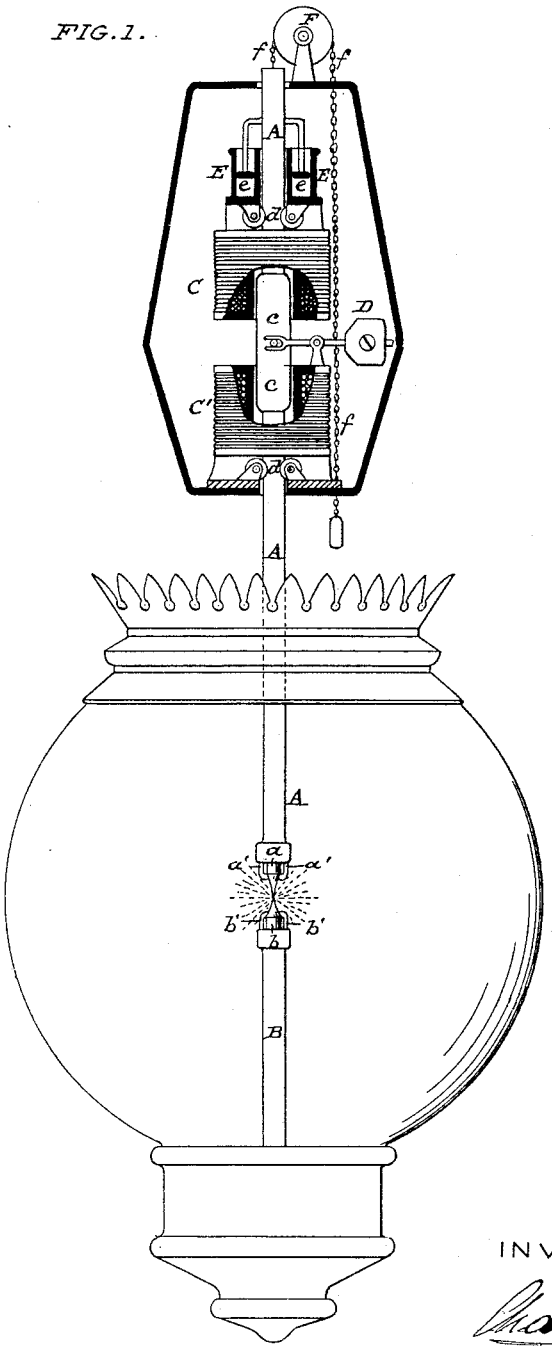
(No Model.) 2 Sheets—Sheet 1.

C. HEISLER.

ELECTRIC ARC LAMP.

No. 263,404. Patented Aug. 29, 1882.

FIG. 1.



ATTEST:

Robert Burns

Wm. St. Gemme

INVENTOR:

Charles Heisler

(No Model.) 2 Sheets—Sheet 2.

C. HEISLER.

ELECTRIC ARC LAMP.

No. 263,404. Patented Aug. 29, 1882.

FIG. 2.

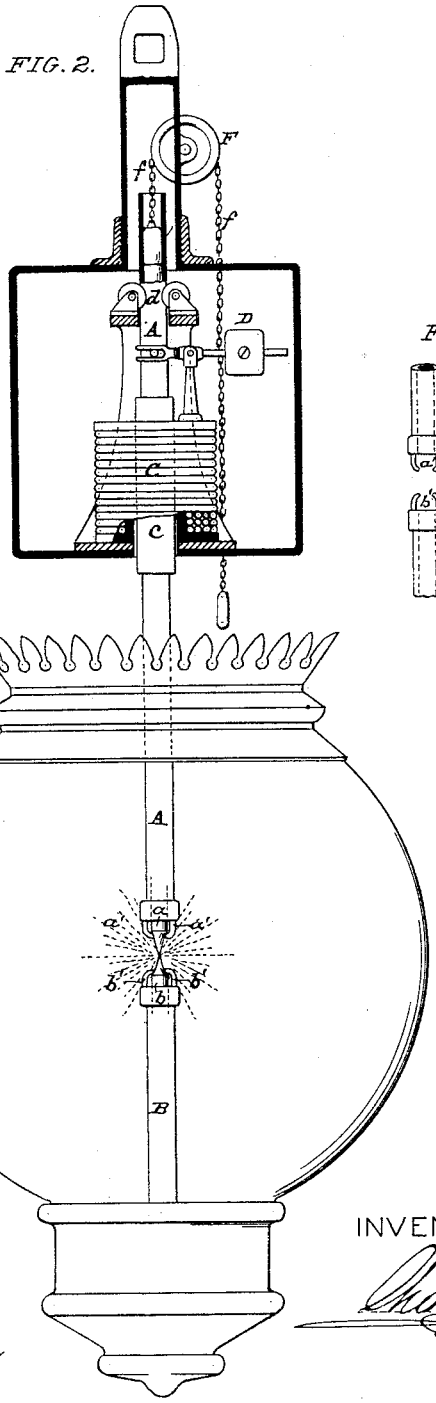


FIG. 3.

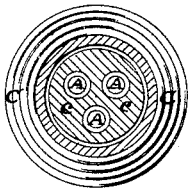
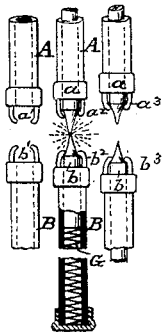


FIG. 4.



