

W. J. DAVY.
ELECTRIC ARC LAMP.

No. 521,877.

Patented June 26, 1894.

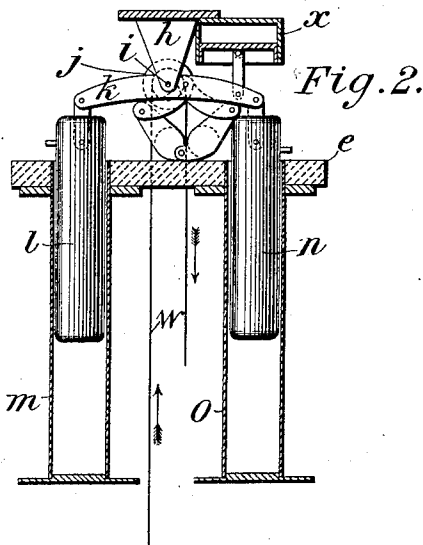
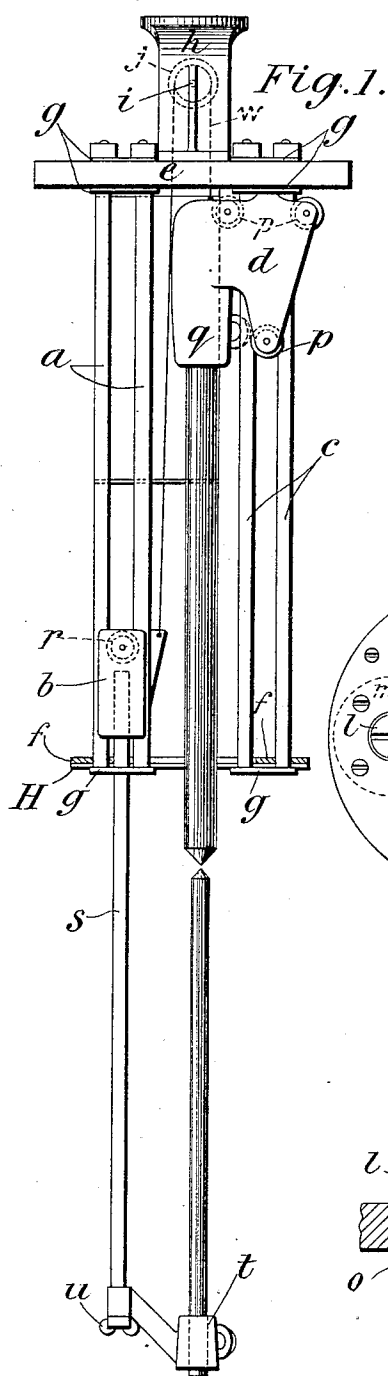


Fig. 3.

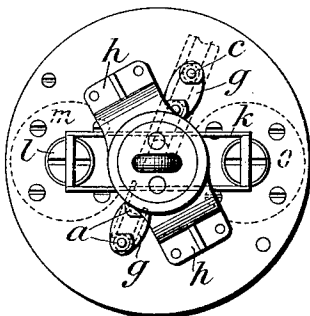


Fig. 4.

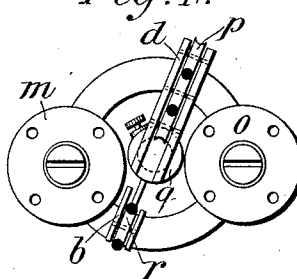


Fig. 5.

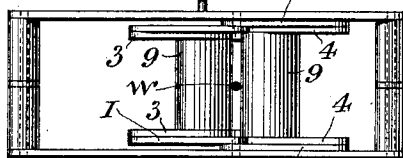
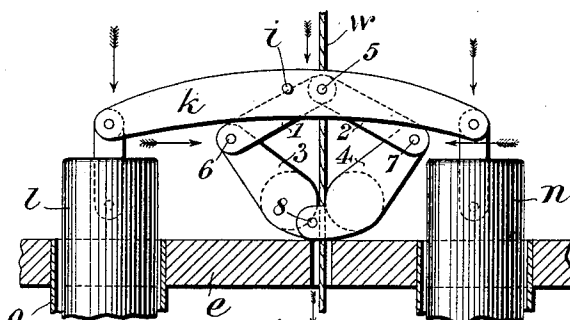


Fig. 6.

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Fig. 7.

