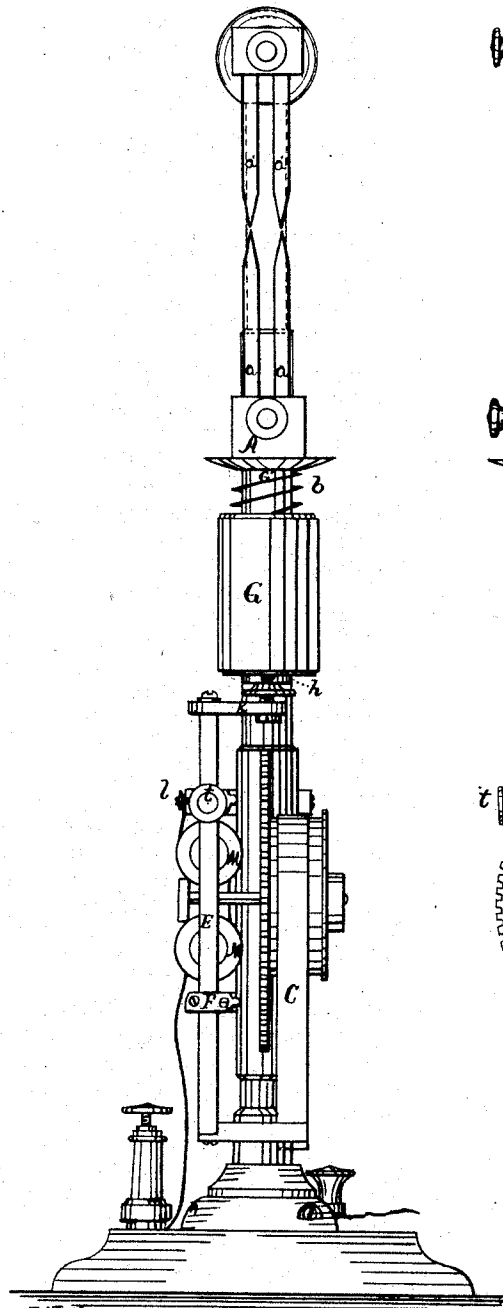


M. DAY, Jr.
Electric Lights.

No. 156,015.

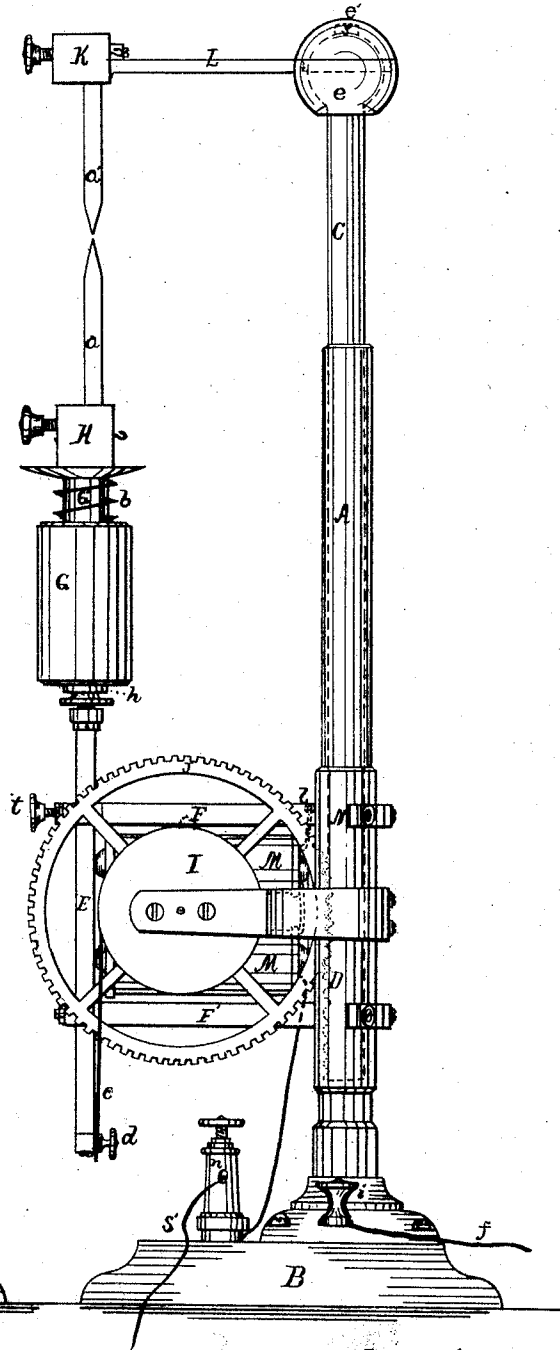
Patented Oct. 20, 1874.

Fig 1.



Witnesses
B. J. Clark
D. S. Mackenzie

Fig 2.



Inventor
Matthias Day Jr.
By A. P. Hewitt his atty.

UNITED STATES PATENT OFFICE

MATTHIAS DAY, JR., OF MANSFIELD, OHIO, ASSIGNOR TO SEELY & STEVENS,
OF NEW YORK, N. Y.

IMPROVEMENT IN ELECTRIC LIGHTS.

Specification forming part of Letters Patent No. **156,015**, dated October 20, 1874; application filed
May 28, 1874.

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 Improvements in Apparatus for Producing Electric Lights, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is an end or edge elevation of my improved apparatus. Fig. 2 is a side elevation of the same.

