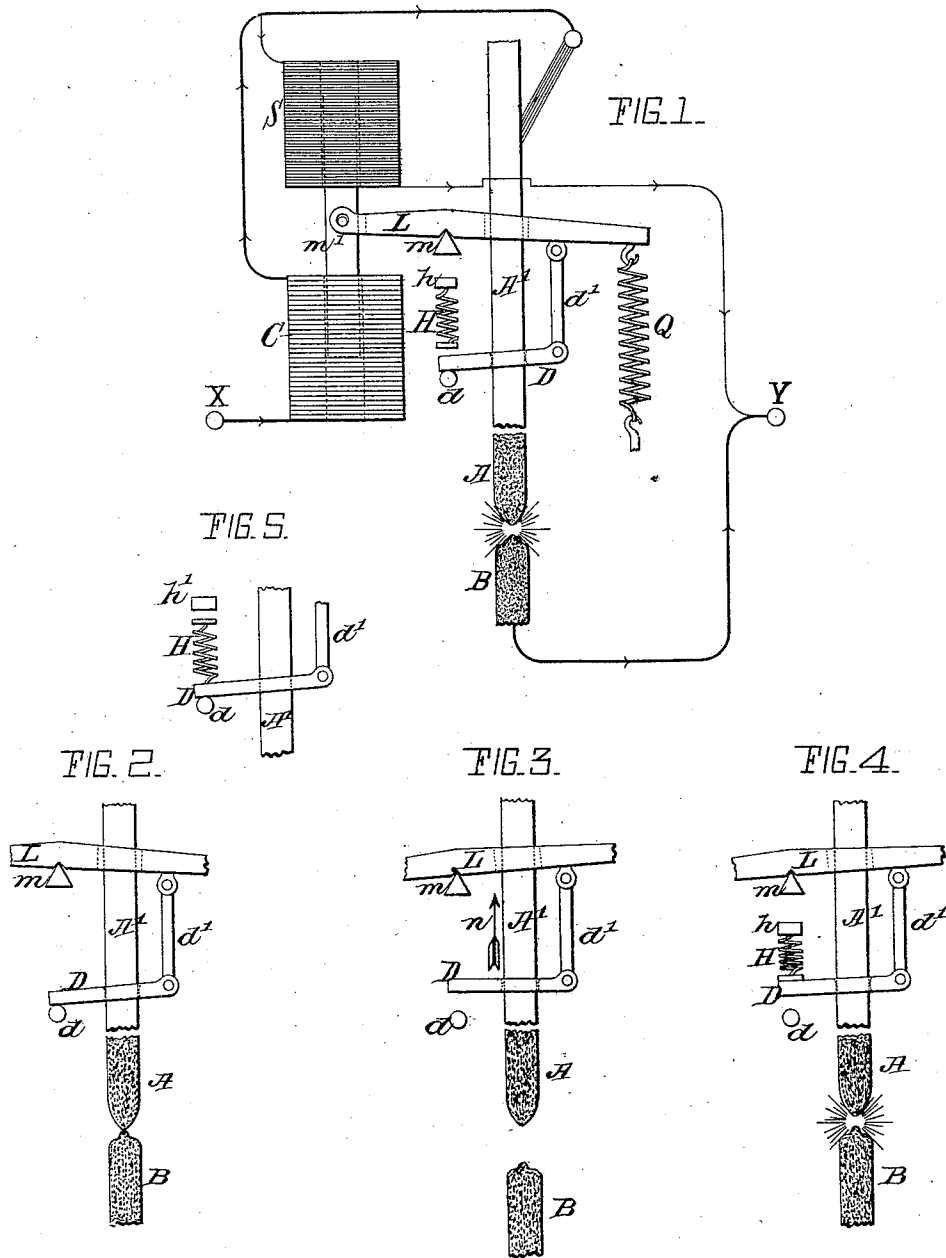


(No Model.)

D. HIGHAM.
ELECTRIC ARC LAMP.

No. 546,534.

Patented Sept. 17, 1895.



WITNESSES:

George Baumann
S. C. Connor

INVENTOR

Daniel Higham
BY
Howson & Howson
his ATTORNEYS

UNITED STATES PATENT OFFICE.

DANIEL HIGHAM, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE HIGHAM ELECTRIC COMPANY, OF PORTLAND, MAINE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 546,534, dated September 17, 1895.

Application filed June 4, 1895. Serial No. 551,632. (No model.)

To all whom it may concern:

Be it known that I, DANIEL HIGHAM, a citizen of the United States, and a resident of Boston, Middlesex county, Massachusetts, have invented Improvements in Electric-Arc Lamps, of which the following is a specification.

This invention relates to electric-arc lamps, but more particularly to constant-potential arc lamps; and its object is to provide means whereby the lighting or "striking" of the arc of an arc lamp can be more quickly and quietly accomplished than has heretofore been possible in connection with a certain type of arc lamps, more fully described hereinafter.