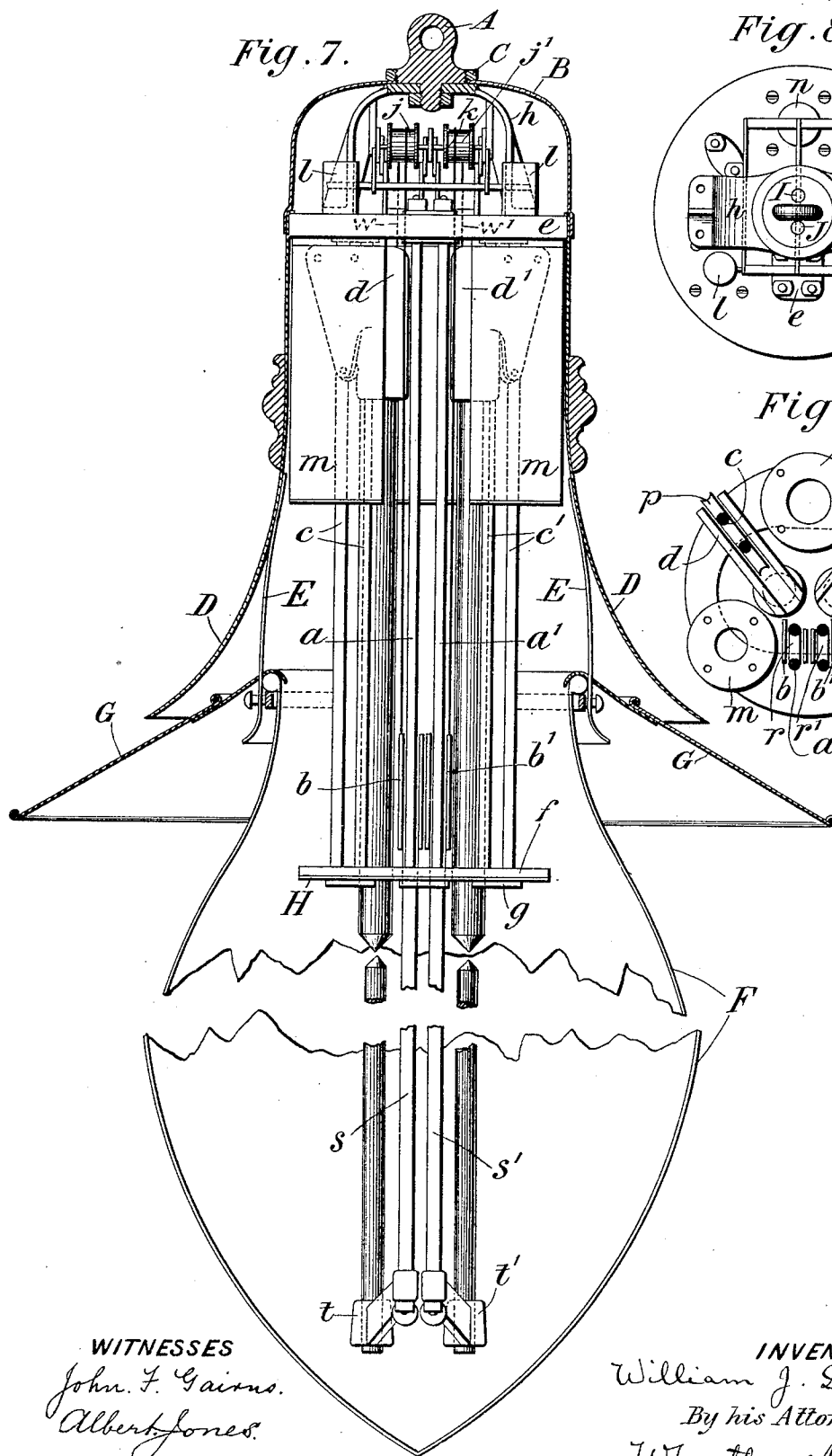


Fig. 8.

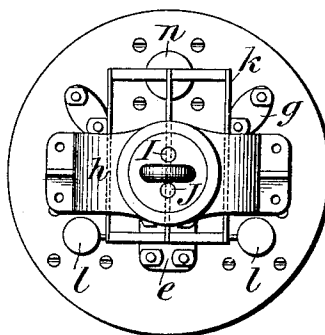
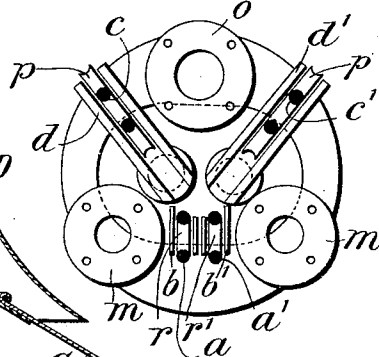


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM J. DAVY, OF LONDON, ENGLAND.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 521,877, dated June 26, 1894.

