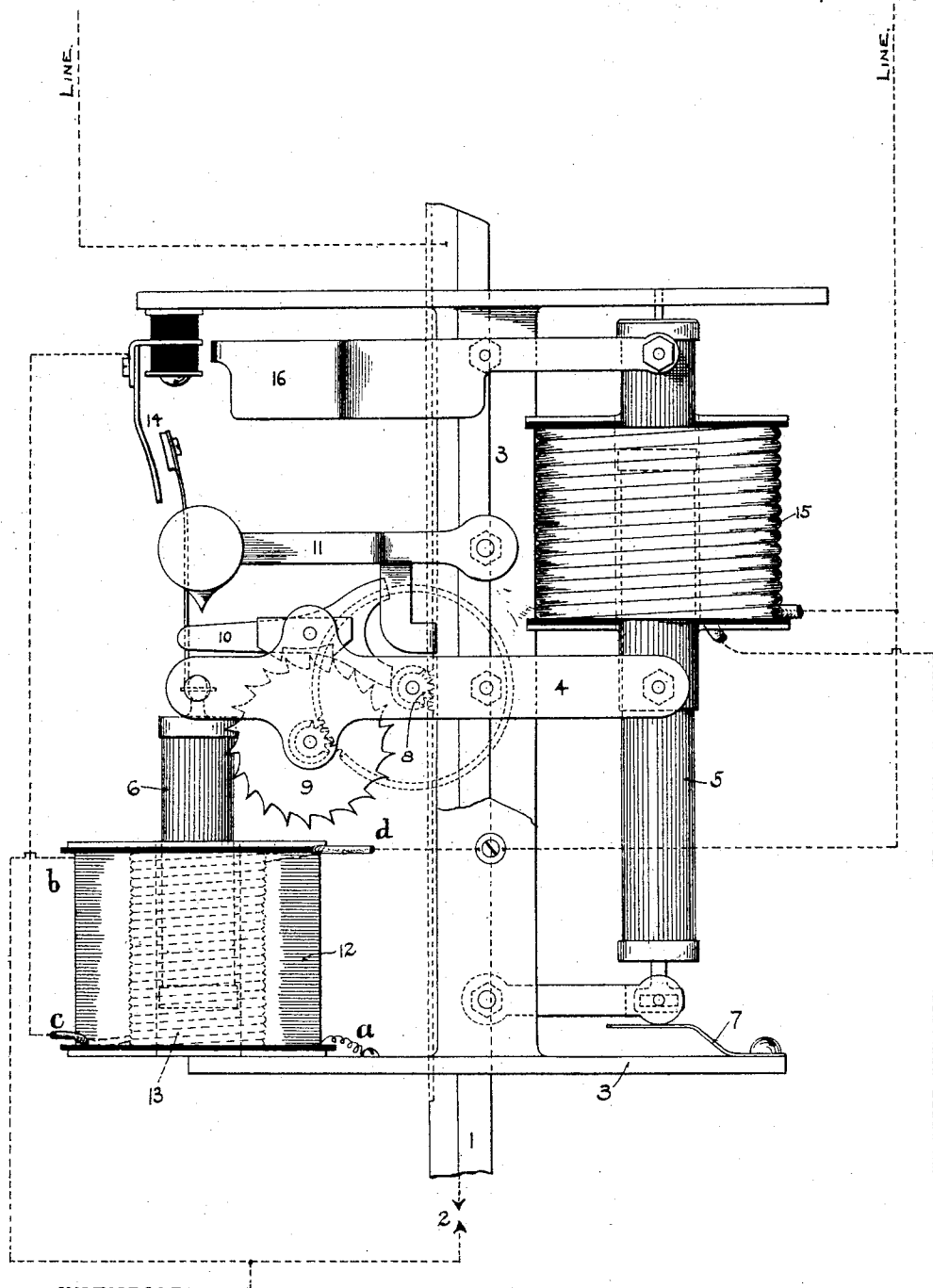


(No Model.)

H. P. DAVIS.
ELECTRIC ARC LAMP.

No. 535,052.

Patented Mar. 5, 1895.



WITNESSES:

James W. Smith
Hubert C. Toner

INVENTOR.

Harry P. Davis.
BY *Terry and MacKay*
ATTORNEYS

UNITED STATES PATENT OFFICE.

HARRY P. DAVIS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 535,052, dated March 5, 1895.

Application filed May 3, 1894. Serial No. 509,876. (No model.)

To all whom it may concern:

Be it known that I, HARRY P. DAVIS, a citizen of the United States, residing in Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Carbon-Controlling Mechanism for Arc Lights, (Case No. 588,) of which the following is a specification.

My invention has reference to mechanism for the control of the carbons in arc lights, and the object of my invention is the provision of means whereby the arc may be made subject to the exclusive control of a shunt coil.

Many devices have hitherto been constructed for the control of arc lights which were dependent upon the conjoint action of a series coil and of a shunt coil. The series coil was employed for the tripping of the arc, while the control of the length of the arc was accomplished by means of the shunt coil. In these cases the proper proportional action of the shunt coil was always interfered with by the presence of a series coil in the circuit. This was due to the effect of the opposing magnetism of the series coil, which opposed a certain force to the action of the shunt coil, which opposition was not constant but varied to some extent owing to the fluctuations in the quantity of current in the circuit. This current, although intended to be kept constant naturally exhibits certain fluctuations which affect the action of the feeding mechanism disadvantageously.

