H. M. COLLIER & H. N. BAKER.

ELECTRIC LAMP.

No. 20,255. Patented May 18, 1858.

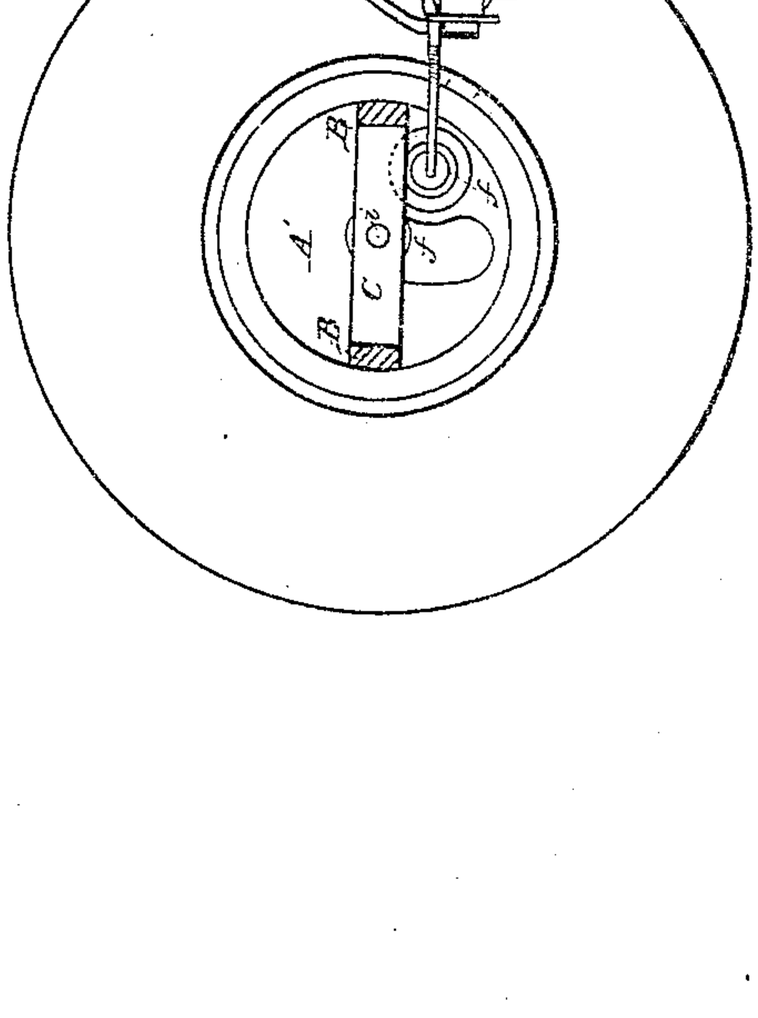

Fig. 2.