Application filed April 14, 1894. Serial No. 507,611. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES DAVY, a subject of the Queen of Great Britain, residing at 161 Huddleston Road, Tufnel Park, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Electric-Arc Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention for improvements in electric arc lamps relates to focusing lamps in which the positive and negative carbon holders are connected together by a cord passing over a pulley and in which the upper carbon holder tends to descend by gravity and thus at the same time to draw up the lower carbon holder so as to bring the two carbons into contact; and consists in an improved arrangement for striking and maintaining constant the arc consisting of a gravity friction grip device acting on the cord and regulated by series and shunt solenoids.

In the accompanying two sheets of illustrative drawings:—Figure 1 is an elevation, the hood shades, solenoids and friction grip brake being supposed removed, of a single lamp constructed according to this invention. Fig. 2 is a sectional elevation of the solenoids and friction grip brake. Fig. 3 is a plan of the upper part of the lamp with the hood removed. Fig. 4 is a plan of the travelers and their guides and of the solenoids. Fig. 5 is an elevation of the gravity friction grip device, and Fig. 6 is a plan of the same. Fig. 7 is a sectional elevation of a duplex lamp constructed according to this invention and Fig. 8 is a plan of the upper part of the lamp and of the friction grip devices, and Fig. 9 is a plan of the travelers and its guides and the solenoids.

The guide rods *a* for the lower carbon traveler *b* and the guide rods *c* for the upper carbon traveler *d* are secured to the non-conducting disks *e* and *f*, the distance between the rods *a* and also between the rods *c* being determined by the tie washers *g*.

Mounted in projections depending from a saddle bracket *h* secured to the disk *e* is a spindle *i* which carries the loose cord pulleys *j* and the fixed regulating brake levers *k* con-

nected by links at one end to the core *l* of the series solenoid *m* and at the other end to the core *n* of the shunt solenoid *o* both solenoids being carried from the under side of the disk *e*.

By using non-conducting disks or supports the several parts of the lamp are thoroughly insulated from one another and a sound solid frame obtained.

The upper carbon traveler *d* is guided by means of small grooved rollers *p* fixed at the extremities of the traveler *d* and bearing on the rods *c* and carries the upper carbon holder *q*. The lower carbon traveler *b* is guided by a single grooved roller *r* mounted at its upper end and bearing between the two rods *a* and is attached to a depending tail rod *s* having a tapered end on which is secured the lower carbon holder *t* by the fly nut *u*. The two travelers *b* *d* are connected together by the cord *w* passing over the loose pulley *j* and between the friction grip device carried by the levers *k*. The guiding arrangement allows of the use of longer carbons or the reduction of the length of the lamp and the method of attaching the lower carbon holder enables the carbons to be easily set in line.

The friction grip device consists of the four pairs of links 1, 2, 3, and 4 jointed together at the points 5, 6, 7, and 8 and suspended from the regulating levers *k* at the point 5 at a slight distance from the spindle *i* forming the fulcrum of the regulating levers *k*. Each pair of lower links carries a jaw or grip 9 between which the cord *w* passes. Normally the jaws rest on the plate *e*.

The operation of the grip device is as follows:—On the current passing to the lamp the core *l* of the series solenoid *m* is drawn down and by means of the regulating lever *k* draws up the point of support 5 of the friction grip links. This motion of the point 5 causes the jaws 9 to grip the cord *w* the jaws still resting on the plate *e*. As soon as the jaws grip the cord the relative motion of the points 5, 8 is stopped and the whole friction grip device is raised with the point 5 and raises with it the cord *w* and so the arc is struck. As the resistance of the arc increases due to the burning away of the carbons and consequent lengthening of the arc the power of the series solenoid decreases and gradually the friction grip device is lowered on to the

plate *e* and the jaws begin to relax their hold on the cord *w* and a continuous and steady feed is obtained by the cord feeding slowly through the jaws 9. If the lamp is working in series the shunt solenoid *o* which is connected across the terminals of the lamp helps to feed the carbons together and maintain a steady arc. In order to still further increase the steadiness of the arc the piston of a dash pot *x* is attached by a link to the regulating lever *k*.

