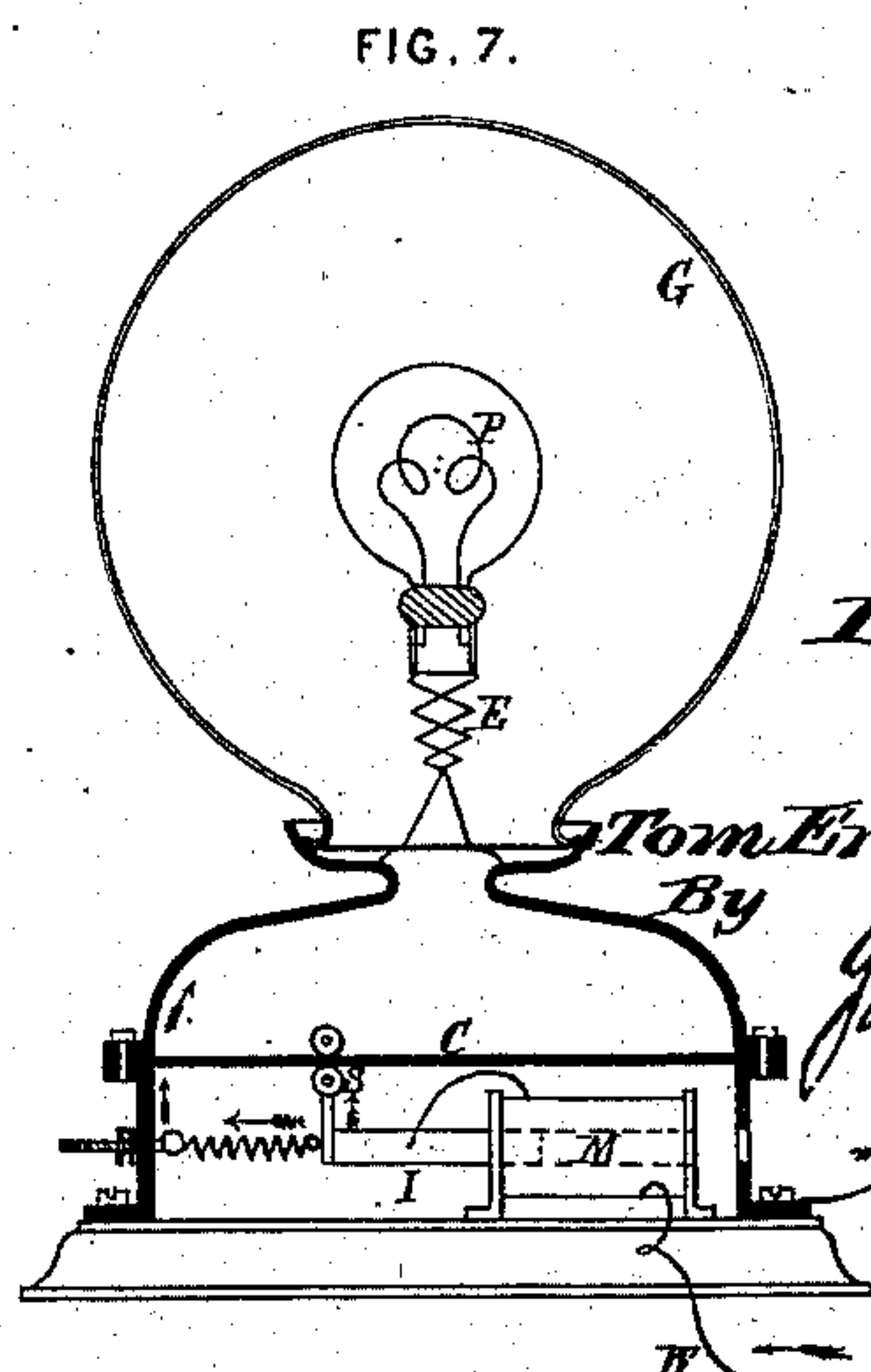
