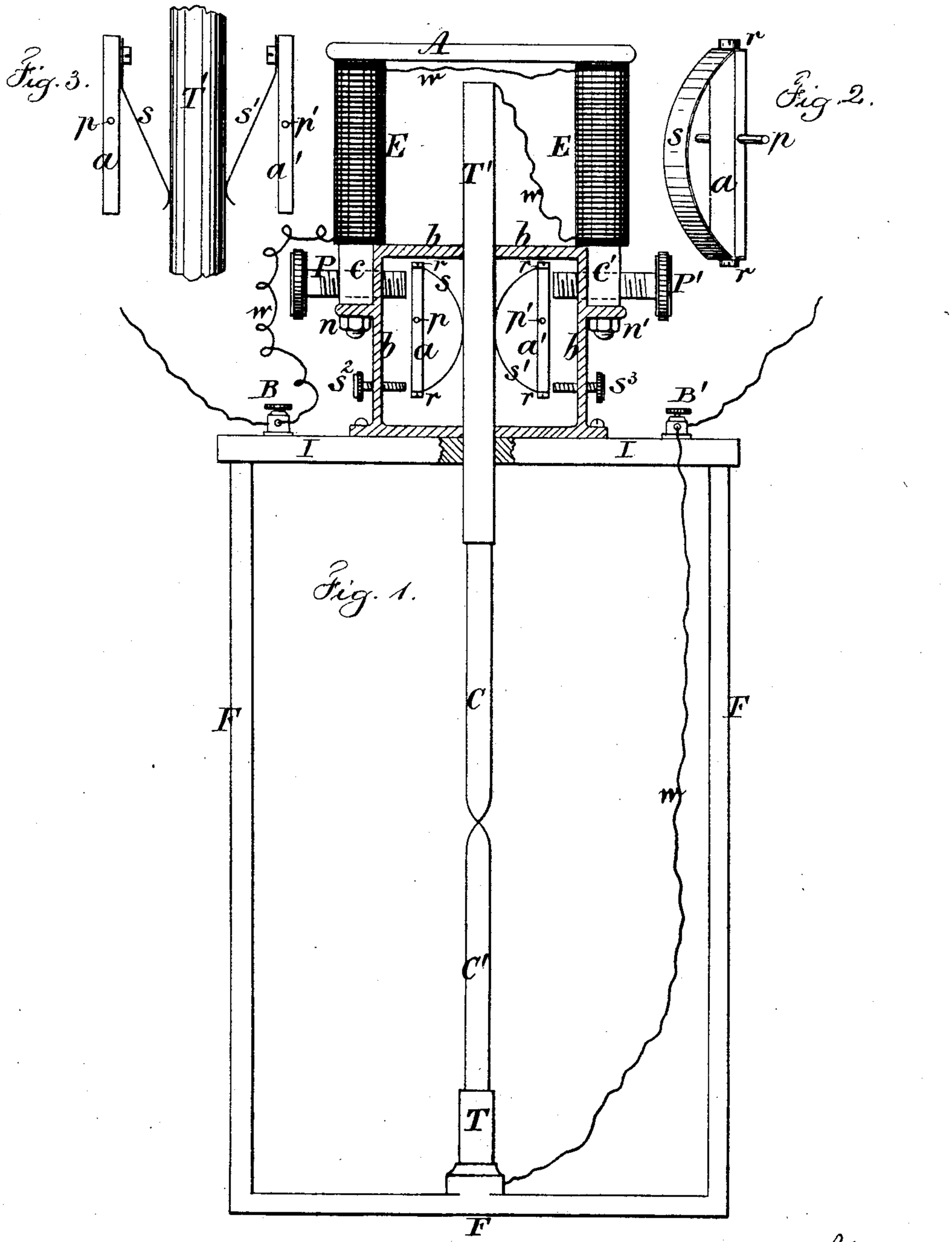
(No Model.)

C. LEVER.

ELECTRIC LAMP.

No. 255,521. Patented Mar. 28, 1882.



Witnesses

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ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 255,521, dated March 28, 1882.

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To all whom it may concern:

Be it known that I, CHARLES LEVER, of Bowdon, in the county of Chester, England, have invented new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention has for its object improved means of regulating the voltaic arc for the production of the electric light.

The improvements to which the invention applies are intended to be used in connection with electric lamps where the light results from the electric current passing between points or pencils of carbon.

These improvements are intended to effect automatically the following operations, viz: first, to separate the carbon points to the required distance for the display of the voltaic arc; second, to allow one of the carbon pencils to be fed forward to compensate for the consumption which takes place when the electric current is passing between the points or pencils of carbon; third, when the current is interrupted to instantaneously bring the carbon points into contact with each other.

I accomplish the first part of my invention by allowing the force of an electro-magnet in circuit with the carbon points to act on armatures which can oscillate on pivots, and provided with springs fixed to the armatures, but arranged eccentrically to the axes on which the armatures are pivoted. These armatures and springs are arranged on both sides of a carbon-holder capable of sliding through suitable bearings, so that when the electro-magnet is excited it will attract the armatures by means of polarized screws, hereinafter described, and consequently the springs attached thereto will impinge on the sides of the movable carbon-holder carrying one of the carbon points, and by their eccentric motion will raise one of the carbon points to the required distance for the display of the voltaic arc.