The duplex lamp shown in Figs. 7, 8, and 9, is actuated by one striking and regulating mechanism there being two sets of travelers *b b'* and *d d'* and carbons, two cords *w w'* and pulleys *j j'* and two friction grip devices actuated by one set of regulating levers *k* and solenoids *m o*. The duplicate parts are similar to those described for the single lamp and are indicated respectively by the same reference letters the second set being indicated by a dash to the letter. Also two series cores *l l'* and solenoids *m m'* acting together are shown. The lamp is suspended by the eye A screwed into the saddle bracket *h* and secured by a lock nut. The hood B fits over the eye A and is secured by the milled nut C. The bell hood D flanges into and depends from the plate *e* and is secured by the hood B whose lower edge passes over the upper edge of the bell hood D as clearly shown. The cover and hood can thus be firmly fixed or removed by hand without removing the conducting wires. The spring clips E for carrying the globe F are riveted to the bell hood D. The reflector or shade G is hooked over the lips of the globe F. A mica disk H protects the lower disk *f* and thus the working parts of the lamp from injury from the ascending gases from the arc. The current enters the lamp at I, thence through the series coil *m* to the holders of the upper carbons through the carbons tail rods and holders for the lower carbons to the terminal J. The shunt coil *o* is connected across the terminals I J in the usual manner. The friction grip devices of the two sets of carbons are arranged so that one set when the regulating levers *k* are actuated leaves the disk *e* before the other.

The operation of the duplex lamp is as follows: On the current passing to the lamp the regulating levers *k* raise the friction grip devices and the first to leave the plate *e* simply separates the corresponding carbons leaving the first pair of carbons—that is the pair to be first consumed—still in contact. On the further motion of the regulating lever the friction grip devices of the first pair of carbons leaves the disk *e*, separates the points of the carbons and strikes and maintains the arc. During the time that the first set of carbons are burning the grip of the second set of carbons keeps its grip on their cord and keeps the points apart. When the holders of the first set of carbons come to rest on the framework of the side rods *a c* and cannot feed further together the lever gradually lowers the

grip devices until the second device comes in contact with the disk and releases the second cord of the second set of carbons which then come in contact and the first set are immediately extinguished. The regulating levers *k* then again raise the grip devices and strike the arc for the second pair of carbons which continue to burn until completely consumed. In a similar manner a lamp with three or more pairs of carbons can be operated by a single striking and regulating mechanism.

As shown the upper or positive carbon is double the size of the lower or negative carbon so that the focus of the lamp is constant. In alternating current lamps the carbons may be of the same size.

What I claim, and desire to secure by Letters Patent, is—

1. In electric arc lamps in which the positive and negative holders are connected together by a cord passing over a pulley and in which the tendency of the carbon holders is to approach, the gravity friction grip device consisting of a system of links pivoted together to form a closed frame, of grip jaws between which passes the part of the cord or connecting device tending to move downward and which are attached to the jointed frame in such position that they approach one another as the frame elongates in a vertical direction, of a stop on which the lower end of the link frame rests and of a means for determining the position of the upper end of the frame relatively to the said stop according to the resistance of the lamp substantially as set forth.

2. In electric arc lamps in which the positive and negative holders are connected together by a cord passing over a pulley and in which the tendency of the carbon holders is to approach, the gravity friction grip device consisting of a lever mounted on the spindle of the loose cord pulley, of a means for determining the position of one end of the lever according to the resistance of the lamp, of a system of links suspended from the lever and pivoted together to form a closed frame, of grip jaws between which passes the part of the cord or connecting device tending to move downward and which are attached to the jointed frame in such position that they approach one another as the frame elongates in a vertical direction, and of a stop on which the lower end of the link frame rests substantially as set forth.

3. In electric arc lamps in which the positive and negative holders are connected together by a cord passing over a pulley and in which the tendency of the carbon holders is to approach, the arc striking and maintaining mechanism consisting of a lever mounted on the spindle of a loose cord pulley, of a solenoid core attached to the lever, of a corresponding solenoid arranged in series, of a system of links suspended from the lever in such manner that they are raised when a solenoid core is drawn into its coil and piv-

oted together to form a closed frame, of grip
jaws between which passes the part of the
cord or connecting device tending to move
downward and which are attached to the
5 jointed frame in such position that they ap-
proach one another as the frame elongates in
a vertical direction and of a stop on which
the lower end of the link frame rests, substan-
tially as set forth.

10 4. In electric arc lamps in which each posi-
tive holder is connected to the corresponding
negative holder by a cord passing over a pul-
ley and in which the tendency of the carbons
is to approach, a series of gravity friction
15 grip devices one for each pair of carbons and
each device consisting of a system of links
pivoted together to form a closed frame, of
grip jaws between which passes the part of

the cord or connecting device tending to
move downward and which are attached to 20
the jointed frame in such position that they
approach one another as the frame elongates
in a vertical direction, of a single stop on
which the lower ends of the links rest, and
of a means whereby the upper ends of the 25
frames are raised together to a height depend-
ent on the current through the lamp the said
devices being so connected to the said means
that they are successively raised off the said
stop, substantially as set forth.

In testimony whereof I affix my signature in
presence of two witnesses. 30

W. J. DAVY.

Witnesses:

GEO. J. B. FRANKLIN,
WALTER J. SKERTEN.