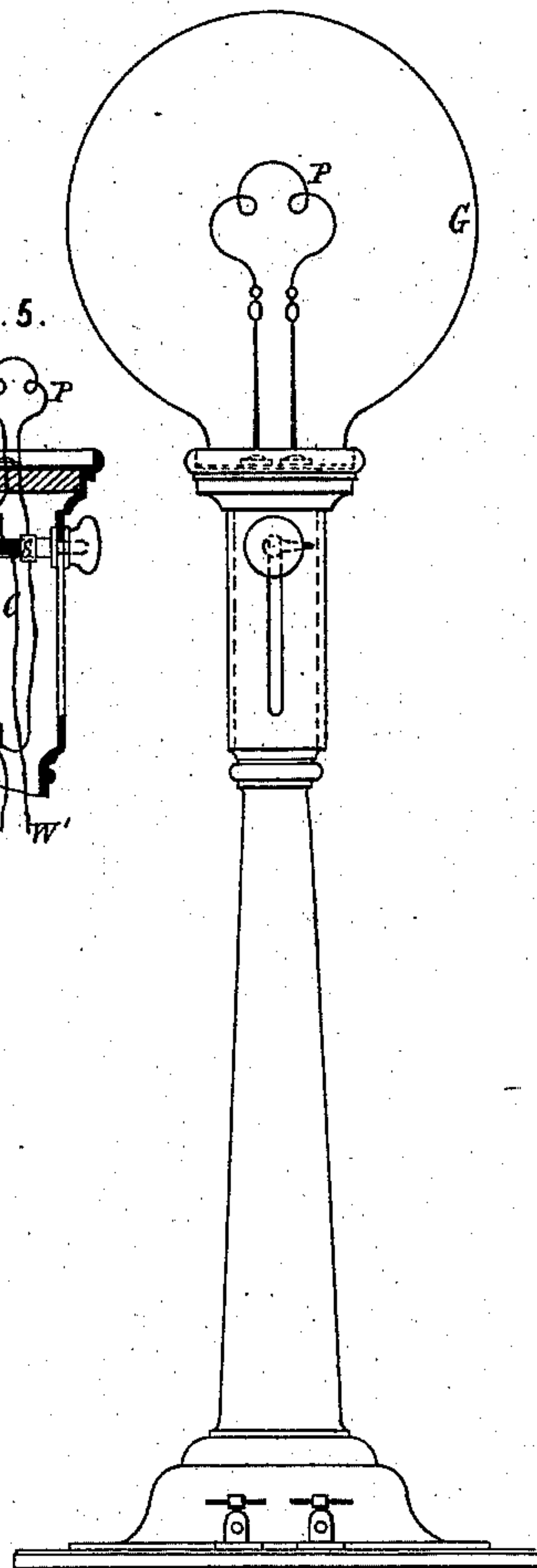
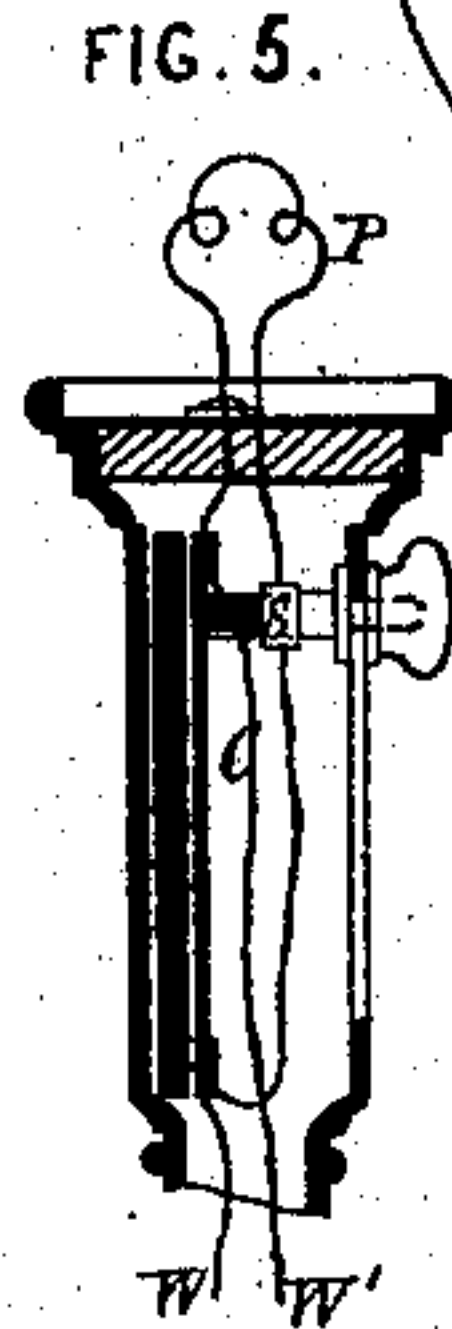