With regard to the second and last part of this invention the springs and armatures are arranged on either side of the upper or movable carbon-holder, so that when the electro-magnet is not excited the upper-carbon holder, with its carbon pencil, will slide freely by the force of gravitation between the springs of the armatures, and consequently the upper carbon pencil will rest on the lower carbon, thus completing the electrical connection; but as, when the current is passing, the resistance of the voltaic arc will increase as the carbons are consumed, the force which the electro-magnet will exert on the armatures will decrease until the upper-carbon holder will by its own weight overcome the force of the electro-magnet, tending to keep it raised, and so by the force of gravity will fall, thus automatically lessening the distance between the carbon points.

The polarized screws referred to in the first part of my invention consist of ordinary iron screws of a suitable diameter and length, which pass through the poles of the electro-magnet, and are consequently polarized or rendered magnetic when the electro-magnet is excited, and are provided with milled heads, preferably of brass or other diamagnetic material. The part which these polarized screws is intended to play is, first, to attract, in virtue of their induced magnetism, the armatures, and consequently to raise the upper carbon pencil; and, secondly, to act as limits or stops for regulating the distance between the carbon points for the production of the voltaic arc.

In order that my invention may be fully understood and carried into effect, I will proceed to describe the annexed drawings.

Figure 1 is a front view of the lamp. E E is an electro-magnet, of which A is the armature and *c c'* the poles, the section of which is preferably square, in order that the electro-magnet may be fixed on the brass box *b b b*, and secured by means of nuts *n n'* to flanges cast on each side of the box. I I is a suitable piece of insulating material—such as wood or vulcanite—upon which the brass box *b b b*, carrying the electro-magnet and the regulators, is fixed, and onto which are also fixed the binding-screws B B' and the conducting-frame F F F, carrying the lower-carbon holder T and carbon rod C'. The brass box *b b b* has a hole drilled in the top and bottom, through which slides freely the upper-carbon holder T', carrying the carbon rod C, and which can be prolonged through the armature A, if desired. The regulators are constructed of two suitable pieces of iron, *p p'*, through which are drilled eccentrically two holes to admit of two pivots, respectively, which are secured to the brass

box *b b b*, so that these pieces of iron or armatures will move freely on the pivots. Two springs, *s s'*, of a suitable tension, are arranged semicircularly on the armatures, but eccentrically to the axis on which each armature is pivoted, and these springs can be fixed by means of small screws *r r r r*, or in any other convenient manner.

Fig. 2 is a perspective view, showing one of the regulators complete.

Referring again to Fig. 1, the two regulators are so fixed by their pivots that when in their normal position—that is, when the polarized screws P P', passing through the poles *c c'* of the electro-magnet E E, are not magnetized—the upper-carbon holder T', carrying the carbon rod C, will slide freely by the force of gravity onto the lower carbon rod, C'. The wires *w w w w* show the electrical connections.

The action of this lamp is as follows: The current, entering at the binding-screw B, passes from thence through the coils of the electro-magnets E E, then through the upper-carbon holder T' and the carbon rod C, through the lower carbon rod, C', and holder T to the binding-screw B', or vice versa. When, however, the current flows through the coils of the electro-magnet E E, the screws P P' are polarized or magnetized, and will consequently attract the armatures *a a'*, and the springs *s s'*, being arranged eccentrically to the axes on which the armatures *a a'* are pivoted, will impinge on the sides of the upper-carbon holder T' and will therefore by this eccentric motion raise the carbon rod C and so display the voltaic arc, the length of which is adjusted by turning the polarized screws P P' in one direction or the other, as may be required; but as the resistance of the arc will increase as the carbons are consumed, the current flowing through the coils of the electro-magnet E E will decrease. Consequently the electro-magnet and polarized screws P P' will gradually lose their magnetism until a point is reached when the force which gravitation exerts on the upper-carbon holder T' will overcome the force exerted by the polarized screws P P' on the armatures *a a'*, tending to keep the upper carbon rod, C, raised, and it will therefore be lowered; but immediately this takes place the electro-magnet E E and polarized screws P P' will regain their magnetic power, because the resistance of the arc will have diminished, and therefore the carbon rod C will again be raised to the distance regulated by the polarized screws P P', and these two actions will take place simultaneously until the carbons are consumed. Should the current be interrupted from any cause whatsoever, the upper carbon, C, will instantly be brought into contact with the lower carbon, C'.

The screws s^2 s^3, preferably of non-magnetic material, are used for the purpose of preventing the ends of the armatures *a a'*, from falling out of the range of attraction of the polarized screws P P' when the upper-carbon holder T' is falling, and should be so adjusted that the upper-carbon holder T' and carbon rod C will just slide freely by the force of gravity between the springs *s s'* of the armatures *a a'*.

Another modification of regulator, on the same principle as that already described, is shown in Fig. 3, where it will be seen the springs *s s'* are only fixed at one end of each armature. In consequence of the peculiarity of this motion, and the novel manner of applying the force of the electro-magnet to the armatures by means of polarized screws and the sensitiveness of this regulator, it is believed that the regulation of the voltaic arc will be rendered more effectual by this invention than by any other at present in use.

I claim as my invention—

1. In an electric-arc lamp, the combination of the eccentrically-pivoted armatures *a a'*, the springs *s s'*, and the electro-magnet E E, and circuit-connections to the carbon points, substantially as and for the purposes set forth.

2. In an electric-arc lamp, the electro-magnet in circuit with the carbons and the polarized adjustable stop-screws P P', inserted through the poles, in combination with armatures and with means for moving the carbon rod to adjust and regulate the distance between the carbon points, substantially as set forth.

3. In an electric-arc lamp, the electro-magnet E E, the eccentrically-pivoted armatures *a a'*, the springs *s s'*, and the polarized screws P P', substantially as and for the purposes specified.

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Witnesses:
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