

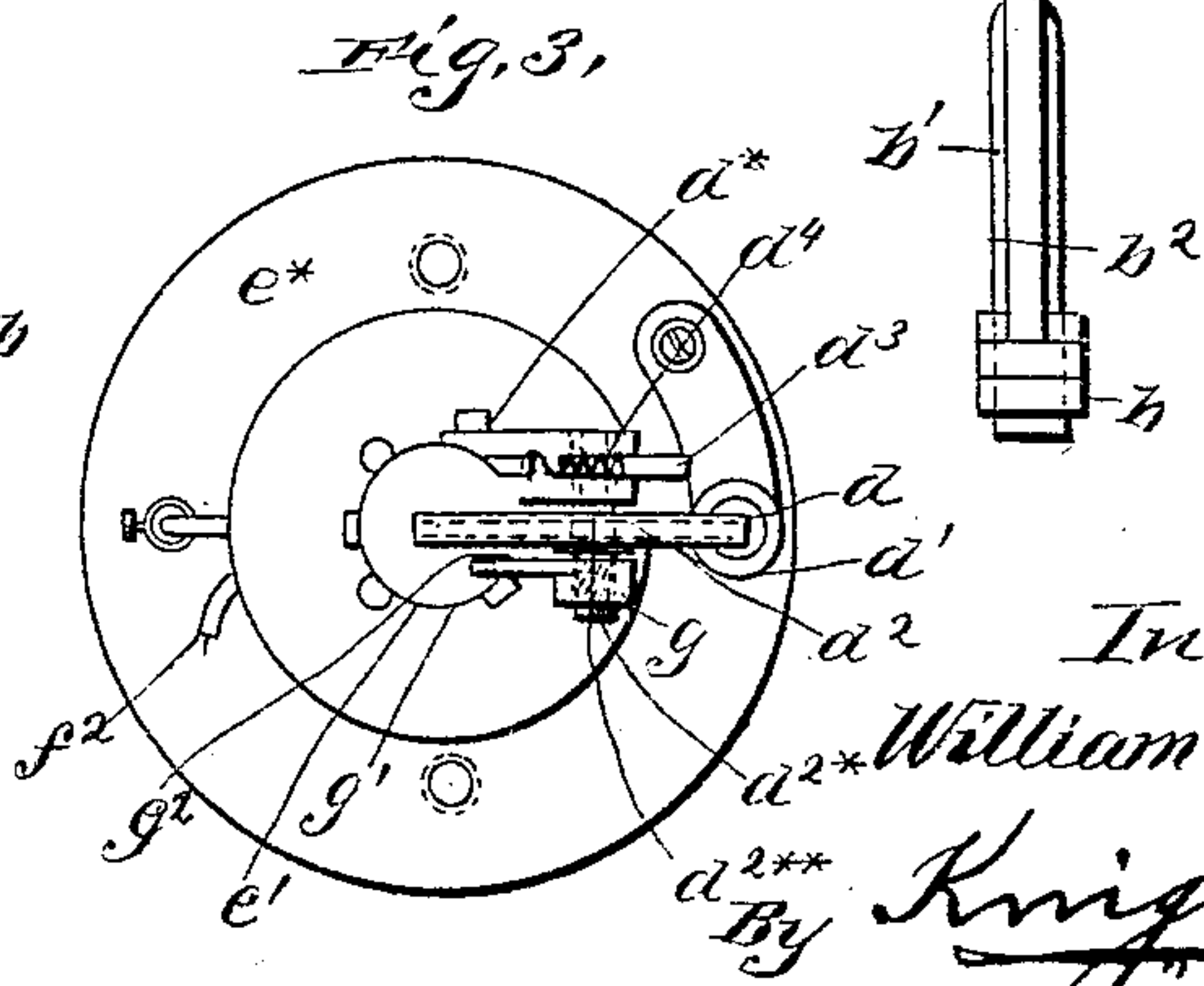
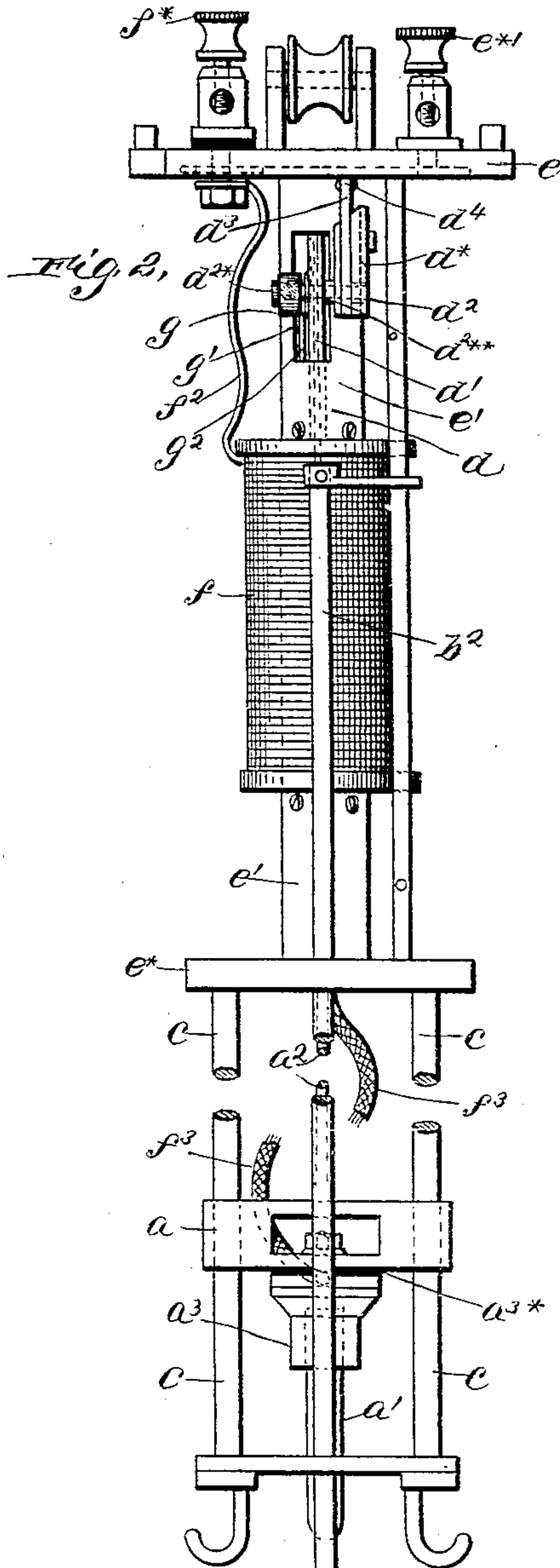