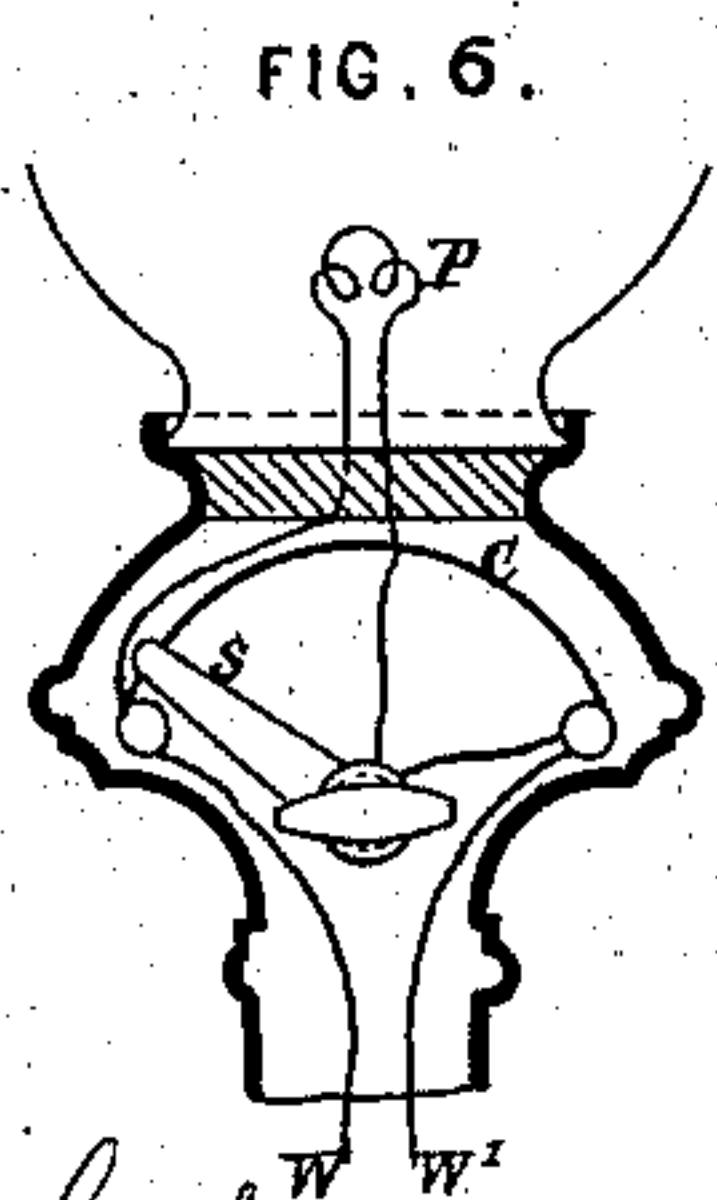
