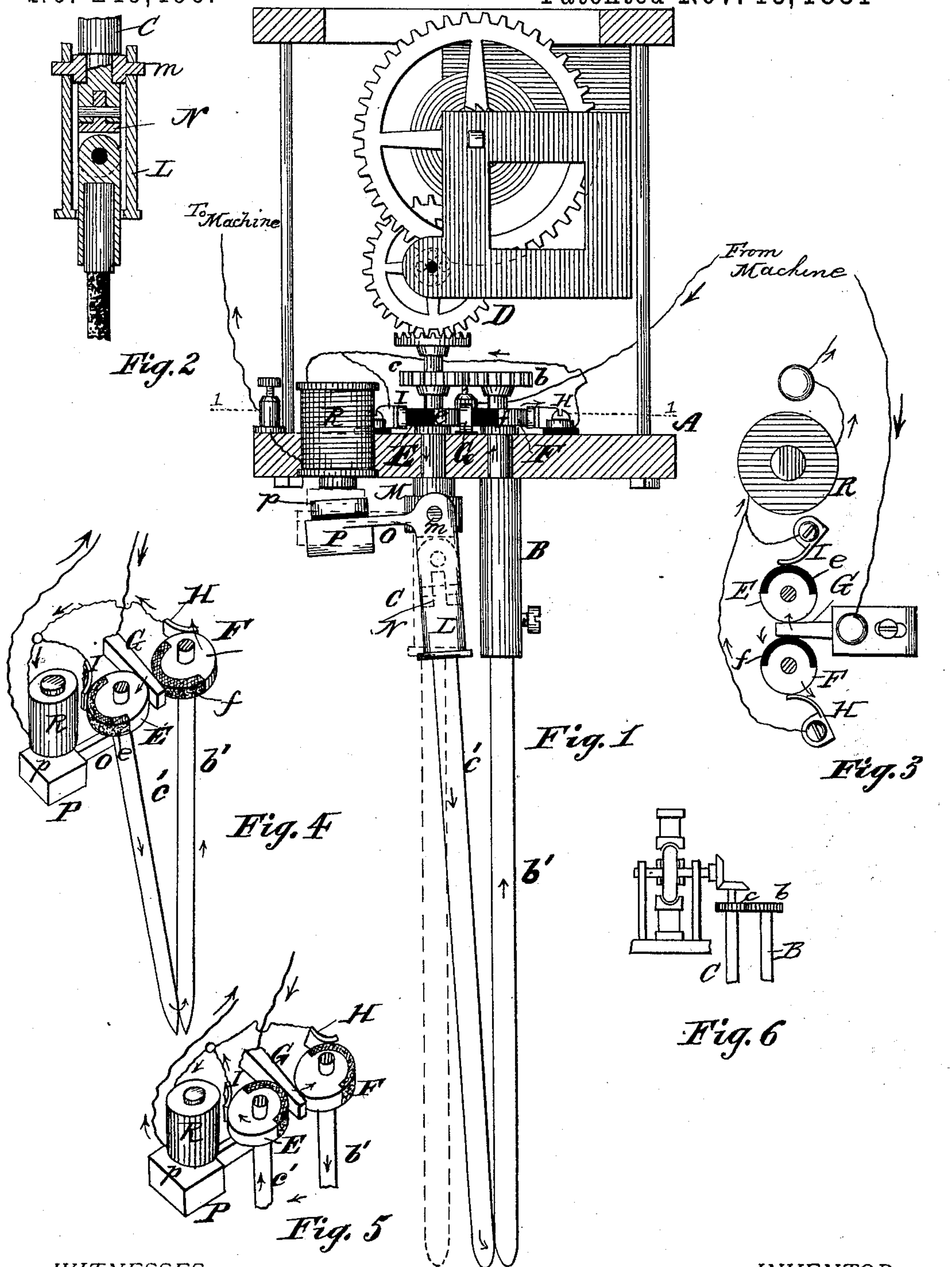


(No Model.)

C. E. BALL.
ELECTRIC LIGHT.

No. 249,496.

Patented Nov. 15, 1881



WITNESSES:

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ELECTRIC LIGHT.

SPECIFICATION forming part of Letters Patent No. 249,493, dated November 15, 1881.

Application filed April 20, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BALL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Lights; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a vertical section of the lamp constructed in accordance with my invention. Fig. 2 is a detail section. Fig. 3 is a detail plan on line 1 1, Fig. 1. Figs. 4 and 5 are perspective diagrams, showing the paths of the current through the lamp; and Fig. 6 is an elevation showing an electro-motor for rotating the electrodes.

My invention has for its object to provide means for remedying the unequal wearing away on adjacent sides of carbon electrodes used in electric lights, lamps, or candles.