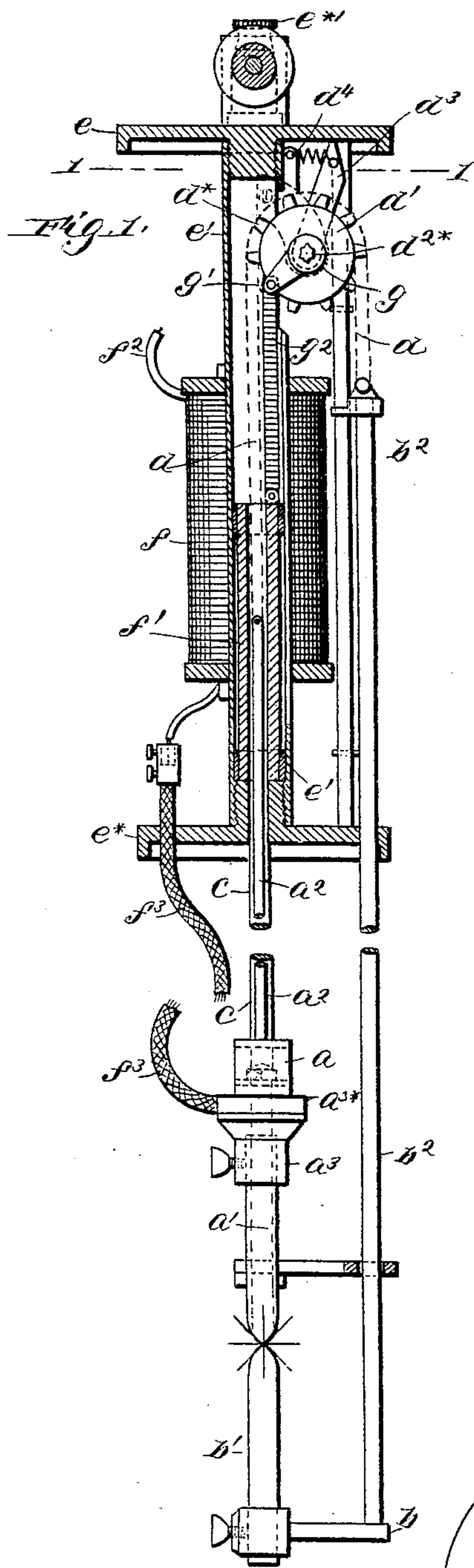
(No Model.)