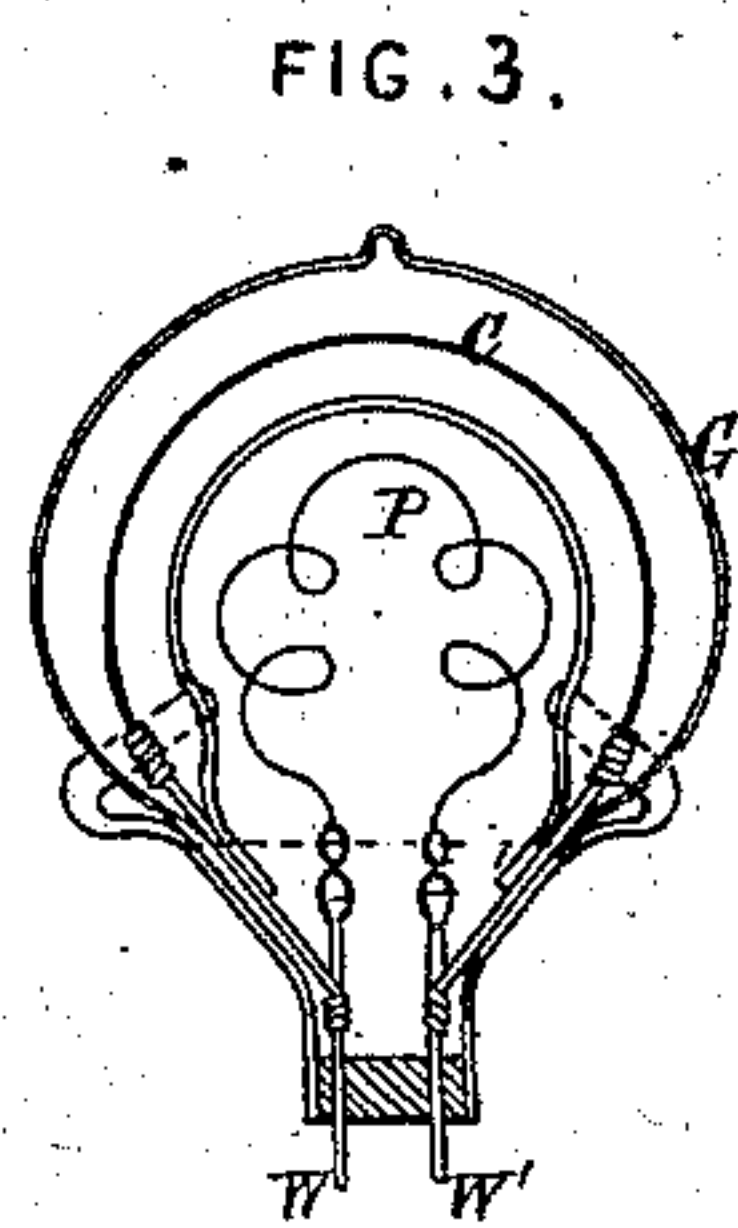
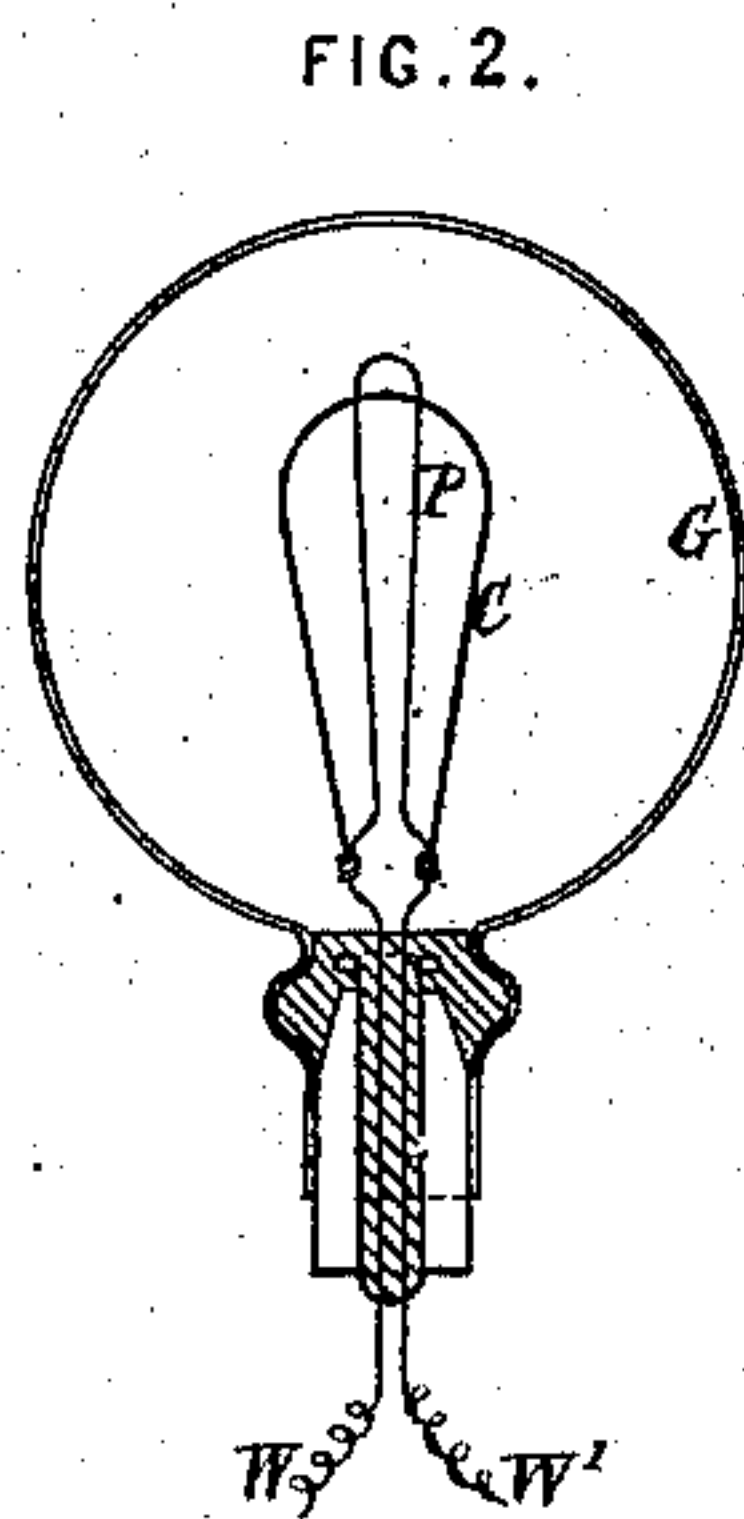