Upon the 24th day of February, 1874, Letters Patent of the United States, No. 147,827, were issued to me for improvement in electric lights. My present invention relates to certain improvements upon the apparatus described and claimed in the Letters Patent referred to; and consists, first, in simplifying the mechanism by which the carbons or points are caused to approach one another automatically; second, dispensing with a portion of the circuit-wire there used, and utilizing the metallic parts of the apparatus itself for the transmission of the battery-current; and, third, providing for the adjustment of the upper carbon-points by means of a universal-joint connection between the main standard and the arm or bracket upon which the carbons are mounted.

A is a hollow metal pillar fixed in a suitable wooden base, B. C is a sliding metal standard fitted into the pillar A, upon the side of which standard, at the lower end, are cogs, constituting it a rack, indicated by the dotted lines D. E is a bar fitted to slide in guideways in the ends of the brackets or arms FF' attached to the pillar A. Upon the top of this bar is mounted a helix-magnet, G, upon the upper end of the core of which is secured a socket, H, for holding the carbon *a* with the spring *b*. I is a revolving drum in which is coiled a spring by which the drum is rotated. The tendency of this spring is to revolve the drum, and thereby revolve the gear-wheel J; at the same time to carry upward the bar E attached to the drum by the cord or rubber *c*. The gear-wheel J engages with the rack D, and acts to raise and lower the standard C. K is the socket for the upper carbon-points held by

the arm L, the opposite end of which has a universal-joint (ball-and-socket) connection with the upper end of the standard C, the ball being on the end of said standard, and the socket formed in two sections, the lower one, *e*, being of one piece with the arm L, and the upper section, *e'*, being screwed to the lower.

For the purpose of forming conveniently a tight joint, a small bit of cork or rubber, *s*, may be let into the inner surface of the upper section, which, when the sections are screwed together, shall press upon the ball and cause friction. N is a rubber tube upon the pillar A, which serves to insulate the said pillar, standard C, arm L, and the carbon-points *a'* *a'* from the other parts. M M are the coils of an electro-magnet, and the bar E, being made of soft iron, forms its armature. The course of the electric current through this apparatus, and over the carbon-points, is as follows: Through the wire *f* to the binding-screw *i* fixed in the base of the metal pillar A; thence through the said pillar, the standard C, arm L, socket K, to the upper carbon-points *a'* *a'*; thence across to the lower carbon-points *a* *a*, and back to the other battery-wire, *s'*, through the socket H, wire-spring *b*, the coil of the magnet G, the wire of which connects with the washer *h*, which is insulated from the core of the magnet, but connected with the arm *k*, and thus with the bar E, the current passing on through this bar and arm F, through the coil of the spools M M, one end of the coil being attached to the said arm at *i*, and the other running to the binding-screw *n*; thence to the battery over the wire *s'*. The wire of the spring *b* is preferably flattened, as shown, in order that the wire may be of sufficient size to conduct the current without objectionable resistance, and at the same time be sufficiently delicate as a spring to yield to the force of the helix-magnet G.

The object of the mechanism now described is to cause an automatic movement in the carbons, whereby they approach each other, as they are consumed, by the action of the current, so that they shall be constantly at a fixed distance apart, and the point of light shall al-

ways be stationary in the focus of the lens or mirror.

The operation is as follows: The set-screw *t* being loosened, the drum *I* will act to lift the bar *E*, and with it the lower carbon-points *aa*. At the same time the gear *J*, being revolved from left to right, will carry down the standard *C*, and with it the upper carbon-points *a' a'*, the proportions of the several parts being such that the movements of the two sets of carbon-points are commensurate to their waste, respectively. Now, the battery-current being turned on, it is evident that as soon as the points are brought into contact, thus permitting the current to pass from one to the other, the coils *M M*, acting as a magnet, will attract the bar *E* to their cores and arrest the movement; then whenever the transmission of the current is so far lessened by the consumption of the carbon-points, and consequent widening of the space between them, that the force of the drum-spring *I* overbalances the force of the magnet *M M*, the points will again move toward each other until the current again passes sufficient to increase the force of the said magnet, so as to hold the bar *E* against the stress of the spring of the drum *I*, and thus, practically, a uniform distance between the points, and consequently a steady light, is maintained.

The office and operation of the helix-magnet *G* and its core *G'* are fully described in my former patent, hereinbefore mentioned, to which reference is made.

It is important that the carbon-points should have a convenient lateral adjustability, in order that they may be kept in exact apposition.

To this end I have provided a universal-joint connection between the arm *L* and the standard *C*, by which means the points *a' a'* are adjustable laterally in all directions.

In place of using a spring in the drum *I* as a motor to revolve the gear *J*, and raise the bar *E*, a weight may be employed with a cord wound upon the drum *I*; or, when the apparatus is used in a vertical position, the weight of the standard *C* with its attached parts may itself be used as the motor, in place of a spring or weight, as above described.

I claim as my invention—

1. In an apparatus for producing electric light, the combination, with the motor *I*, and the carbon-electrodes *a a'*, of sliding bar *E*, the magnet *M M*, the gear *J*, the standard *C*, as and for the purpose specified.

2. The combination, in an electric-light apparatus, of the circuit-wires, and the pillar and standard *A C*, the arm *L*, the spring *b*, the bar *E*, and arm *F*, whereby the metallic parts of the apparatus itself are employed in place of line-wires for the transmission of the battery-current over the carbon-points, as specified.

3. The combination, in an electric-light apparatus, of the carbon-points, arranged point to point, and made relatively adjustable by means of a universal joint, as and for the purpose specified.

Witness my hand this 23d day of May, 1874.

M. DAY, JR.

Witnesses:

I. P. FITCH,

B. S. CLARK.