In the accompanying drawings, Figure 1 is a diagram of a simple form of clutch arc lamp having my present invention applied. Figs. 2 and 3 are diagrams illustrating the action of the ordinary construction of lamp. Fig. 4 is a diagram illustrating the action of a lamp provided with my invention, and Fig. 5 is a diagram showing a modification.

In Fig. 1, A represents the upper carbon carried by a movable rod A, while B represents the lower or fixed carbon. Acting upon the movable carbon-rod A' is a clutch D, one end of which rests upon a stop *d* on the frame when the lamp is out of action, while the other end is connected through a link *d'* to a lever L pivoted at *m*.

S is a fine-wire coil in a shunt-circuit around the arc and acting magnetically upon solenoid-core *m'* supported by lever L.

C is a coarse-wire coil in the main circuit, and also acting magnetically upon the solenoid-core *m'*, but tending to move it in an opposite direction to that imparted by coil S.

Q is a spring to act upon the lever L against the magnetic action of coil C.

H is a compression-spring or elastic stop for the clutch D. This elastic stop is shown in Figs. 1 and 4 as carried by a part *h* of the frame, while in the modification, Fig. 5, the elastic stop H is shown as being carried by the clutch D and adapted to abut against a part *h'* of the frame.

The circuits between the terminals X Y of the lamp are sufficiently indicated by the arrow-heads. The clutch type of arc lamp when in connection with a constant-potential

circuit having a suitable resistance in the lamp branch or other means to obtain "stability" of current for normal working of the lamp will, as ordinarily constructed, always show considerable "hammering" in first lighting the lamp or in striking the arc which is mostly due to the following: In Fig. 2 the clutch D and carbon points in such a lamp are shown in positions in which the lamp is at rest or before current is switched on, while Fig. 3 shows positions of the same at the moment after the current has been switched on. It will be seen from Fig. 2 that as the carbon points are in contact the current will be very heavy at the instant when current is switched on from a constant potential circuit, and will cause the series windings C to raise the upper carbon and carbon-rod so quickly as to carry the carbon-rod slightly up through the clutch in the direction indicated by the arrow *n* (shown in Fig. 3) and open the arc, as also indicated in Fig. 3, by the amount of space between the carbon points and thrown-up position of the clutch D, whereby the lamp will relight more or less, or "hammer" until it finally "strikes" its arc, as will be readily understood. By the use of my elastic stop H, however, this throwing up of the carbon-rod through the clutch is prevented and consequently the striking of the arc can be more readily accomplished. A comparison of Figs. 1 and 4 will serve to show the action of the elastic stop H in preventing the arc from being thrown open when the upper carbon is quickly drawn up. It will be seen that the elastic pressure of the stop H between the frame and clutch is in such a direction as to lock the clutch to the carbon-rod when the arc is being "struck," so that not only will the carbon-rod be prevented from being thrown up through the clutch, but the elastic stop will force the clutch and carbon-rod downward and assist in overcoming the impetus given to the mechanism in the first quick movement in striking the arc, at the same time taking up any backlash which might exist in link *d'* or other parts of the mechanism, as will also be readily understood. There should be sufficient space between the clutch and elastic stop H when the clutch touches upon stop *d* (or in case of the modification shown in Fig.

5 the space between the spring II and abutment h' should be sufficient) that during the normal feed action or working of the lamp the spring or elastic stop II will be free from action upon the clutch, as illustrated in Figs. 1
 5 and 5. There should also be sufficient elasticity to the spring or elastic stop II to allow the magnetic action of the series windings C to draw a quiet arc (not a hissing arc) for any
 10 reasonable increase or decrease of current from the normal amount due to variations of voltage at the mains. This sufficient elasticity to the spring II is necessary to prevent a rapid hammering of the upper carbon from
 15 going in and out from a quiet to a hissing arc when the arc is being struck.

I have found by repeated experiment that when the proper amount of elasticity is given to the spring II (by making it have more or
 20 less spiral turns, for instance) the arc can be struck without the slightest hammering in any respect, whereas without the elastic stop the lamp would only be able to strike its arc with great difficulty. I have also found that
 25 a smaller amount of dead resistance can be run in the lamp branch when the elastic stop is employed, and in case of the method of obtaining stability of current described by me in Letters Patent, dated May 22, 1894, No.
 30 520,232, a smaller induction-coil can be used.

I am aware that a positive stop has been used above the clutch in connection with constant-current arc lamps to limit the movement of the mechanism in striking the arc to a positive length, but this in no way would perform
 35 the functions of the elastic stop described by me, besides any positive stop to hit upon the clutch of a lamp subject to momentary heavy currents in its series windings would break or bend any clutch mechanism delicate enough
 40 for a close and delicate feeding-lamp.

I claim as my invention—

An electric arc lamp, having a suitable feeding mechanism with a carbon rod and clutch
 45 for same, in combination with a spring or elastic stop for said clutch, acting to lock said clutch with said rod and to oppose the magnetic action of the series windings of said lamp, when the arc is being struck, but free
 50 from action upon said clutch and opposition to said series windings when the lamp is normally working, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL HIGHAM.

Witnesses:

HENRY W. WILLIAMS,
 A. N. BONNEY.