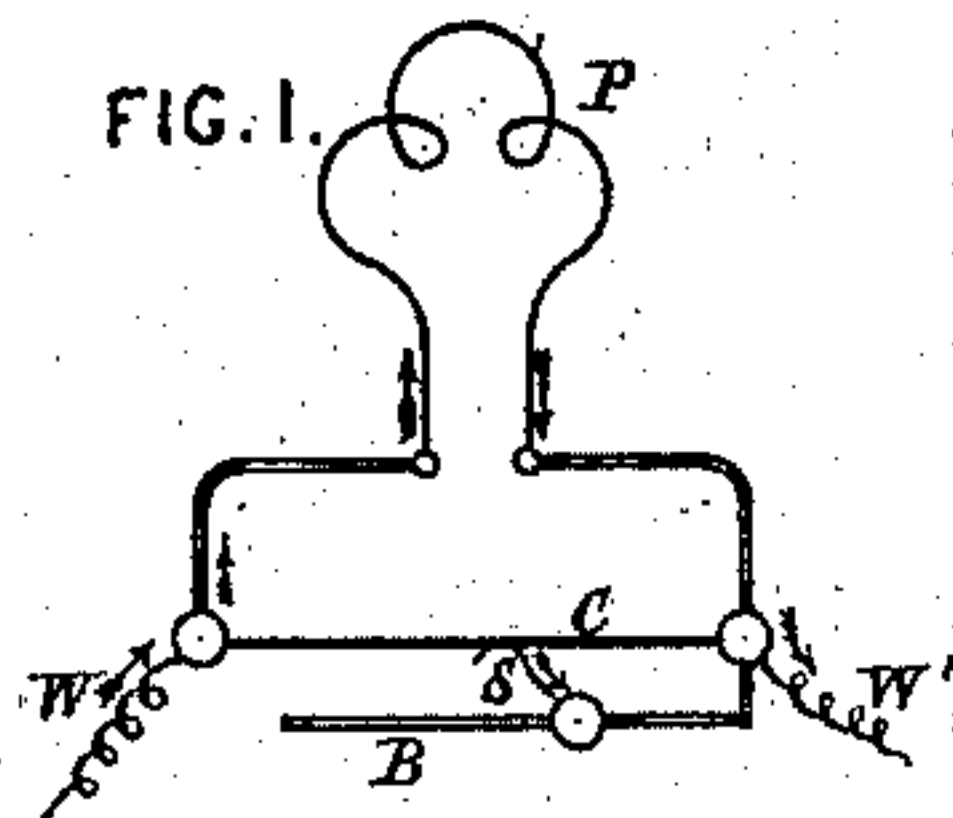