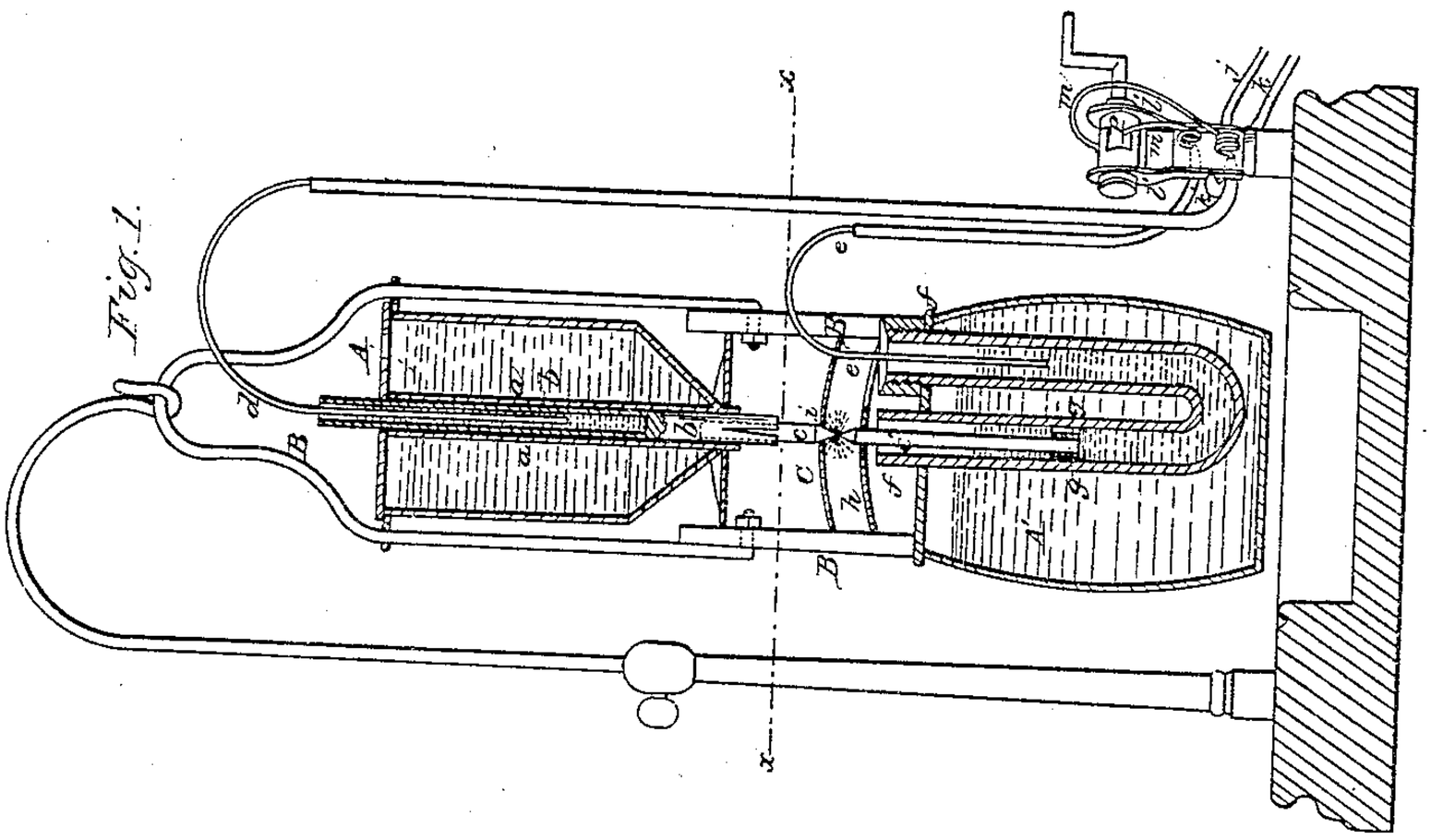

Fig. 1.

UNITED STATES PATENT OFFICE.

H. M. COLLIER, OF BINGHAMTON, AND H. N. BAKER, OF NEW YORK, N. Y.

IMPROVED ELECTRIC LAMP.

Specification forming part of Letters Patent No. **20,255**, dated May 18, 1858.

To all whom it may concern:

Be it known that we, HENRY M. COLLIER, of Binghamton, in the county of Broome and State of New York, and HENRY N. BAKER, of the city, county, and State of New York, have invented certain new and useful Improvements in Electric Lamps; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical section of a lamp in which our improvements are illustrated. Fig. 2 is a horizontal section of the same in the line *x x* of Fig. 1.

Similar letters of reference indicate corresponding parts in said figures.

In the production of light by electricity, as far as we can ascertain, the most intense and desirable light has been exhibited by using carbon pencils for the electrodes; but great difficulty has been experienced in rendering such a light constant and uniform, owing partly to the impracticability of preserving at all times a uniform distance of separation between the points of the carbon pencils, and partly to the difficulty of keeping the pencils pointed.

The object of our invention is to obviate these objections to the use of carbon electrodes. In the first place we do not find it essential to separate the electrodes, but find it perfectly feasible to keep the points in contact, and our apparatus accomplishes this constant contact when desired. The contact of the points has generally been supposed to be impracticable in the production of an intense light with carbon pencils; but we find by long-continued experiment that by employing in our apparatus an electric current of very low intensity but large volume we are enabled successfully to use the carbon points in contact; and our improvements consist in certain means of controlling the positions of the electrodes, by which they are kept properly in contact with each other as they are reduced by oxidation and by the disengagement of particles when the current of electricity used is of large volume and low intensity, or preserving a proper and uniform distance of separation when the current used is of high intensity. In the second place the difficulty of keeping the carbon pencils pointed has resulted in part from many of the particles of carbon being carried over from the positive to the negative electrode by the current of electricity, which current, as generated by the ordinary galvanic battery, is constant in one direction. Therefore, with a view to obviate this objection, we apply to the conducting-wires of an ordinary galvanic battery a mechanical pole-changer to reverse the current of electricity at frequent intervals.

