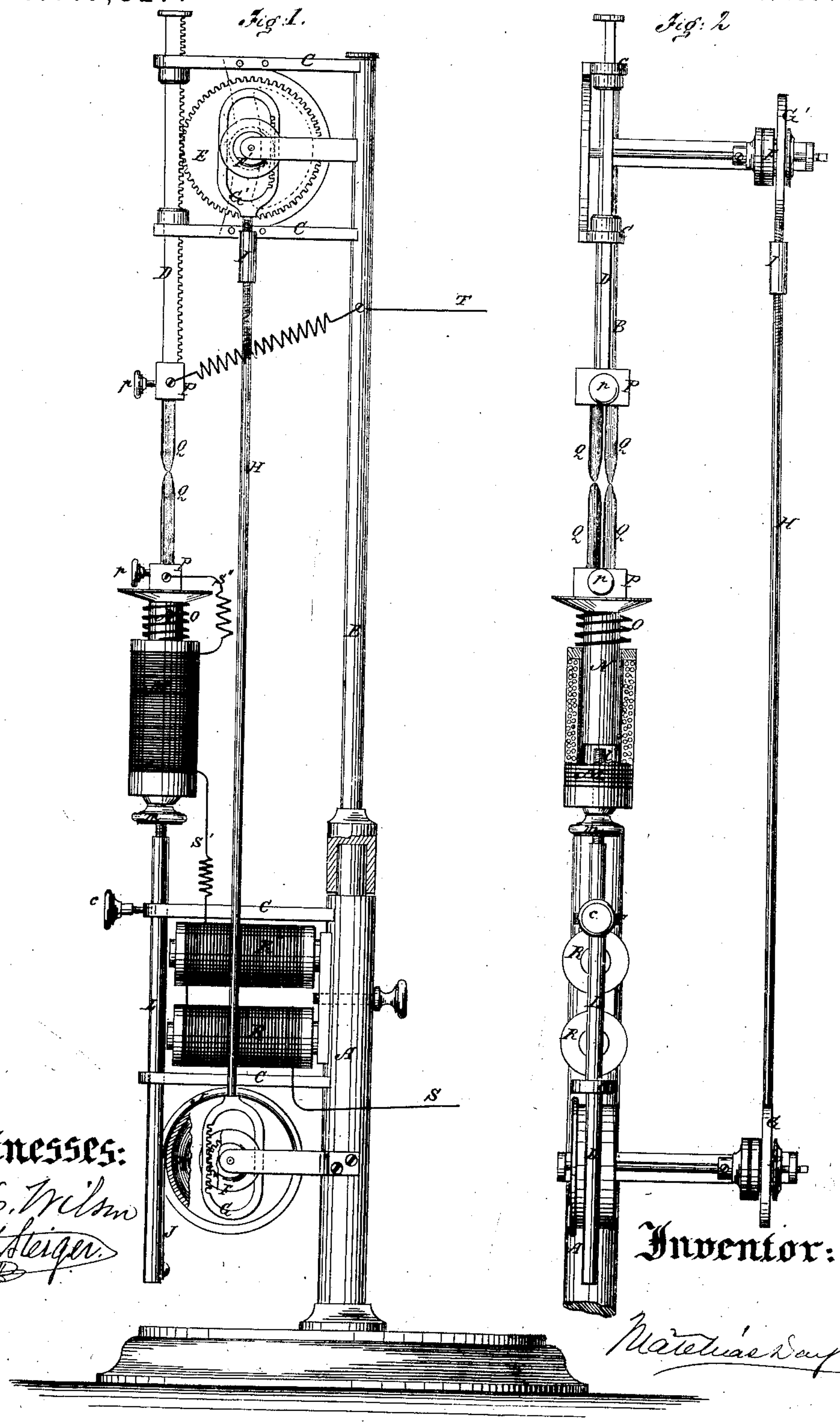
2 Sheets--Sheet 1.

M. DAY, Jr.

Electric-Lights.

No. 147,827. Patented Feb. 24, 1874.



Witnesses:

E. M. Wilson

Wm. T. Steiger

Inventor:

Mathias Day Jr.

2 Sheets--Sheet 2.

M. DAY, Jr.

Electric-Lights.

No. 147,827. Patented Feb. 24, 1874.

Fig: 3.