(No Model.)

T. E. GATEHOUSE.  
INCANDESCENT ELECTRIC LAMP.

No. 284,409.

Patented Sept. 4, 1883.



Witnesses,

J. A. Rutherford  
George W. Rea

Inventor,

Tom Ernest Gatehouse

By

James L. Norris  
Atty.



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# UNITED STATES PATENT OFFICE.

TOM ERNEST GATEHOUSE, OF CAMBERWELL, COUNTY OF SURREY, ENGLAND.

## INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 284,409, dated September 4, 1883.

Application filed November 9, 1882. (No model.) Patented in England July 25, 1881, No. 3,240; in France January 24, 1882, No. 147,003; in Belgium January 25, 1882, No. 56,887; in Austria April 8, 1882, No. 4,524; in New South Wales June 28, 1882, No. 7,332; in Italy June 30, 1882, XXVIII-118; in Sweden July 15, 1882; in India August 14, 1882, No. 840; and in Norway September 2, 1882.

*To all whom it may concern:*

Be it known that I, TOM ERNEST GATEHOUSE, a citizen of England, residing at Camberwell, in the county of Surrey, England, have invented an Improvement in Incandescent Electric Lamps, (for which I have obtained patents in Great Britain, No. 3,240, dated July 25, 1881; France, No. 147,003, dated January 24, 1882; Belgium, No. 56,887, dated January 25, 1882; Austria, No. 4,524, dated April 8, 1882; Italy, Vol. XXVIII, No. 118, dated June 30, 1882; Sweden, dated July 15, 1882; Norway, dated September 2, 1882; India, No. 840, dated August 14, 1882; and New South Wales, No. 7,332, dated June 28, 1882,) of which the following is a specification.

In incandescent electric lamps, when a fine platinum or other metallic wire is employed as the illuminant, there is danger of its fusion or destruction by excess of current.

My invention relates to means of guarding against this risk by employing, in combination with the illuminant-wire, a conductor, forming with it a parallel circuit, this conductor being in respect of electrical resistance relatively to heat of a character opposite to the wire. Such a substance is carbon, for, while the resistance of a metallic wire increases with increase of temperature, the resistance of a rod or filament of carbon decreases with increase of temperature. Taking advantage of this property, I divide the electrical circuit of the lamp into two parallel branches, one through the wire and the other through a rod or filament of carbon, and thus, if the current should increase, heating both wire and carbon, a smaller portion of the increased current will pass through the wire on account of its increased resistance, and a larger portion will pass through the carbon by reason of its lessened resistance. The wire is thus, in great measure, guarded against the effects of excessive currents. The carbon may be selected of such resistance as to suit the wire employed, or it may have its resistance adjusted manually or regulated automatically, as I will explain, referring to the accompanying drawings.