In using a current of electricity generated by a magneto-electric machine the change of direction in the current is accomplished by dispensing with the use in said machine of the frotteur plate or pole-changer, which is generally used in such machines to produce a constant current.

In the accompanying drawings, A A′ represent reservoirs, constructed of wood, metal, or other suitable material capable of containing water or other suitable refrigerating matter, for the purpose of preventing the undue heating of the electrodes and other parts of the apparatus. These reservoirs are arranged one directly over the other, and are supported and kept at a suitable distance apart by a frame, B B, in which they are secured, which frame is made of wood or other suitable non-conductor, so as to insulate the reservoirs and their appurtenances from one another. The upper reservoir, A, has a vertical opening, *a*, through its center, which receives a tube, *b*, the lower end of which receives and holds the upper electrode or carbon pencil, *c*, the said tube being fitted to slide easily up and down through the opening *a*, which arrangement serves as a guide to the upper electrode, *c*. The tube *b*, being closed at its lower end by the carbon pencil fitting snugly therein, is then filled with mercury, which serves the double purpose of effecting a perfect and convenient connection of the electrode *c* with the conducting-wire *d*, conveying the electric current, and weighting the tube *b* so as to keep the point of the carbon pencil *c* within the seat *i* in a metallic bridge-plate, C, which bridge-plate is secured across the frame B B. The said seat *i* consists of an orifice or circular opening in the center of bridge-plate C, of a size a trifle less than the body of the carbon pencil *c*, and which will therefore allow the point of *c* to protrude, but

will not allow it to pass through, except so fast as it is reduced. The weight of the tube *b* and the mercury contained therein will cause the electrode *c* to be fed down as fast as the reduction of the point will allow.

In the lower reservoir, A′, is secured an iron tube, *f*, about an inch in diameter, bent into the shape of an inverted siphon. The axis of one link of this tube is in line with the axis of the tube *b*, and this link receives the lower electrode or carbon pencil, *c′*. To the lower extremity of the carbon pencil *c′* is secured an open or porous thimble, *g*, of a diameter corresponding and fitting to the inside diameter of the tube *f*, so as to be allowed to move freely up and down in said tube.

Just above the end of the tube *f* is secured, across the frame B B, a second stationary bridge-plate, *h*, having a circular opening in its center corresponding and fitting to the lower carbon pencil, *c′*, which, with the thimble *g*, serves as a guide to keep the center of said *c′* exactly in line with the center of upper electrode, *c*. The tube *f* is nearly filled with mercury, which flows through the porous thimble *g* and surrounds and buoys up the carbon pencil *c′*. The buoyancy of the carbon pencil in the mercury secures a gentle and certain feed upward and a sure contact of the lower electrode, *c′*, with the upper electrode, *c*. The other limb of the tube *f* receives the conducting-wire *e* of the electric current, which is thus conducted through the mercury to the electrode *c′*.

It is not essential that the tube *f* shall be in the shape described, as a straight tube would answer the purpose, the above-described shape being, however, as we think, the most desirable.

In the accompanying drawings we have represented a pole-changer to change at intervals the direction of the electric current, supposing the current employed to be generated by a galvanic battery. This pole-changer is of the usual construction, the wires *j k* from the battery connecting with the two metal standards *l′ l′* of the rotary brake-plate P, and the spring-brakes *m m′* connecting with the conducting-wires *d e*. The brake-plate may be rotated by means of electricity or otherwise, and its effect is well understood.

We do not claim the feeding together of the electrodes in an electric lamp by means of floats, springs, or other mechanical appliances, nor the mechanical pole-changer as heretofore used, but only as applied to an electric lamp in the manner described; but

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The employment, in an electric lamp, of an open seat, *i*, contained in a stationary bridge-plate, C, or its equivalent, and receiving the electrode in such a manner as to allow the point only thereof to protrude through it the distance required, and permitting the advance of the said point so fast only as it is oxidized and reduced by the electric current, substantially as herein described.

2. The combination of the loaded tube *b*, carrying the upper electrode, *c*, the open seat *i*, and the mercury-tube *f*, in which floats and is secured the lower electrode, *c′*, substantially as described, so that while the upper tube, *b*, feeds the upper electrode down to the open seat as fast as it is reduced, the lower electrode, *c′*, is also fed up as fast as reduced and kept in its proper position with reference to the upper electrode, *c*.

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Witnesses:
HENRY T. BROWN,
WM. TUSCH.