2 Sheets—Sheet 1.

W. H. AKESTER.  
ELECTRIC ARC LAMP.

No. 496,386.

Patented Apr. 25, 1893.



Witnesses:  
*Geo. Bruce.*  
*Walter E. Allen.*

Inventor:  
*William H. Akester.*  
By *Knight Bros.*  
Attorneys:

W. H. AKESTER.  
ELECTRIC ARC LAMP.

No. 496,386.

Patented Apr. 25, 1893.

Fig: 4.

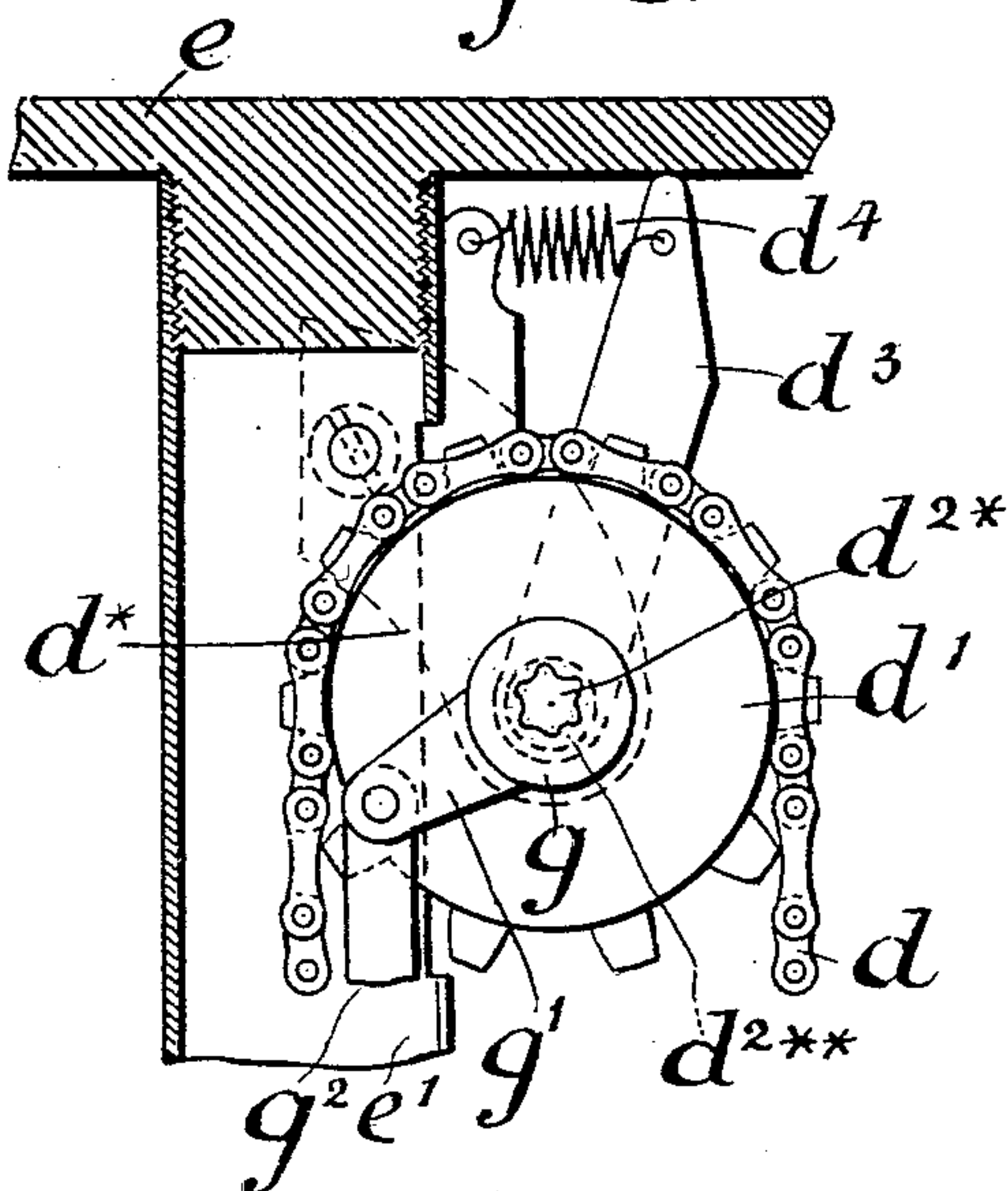
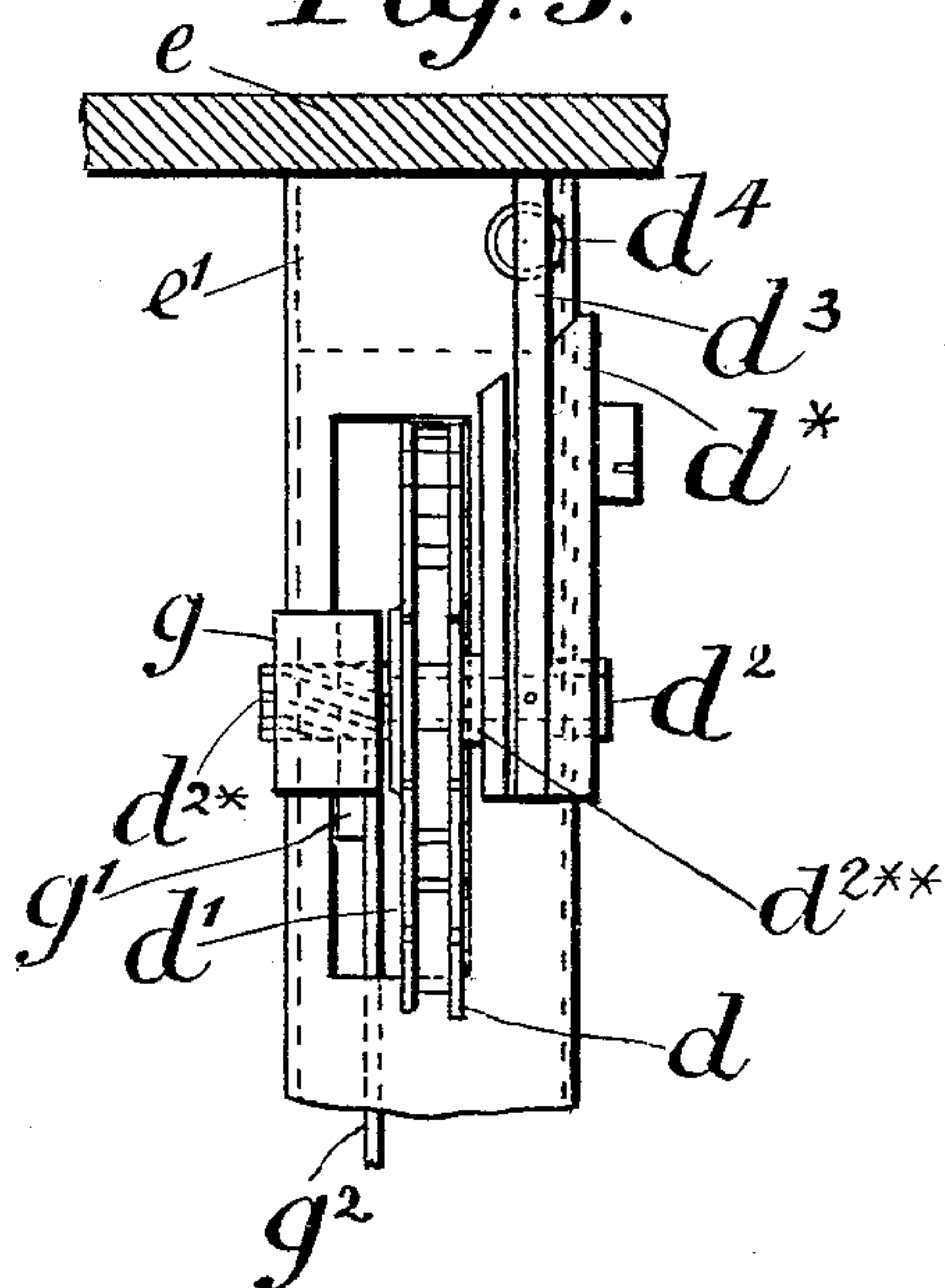


Fig: 5.