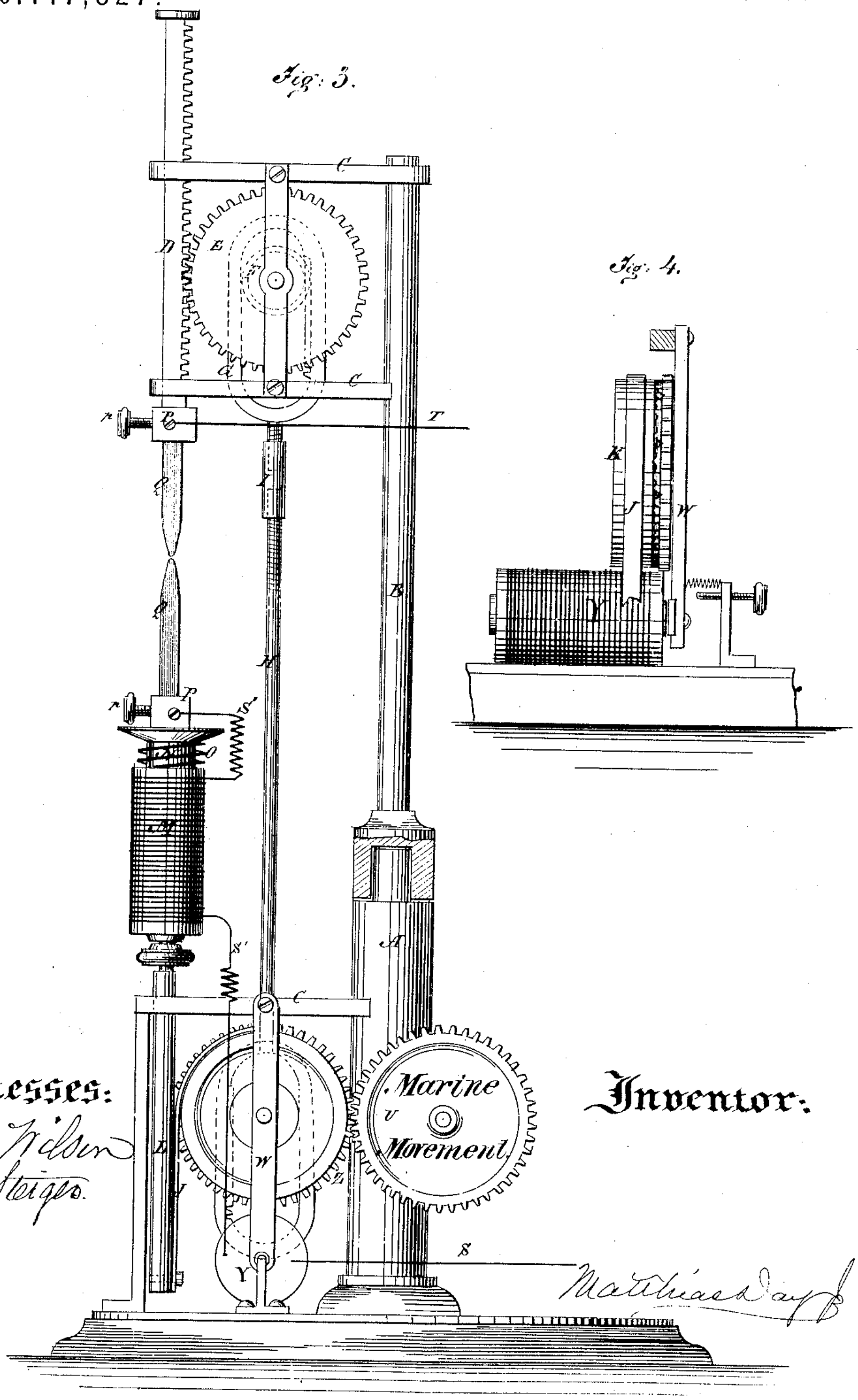


Fig: 4.

Witnesses:

E. K. Wilson
Wm. J. Steiger

Inventor:

Matthias Day Jr.

UNITED STATES PATENT OFFICE

MATTHIAS DAY, JR., OF MANSFIELD, OHIO.

IMPROVEMENT IN ELECTRIC LIGHTS.

Specification forming part of Letters Patent No. 147,827, dated February 24, 1874; application filed March 27, 1873.

To all whom it may concern:

Be it known that I, MATTHIAS DAY, Jr., of Mansfield, county of Richland and State of Ohio, have invented certain Improvements in Electric Lights, of which the following is a specification:

In the use of electric burners, the following difficulties are found: First, causing the carbons or points to approach automatically with a speed commensurate to waste by the current. A greater or less speed breaks the current and extinguishes the light. Second, the waste of the point connected with the carbon pole of the battery is greater than that of the other, and, from various causes, is irregularly so. Hence the carbons must approach at unequal, and at consequently varying, speed in order that the point of light may always be stationary in the focus of the lens or mirror. Third, owing to the rapidity of the waste, electric lights have been of short duration, requiring a constant attendant to replace the carbons, during which time the light is of course extinguished.

The object of my invention is to overcome these difficulties.