It is the object of my invention to insure the presence of a perfectly uniform and constant pull due to the series coil in opposition to the pull of the shunt coil.

Another object of my invention is the provision of means for obviating danger of breakage under certain circumstances and for bringing the whole mechanism into as small a space as possible.

My invention is illustrated in the accompanying drawing, in which the circuits are shown in dotted lines, and the mechanism of my device is shown in side elevation, certain hidden parts being shown in dotted lines.

In the drawing, the movable carbon-bearing rod is shown at 1, the arc being diagram-

matically indicated at 2. The framework 3 is in electrical connection with the rod 1 and carries the lever 4 to one end of which is pivoted a solenoid core 6. To the other end of the lever 4 is pivoted one end of a sleeve 5^a which carries a solenoid 15 connected in series with the line. One end of a movable core 5 extends into the sleeve 5^a, the other end resting upon the spring 7, or any other convenient buffer, when the current is not passing. Upon one end of the lever 4, which is preferably made in the form of a frame-work, the other side of the frame being hidden in the drawing, is carried a train of gearing, one end of which train meshes, as shown at 8, with the rack-bar on the rod 1. Only a few teeth are shown on the pinion and on the bar, but it will be understood that the pinion is an ordinary gear and the rack is adapted to mesh therewith. The movement of the train of gearing is controlled by means of an escapement comprising the wheel 9 and the escapement lever 10, so that when the latter is held fast, the train of gearing forms virtually a rigid whole with the frame or lever 4, so that depression of the right hand end of this lever will raise the gearing and with it the rod 1 which is in mesh therewith. A weighted lever or stop 11 is pivoted to the framework 3 above the escapement lever 10 and serves to hold the escapement fast when the train of wheels is raised.

The core 6 is governed by the fine wire or shunt coil 12, whose terminals are shown at *a b*. Within the fine wire coil 12 is wound the cut-out coil 13, which is of coarse wire, so as to offer as little resistance as possible to passage of current on the line. The terminals of this coil are shown at *c d*, and this coil is brought into play when for any reason the voltage becomes too high on the shunt coil and the core 6 being depressed closes the cut-out circuit at 14. The series spool 15 is held in a balanced position by the pivoted weight 16, so as to embrace the upper end of the core 5. The balancing of the series coil may be accomplished in any desired manner, as, for instance, by the counterweighting effect of the tripping and feeding mechanism.

The operation of my lamp is as follows:—

Upon passage of the current through the carbons in contact and through the series coil, the latter immediately attracts the core 5 and the total weight of the coil and core serves to depress the right hand end of the lever or frame 4. This trips the arc and at the same time prevents the feeding down of the carbons by contact of the outer end of the escapement lever 10 with the stop 11. It is at this time that the pivoting of this last-named stop is of peculiar advantage, inasmuch as it prevents breakage of the teeth or smaller parts of the mechanism in case of too sudden and violent an action of the series coil. As the arc grows longer and the potential across the terminals of the shunt spool becomes higher, the core 6 will be depressed more and more until finally the escapement lever 10 is drawn out of contact with the stop 11 and is free to vibrate and permit the downward movement of the rod 1 by the turning of the train of gear wheels. This movement is stopped as soon as the arc becomes so short as to restore the normal potential across the terminals of the shunt spool. In the meantime the force opposing the attraction of the shunt spool remains constant independently of all these fluctuations of the current supplied, inasmuch as the series coil is balanced, and increase of magnetism cannot produce increase of weight in the sum of the weights of the field and core. It will be seen that this constancy of counterbalancing weight makes this form of lamp one dependent for its action upon a shunt coil alone, which action is not interfered with by electromagnetic variations in other parts of the system.

Various modifications of detail might be made in this device without departing from the spirit of my invention, and I do not de-

sire to be understood as limiting myself to the exact details shown herein.

What I claim is—

1. In a feed mechanism for arc lamps an arc tripping mechanism, a balanced series coil attached thereto, and a core controlled by said coil and adapted to hang by attraction of said coil within the same, substantially as described.

2. In a feed mechanism for arc lamps, an arc tripping mechanism, a sleeve attached to said tripping mechanism, a balanced series coil, wound on said sleeve, and a core controlled by said coil and adapted to hang by attraction of said coil within the same, substantially as described.

3. In a feed mechanism for arc lamps, a movable gear train for tripping the arc, an escapement for controlling the action thereof, a pivoted, weighted stop located in the path of movement of said escapement and adapted to yield whenever the escapement is moved into engagement therewith and operating directly and solely by its weight to lock said escapement against movement, substantially as described.

4. In a feed mechanism for arc lamps, an arc tripping mechanism, a series coil attached thereto, and a counterweighted pivoted lever independent of the tripping mechanism and supporting more or less of the weight of said series coil, substantially as described.

In testimony whereof I have hereunto subscribed my name this 30th day of April, A. D. 1894.

HARRY P. DAVIS.

Witnesses:

JAMES WM. SMITH,
HAROLD S. MACKAYE.