Attest:  
Geo. O. Cruise  
Walter E. Allen.

Inventor:  
William H. Akester  
By Knight Bros.  
Attorneys



# UNITED STATES PATENT OFFICE.

WILLIAM HOPKIN AKESTER, OF LONDON, ENGLAND.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 496,386, dated April 25, 1893.

Application filed September 9, 1892. Serial No. 445,474. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HOPKIN AKESTER, electrician, a subject of the Queen of Great Britain, residing at Fulham, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

This invention relates to improvements in the construction of electric arc lamps whereby the striking of the arc, the maintaining of the carbons at the required distance from each other, and the feeding of the same are effected in a more regular and reliable manner than is the case with similar lamps, as ordinarily constructed, while, at the same time, the mechanism for effecting those objects is greatly simplified and less liable to get out of order. The runner, carrying the positive or upper carbon, which is made heavier than that carrying the negative or lower carbon, is arranged to slide up and down on the two vertical side rods of the lamp in the well known manner and is connected to one end of a chain, or other suitable flexible connection which passes over a sprocket or other suitable wheel or pulley mounted on a spindle at the upper part of the lamp the other end of the flexible connection being connected to the upper part of a rod fixed to and projecting vertically from, the runner carrying the negative carbon. In close proximity to the before mentioned wheel or pulley, is arranged a solenoid, provided with a hollow movable soft iron core, through the center of which passes freely that end of the flexible connection which is connected to the runner of the positive carbon. The said wheel or pulley is mounted loosely on a spindle carried by suitable bearings in a bracket fixed to the top plate or other convenient part of the frame of the lamp. Both ends of such spindle project beyond the sides of the wheel or pulley, and upon one end, which is formed with screw threads, is placed a nut, the aperture in which is grooved to correspond with the screw threads on the spindle, fixed to and projecting from the said nut is an arm, the outer end of which is connected with the upper part of the core of the solenoid, on the opposite end of the spindle is fixed an arm the outer end of which is connected by a spring with the frame of the lamp.

In order that the said invention may be more clearly understood, and readily carried into effect, I will proceed aided by the accompanying drawings more fully to describe the same.

In the drawings—Figure 1 represents an elevation partly in section of an electric arc lamp constructed according to the present invention and with the globe removed. Fig. 2 is an elevation thereof taken at right angles to Fig. 1. Fig. 3 is a horizontal section taken on the line 1—1 of Fig. 1. Fig. 4 represents a portion of the upper part of Fig. 1 drawn to an enlarged scale, and, Fig. 5 is a similar view of the upper part of Fig. 2.

In the several figures like parts are indicated by similar letters of reference.

*a* represents the runner which carries the positive or upper carbon *a'* in the usual manner, while *b* represents the carrier for the negative or lower carbon *b'*. The carrier *a<sup>3</sup>* of the upper carbon which is insulated by a mica plate *a<sup>3\*</sup>* is made heavier than the carrier *b* of the lower carbon, and it is arranged to slide up and down upon two vertical side rods *c* of the lamp in the manner now well known, and the carrier *a<sup>3</sup>* is connected by means of a rod *a<sup>2</sup>* to one end of a chain or other suitable flexible connection *d* which passes over a sprocket wheel *d'* (or it might be any other suitable form of wheel or pulley) mounted loosely on a short shaft or axle *d<sup>2</sup>* carried in bearings in a bracket *d<sup>\*</sup>* from a tube *e'* connecting the two plates *e e<sup>\*</sup>* of the frame of the lamp, or, if desired, the bracket *d<sup>\*</sup>* might be carried by the top plate *e* or other convenient part of the frame of the lamp. The other end of the flexible connection *d* is connected with the upper end of a rod *b<sup>2</sup>* rising vertically from the carrier *b* of the negative carbon *b'*.

Immediately beneath the sprocket wheel or pulley *d'* and fixed to the tube *e'* is arranged a solenoid *f* provided with a hollow movable soft iron core *f'* through the center of which passes freely the rod *a<sup>2</sup>* which at one end is connected with the flexible connection *d* and at the other end is connected with the runner *a* of the positive carbon *a'*.