In electric lights or candles—such, for example, as the Jablochkoff candle—where two parallel carbon electrodes are employed, or two carbons standing side by side in the same horizontal plane, it has been found that, owing to the intense heat of the arc formed between them, such electrodes wear away or chip or scale off on their adjacent sides, and do not therefore burn down uniformly. To remedy this evil it has heretofore been the practice in some cases to use electrodes of such slight diameter that no extensive chipping or breaking can occur, the heat of the arc being substantially uniform for the full diameter of the electrodes; but this plan is open to the further objection that such electrodes, being of but slight body or mass, quickly become consumed, and require to be replaced or replenished at short intervals.

To remedy the defect of breaking away of the electrodes, and at the same time to preserve the maximum mass of the same, my invention contemplates providing means for rotating the electrodes on their central longitudinal axes, whereby they will be constantly changing their adjacent sides, so as to distribute the heat of the arc uniformly over their entire circumference, causing them to burn down evenly.

My invention consists in the combination, with parallel carbon holders provided with mechanism for rotating them independently on their central longitudinal axes, of means whereby a current of one direction or polarity will be caused to pass to said electrodes alternately, as hereinafter set forth, so that both carbons will wear away alike.

My invention still further consists in the combination, with the electrodes provided with mechanism for rotating the same independently on their central longitudinal axes, of means for permitting said carbons to touch, and causing them to be separated for the purpose of establishing the arc, such means operating without interference with the rotation of said electrodes, or while such rotation is proceeding.

Referring to the accompanying drawings, A represents a bar, duly supported in any suitable manner and affording bearings for two carbon-holders, B and C, designed to rotate each on its own central longitudinal axis. To effect such rotation said holders are provided with pinions *b c*, which mesh with each other, and are run by means of a train of gearing or clock-work, D. Said holders have collars E F, which rotate with them, the holders and their collars being composed of metal or other good conductor. Each collar has an insulating-piece, *ef*, or section inserted in its periphery and forming one-half of its circumference.

G represents a metallic tongue, which is in the circuit to the holders and bears constantly against both the collars, being in contact with the conducting-surface of one while bearing against the insulated part or section of the other. Hence at every revolution of said holders the current passes for half a revolution to one carbon and for the remaining half-revolution to the other carbon. Brushes H and I in the circuit bear against the collars, and are arranged so that the outgoing current will pass through them alternately, the current going out by way of the brush which at the time is in contact with the conducting-surface of the collar, the tongue G being at the same time in contact with the conducting-surface of the other collar. The course of the currents is plainly indicated by the arrows in the plan Fig. 3.

To permit the electrodes shown at *b'* and *c'* to come together and cause them to be separated,

rated to produce the arc, the following arrangement is provided: One of the holders, C, is provided with a sleeve, L, connected to the holder by a swiveled ring, M, having trunnions *m*, which have their bearings in said sleeve, thus permitting the holder to rotate within the sleeve and ring, while said sleeve can be vibrated or rocked on the trunnions of the ring without interfering with the rotation of said holder. The holder is also formed with a universal joint, N, located inside of the sleeve L, permitting said holder to continue its rotation when deflected at said joint out of a straight line by contact or pressure of the sleeve when the latter is vibrated or rocked on its trunnions or bearings. Said sleeve is formed or provided with a laterally-projecting arm, O, which carries at its outer end a weight, P. Said arm also forms or carries an armature, *p*, whose magnet R is in the circuit with the carbons or electrodes, as shown. When no current passes the weight draws the armature away from the magnet, causing the points of the carbons to meet. As soon as the current passes the armature is attracted, drawing the carbon points apart and establishing the arc. If desired, this arrangement of allowing the carbons to separate and causing them to be moved apart may be dispensed with and a paste or destructible conductor be used to connect the electrodes and be burned away by the arc, as in the Jablochkoff candle. So, too, electro-magnetic devices may be substituted for the clock-work or mechanical gearing for effecting the rotation. A form of devices for this purpose is shown in Fig. 6.

What I claim as my invention is as follows:

1. The combination of two carbons or elec-

trodes arranged side by side, and designed and adapted to be independently rotated on their longitudinal axes, said electrodes being in the same electric circuit, with means, substantially as described, for causing an electrical current passing over said circuit to pass into said electrodes alternately, substantially as shown and described.

2. The combination, with two carbon or electrode holders designed and adapted to be rotated independently, each on its own central longitudinal axis, of two collars on said holders with insulated sections, a tongue or contact point between said collars for conducting the current into said holders alternately, and a brush or commutator for taking up the outgoing current, substantially as shown and described.

3. The combination of two carbon or electrode holders, one of which is hinged or jointed, and both of which are designed and adapted to be rotated, each on its own central axis of rotation, a weight for bringing said carbons together, and an electro-magnet in circuit with said carbons or electrodes, and armature for causing said electrodes to separate, substantially as shown and described.

4. The combination, with a carbon or electrode holder having joint N, of sleeve L and swiveled ring, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of April, 1881.

CHAS. E. BALL.

Witnesses:

JOHN RODGERS,

CHAS. A. HARMSTAD.