Figure 1 is a diagram illustrating generally my invention. Figs. 2 and 3 are sections of

incandescent lamps, with their two parallel circuits invariable. Fig. 4 is an elevation, and Figs. 5 and 6 are part transverse sections, of a lamp, in which the carbon circuit can be varied by a slide worked by hand. Fig. 7 is a section of a lamp in which the carbon circuit is automatically regulated.

In Fig. 1, P is the platinum wire, and C is a rod of carbon, against which presses a spring-rubber, S, projecting from a boss that can be slid along a metal bar, B, so as either to increase or diminish the length of carbon through which part of the current passes, the other part passing through P. W W' are the conducting-wires to and from the lamp. In Fig. 2 the platinum wire P and a carbon filament, C, are both fixed side by side within an exhausted globe, G. In Fig. 3 the platinum wire P is in an inner globe, which may be open at the bottom, and the carbon filament C is inclosed in an exhausted space between the inner globe and the outer globe, G. In Figs. 4 and 5 the platinum wire P is within a globe, and the carbon rod C is fixed within the standard of the lamp, the length of the carbon circuit being varied by an insulated rubber or brush, S, that can be slid up or down the carbon by hand applied to an external button. In Fig. 6 the carbon C has the form of a circular arc, along which a contact brush or spring, S, can be moved by turning a button.

In the self-regulating arrangement shown in Fig. 7, M is a solenoid having its coil in the circuit of the lamp, and attracting, in opposition to a spring, its iron core I, which carries contact-rollers S, embracing a carbon rod, C.

The platinum wire P may be placed, as shown, within an inner globe, which is supported on flexible wire springs E within a larger globe, so that the platinum is saved from shocks when the lamp is moved about.

I am aware that in an incandescing electric lamp a material which is normally a non-conductor has been arranged to become a conductor and form a part of a branch circuit parallel with the incandescing filament when heated by said filament, and I do not claim such a lamp.

Having thus described the nature of my in-



vention, and the best means I know of putting it in practice, I claim—

1. In an incandescing electric lamp, two normally-conducting materials—such, for instance, as platinum and carbon—having such property that the electrical resistance of the one increases and that of the other decreases with the elevation of the temperature, and combined, substantially as set forth, in parallel circuit, whereby any excess of current is received by the carbon conductor, as described.

2. In an incandescing electric lamp, the combination, with an incandescing filament or burner having the property that its electrical resistance increases with elevation of temperature, of a normal conductor arranged in parallel circuit therewith, and having the property that its electrical resistance decreases with elevation of temperature, substantially as described.

3. In an incandescing electric lamp, the combination, with an incandescing filament, of a second conductor in parallel circuit therewith, both conductors being of different conductivity while subject to the same current, whereby any excess of current is received by the con-

ductor having increased conductivity under increase of temperature, and an automatic device controlled by the electric current for increasing and decreasing the resistance of said second conductor, for the purposes set forth

4. In an incandescing electric lamp, the combination, with an incandescing filament having such property that its electric resistance increases with elevation of temperature, and a second conductor arranged in parallel circuit therewith, both conductors being of different conductivity while subject to the same current, whereby any excess of current is received by the conductor having increased conductivity under increase of temperature, and an adjustable device for regulating the normal resistance of said second conductor, for the purpose specified.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of October, A. D. 1882.

TOM ERNEST GATEHOUSE.

Witnesses:

CHAS. R. GATEHOUSE,  
JNO. P. M. MILLARD.