The sprocket wheel *d'* is mounted at or near the center of the shaft or axle *d<sup>2</sup>* and one end of such shaft is mounted with capability of



revolution in its bearings in the bracket  $d^*$ ,  
 a disk or collar  $d^{2**}$  being formed or fixed  
 upon the shaft  $d^3$  and located between the  
 bearings thereof and the sprocket wheel  $d'$   
 5 while the other end of the shaft or axle  $d^2$  is  
 formed with several quick screw threads  $d^{2*}$   
 thereon, upon which is placed a nut  $g$  which  
 is threaded to correspond with the thread  $d^{2*}$ .  
 The nut  $g$  has formed thereon or fixed thereto  
 10 an arm  $g'$  the outer end of which is by a link  
 $g^2$  connected with the upper end of the core  
 $f'$  of the solenoid  $f$  while upon the opposite  
 end of the shaft or spindle  $d^2$  is fixed an arm  
 $d^3$  the upper end of which is by a spring  $d^4$   
 15 connected with the frame of the lamp.

The action of the mechanism hereinbefore  
 described is as follows:—When no current is  
 passing through the lamp the superior weight  
 of the carrier  $a^3$  brings the carbons  $a' b'$  into  
 20 contact, but upon a current being admitted  
 it passes by the terminal  $f^*$  and conductor  $f^2$   
 to the coil of the solenoid  $f$  and after passing  
 therethrough it is led by the conductor  $f^3$  to  
 the carrier  $a^3$  of the upper carbon  $a'$ , it thence  
 25 passes through the carbons  $a' b'$ , carrier  $b$ ,  
 rod  $b^2$ , and the frame of the lamp to the ter-  
 minal  $e^{**}$ . The passage of the current through  
 the coil  $f$  of the solenoid causes the soft iron  
 core  $f'$  to be raised or drawn farther into the  
 30 center of the solenoid, and the arm  $g'$  of the  
 nut  $g$  is through the link  $g^2$  thereby raised  
 causing the nut  $g$  to travel upon the screw  
 thread  $d^{2*}$  upon the spindle  $d^2$  and to bind or  
 grip the sprocket wheel  $d'$  against the collar  
 35  $d^{2**}$  while in the continued ascent of the core  
 $f'$  the resistance of the spring  $d^4$  will be over-  
 come, and the spindle  $d^2$  and sprocket wheel  
 $d'$  will be partially revolved thereby separat-  
 ing the carbons  $a' b'$  and striking the arc.  
 40 The intensity of the current being now dimin-  
 ished the core  $f'$  of the solenoid  $f$  will descend  
 to its normal position, and will thereby re-  
 volve the nut  $g$  in the opposite direction and

release the sprocket wheel  $d'$  from the disk or  
 collar  $d^{2**}$  the spindle  $d^2$  being restored to its 45  
 normal position by the action of the spring  
 $d^4$  through the arm  $d^3$ .

Having now particularly described and as-  
 certain the nature of my said invention and  
 in what manner the same is to be performed, 50  
 I declare that what I claim is—

1. In an electric arc lamp, the combination  
 of two carriers for the upper and lower car-  
 bons, connected through suitable rods or the  
 like, by means of a flexible connection, a 55  
 sprocket wheel or pulley loosely mounted upon  
 its shaft over which the flexible connection  
 passes, a spring for normally holding the  
 sprocket wheel shaft in a given position, a col-  
 lar upon the shaft located upon one side of 60  
 the sprocket wheel, a screw thread upon the  
 other end of the shaft, a nut loosely engaging  
 the screw thread, a solenoid, an arm or pro-  
 jection from the nut and a link connecting  
 the core of the solenoid with such arm, sub- 65  
 stantially as herein shown and described and  
 for the purpose stated.

2. In an electric arc lamp, a regulating de-  
 vice consisting of a shaft, a wheel mounted  
 loosely thereon, a spring or the like for nor- 70  
 mally retaining the shaft in a given position,  
 a screw thread upon the shaft, a nut loosely  
 engaging the screw thread and adapted to en-  
 gage the wheel, means for causing the carbons  
 to rise and fall by the rotation of the wheel, 75  
 a solenoid and suitable connections from the  
 core of the solenoid to the nut for causing the  
 same to partially revolve with the rise or fall  
 thereof, substantially as herein shown and  
 described and for the purpose stated.

WILLIAM HOPKIN AKESTER.

Witnesses:

GEO. S. VAUGHAN,  
 57 Chancery Lane, London.

S. E. HAWKINS,  
 24 Victoria Rd., Forest Gate, London.