ATTEST:

Robert Burns.

Wm. St. Gemmes

INVENTOR:

Charles Heisler

UNITED STATES PATENT OFFICE.

CHARLES HEISLER, OF ST. LOUIS, MISSOURI.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 263,404, dated August 29, 1882.

Application filed March 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HEISLER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

This invention consists in the provision, in an electric lamp of the arc type, of two or more sets of carbon electrodes, the holders of which are connected together and moved in common by an operating electro magnet or magnets, when said holders have their lower ends arranged at varying distances apart, so that when the first set of carbons are consumed the next set will come into action before the holders of the first set can come together and form a metallic connection for the passage of the current, as will hereinafter more fully appear.

In the drawings, Figure 1 is a side view of an electric lamp having an upper and lower electro-magnet for operating the upper-electrode holder. Fig. 2 is a similar view with a single electro-magnet for accomplishing the same result. Fig. 3 is a horizontal section taken through the electro-magnet, illustrating the arrangement in a circle of the carbon-holders, &c., of a single electric lamp having three sets of carbon electrodes; and Fig. 4 is a side view, illustrating the arrangement of said holders in a straight line.

Referring to the drawings, A represents the upper and B the lower carbon electrode holder, which are tubular in shape so as to receive the carbon pencils or electrodes *a b*. These electrodes are prevented from being forced bodily out of their holders by detaining-fingers *a' b'*, which embrace the conical ends usual to said electrodes, and permit only the cone portion to project, as clearly indicated in the drawings. These fingers or stops may be of any suitable form, and in their construction platina or other refractory material may be used. Near its upper end the holder A is provided with a surrounding annular armature-core, *c*, of the operating axial electro-magnet C, by means of which the upper electrode is lifted so as to separate the points and form the light-arc when the lamp is first started, and retain them in such separated position during the operation of the lamp. This electro-magnet also acts to adjust the said points to lengthen or shorten the voltaic arc, in order to compensate for the varying resistance and intensity of the current, and thus insure a steady and even light.

In use a single electro-magnet, C, placed in the lamp-circuit may be used, as indicated in Fig. 2, or an electro-magnet C similarly placed in said circuit with an electro-magnet, C', placed in a branch or shunt portion of the main circuit, as indicated in Fig. 2. The action of the magnet C' is to draw the electrode-holder A down when the attraction of the magnet C decreases, owing to an increase in the resistance due to an increased length of the light-arc between the points of the electrodes. Where the two electrodes C C' are used a single core-armature, *c*, may be used for both; or, if preferred, a separate armature may be provided for each electro-magnet.

D is a counterbalance weight and lever, which is used to partly or wholly balance the weight of the moving electrode and holder A *a*.

d are guide-rollers for guiding the holder A in proper axial line with the lower holder.

The retarding device for preventing a too sudden downward movement of the carbon-holder consists of an annular cylinder, E, secured to the supporting frame or casing of the machine and filled with glycerine or other suitable body, the annular piston *e* of this cylinder being connected to the electrode-holder A, as indicated in Fig. 1.

In order to counteract the irregular action of the electro-magnet caused by the decreasing weight of the carbon electrode as it becomes consumed, I have provided a compensating device as follows, the action of which is to add weight corresponding to that lost by the consumption of the electrode: It consists of a chain, *f*, balanced over a pulley, F, and connected to the electrode, so that the downward movement of said electrode as it is consumed will draw said chain over the pulley and add a weight on top of the electrode corresponding to the amount of carbon consumed, the weight of a given length of chain being equal to a given length of the carbon electrode.

In carrying out this part of my invention various mechanical equivalent devices to that described, and which will readily suggest themselves to those skilled in the art, may be used instead without departing from the spirit of

my invention, which is broadly for a compensating device to compensate for the gradual decrease in the weight of a carbon electrode by use.

In a great many situations it is desirable to provide a lamp that, when one set of electrodes are consumed or the electric arc between the same broken, will automatically bring a succeeding set of electrodes into connection to re-establish the voltaic arc and continue the lighting. In order to attain this object I make use of the following construction and arrangement of parts: The sets of electrodes and holders are grouped together either in a circular direction, as indicated in Fig. 3, or in a straight line, as indicated in Fig. 4, and are so connected together as to be moved in common by the operating electro-magnet C. The fingers or stops a' a^2 a^3, b' b^2 b^3 of the different sets are arranged at slightly varying distances apart, as indicated in Fig. 4. In this figure both sets of fingers are shown as varying from a horizontal line; yet it is evident that such variation may be made solely in either the upper or lower set, as desired or found convenient. This construction insures the following results: The electric light will be established first between the first or nearest set of electrodes, and when these are consumed between the next nearest set, and so on through any number of sets that may be found necessary, the arrangement or position of the fingers or stops being such that the electric arc will be established between the last set before the fingers of the first set come together to form metallic connection for the passage of the current. The lower electrodes, *b*, are moved upwardly by a spiral spring, G, or any other suitable mechanism found convenient or desirable.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

In an electric lamp, two or more electrode-holders, said holders moved in common by an electro magnet or magnets, and having their ends projecting variously toward a corresponding set of opposing holders, as and for the purpose set forth.

In testimony of my invention, witness my hand this 24th day of March, 1881, at St. Louis, in the State of Missouri.

CHAS. HEISLER.

In presence of—
THEODORE PAPIN,
RUDOLPH HIEZEL.