In the accompanying drawings, Figures I and II, the standard, which may be either vertical or horizontal, is in two parts—the one, A, of wood, and the other, B, of metal. For many purposes it is just as well to make it all of wood. C C C C are metallic arms for supporting the guides L and D—L being made of soft iron, and D, preferably, of brass. Between the lower arms C C is an electro-magnet, R, so adjusted that the soft-iron guide L becomes its armature. Below the magnet is a coiled spring, K, to the drum of which I attach one end of a cord or ribbon, J, preferably of steel, its other end being fastened to the lower end of the guide L. The spring K, as will appear, gives motion to all parts of the burner. The same results may be accomplished by a weight. Upon the shaft of the spring is the insulated pinion and jam-nut F. Between the upper arms C C is the wheel E, gearing into the rack upon the inner edge of the guide D, and upon the shaft of the wheel E is the insulated pinion and jam-nut F′. H is a connecting-rod, with slots at each end, geared, respectively, to opposite sides of the pinions F and F′. Upon the upper end of the guide L is a helix-magnet, M, with its core N, spring O, and carbon-socket P, in which is a slide-plate, to be held firmly against the carbons or points by the set-screw *p*. A similar socket is attached to the opposite guide D. The set-screw *c* holds the guides in any position when the burner is not in use. The carbons are respectively connected with the battery by the wires S and T. The sockets P P are made to hold two or more points, preferably arranged in parallel, not touching each other, and those in the upper socket opposite those in the lower. The connecting-rod H has a screw-joint at I, to admit of changing the upper end. By having slots of different sizes, with pinions F′ to correspond, the relative speed of the carbons may be materially changed.

The operation of the burner is as follows: The carbon points being placed in the sockets, the set-screw *c* is loosened, and the spring K lifts the guide L, and by means of the connecting-rod H and its reverse gearing, with the pinions F and F′, depresses the guide D. By this simultaneous motion of the guides the carbon points meet in the focus of the lens or mirror. If, now, the connections are made with the battery, the battery R will gripe the soft-iron guide L, and, by the connections, also the guide D, and hold them firmly in position. The helix-magnet M, acting at the same instant, draws down the lower carbons, and the light is shown. The current selects the route offering the least resistance, and therefore follows that pair of carbons in closest impact. When the points are separated it continues to follow the same pair until the distance between them, resulting from waste, is too great, when the current weakens or breaks. The magnets R and M let go the springs K and O, promptly bring the points together again, and the circuit is again complete. The current chooses another pair of carbons, the magnets come into play, and the light is reestablished. The same operation is constantly repeated, and thus the current passing through the carbons alternately wears them away equally, and the duration of the light is only limited by the capacity of the sockets for holding carbons. The changes from carbon to carbon are made so quickly that the light is reliably continuous.

To correct the excess of waste in the points connected with the positive pole of the battery, I either change the size of the pinion F', or use an automatic rheotrope between the battery and burner, by which the current may be reversed at brief intervals, and thus the point of light remains in the focus.

Instead of by the rod H, the upper guide E may be connected with the spring K by a metallic cord, the upper end being attached to a variable drum or pulley facing the wheel E.

In Figs. III and IV, I show another form of the burner. The office of the electro-magnet R is to restrain the spring K. The spring may be retarded or restrained by a clock-movement. An ordinary marine-clock movement is attached to A, and has upon its face a wheel gearing with the cog-wheel Z, upon the back of which is a plate of rubber, or its equivalent. To it is attached the lever W, one end of which is pivoted to the arm C, and the other fastened to the core of the helix-magnet Y. When the current is passing through the burner, the magnet Y, acting upon the lever W, presses the wheel Z firmly against the drum of the spring K, and, by its frictional or rubber gearing, prevents the revolution of the drum, except as released by the movement of the clock.

I am aware that clock-work has been used in connection with electric burners heretofore; but I believe it has always been as a motive instead of restraining power. They have moved intermittently when released from the control of the magnets, and the light in consequence was fitful and of varying power. By the plan I describe there is a constant motion of the carbons and a light of uniform brilliancy.

Should the movement of the clock be too slow, and the distance between the carbons become too great, the magnet Y lets go, and the spring K, released from the control of the clock, brings the points promptly together, and the light is re-established. For the carbon points may be substituted carbon disks, to be revolved by connection with the spring K, or with the clock, the disks and the points being controlled equally well by the burner.

Having thus described the nature of my invention, I claim—

1. In an electric light, the combination, with each electrode-holder and one electrical circuit, of two or more electrodes, substantially as and for the purposes set forth.

2. The combination, with the magnet R, of the carbon-supporting rod L, arranged to act as the armature of the magnet, substantially as described, and for the purposes set forth.

3. The combination, with the armature or guide-rod, of the electro-magnet M, arranged upon the top thereof, in the manner and for the purposes set forth.

4. The combination, with the motive power of an electric light and the carbon electrodes thereof, of a connecting-rod and gearings, imparting simultaneous motion to both electrodes, substantially as herein set forth.

5. The combination, with the motive power of an electric light, of a constant and regularly acting clock-movement, substantially as and for the purposes set forth.

MATTHIAS DAY, JR.

Witnesses:
JAMES S. GRINNELL,
W. E. CHAFFEE.