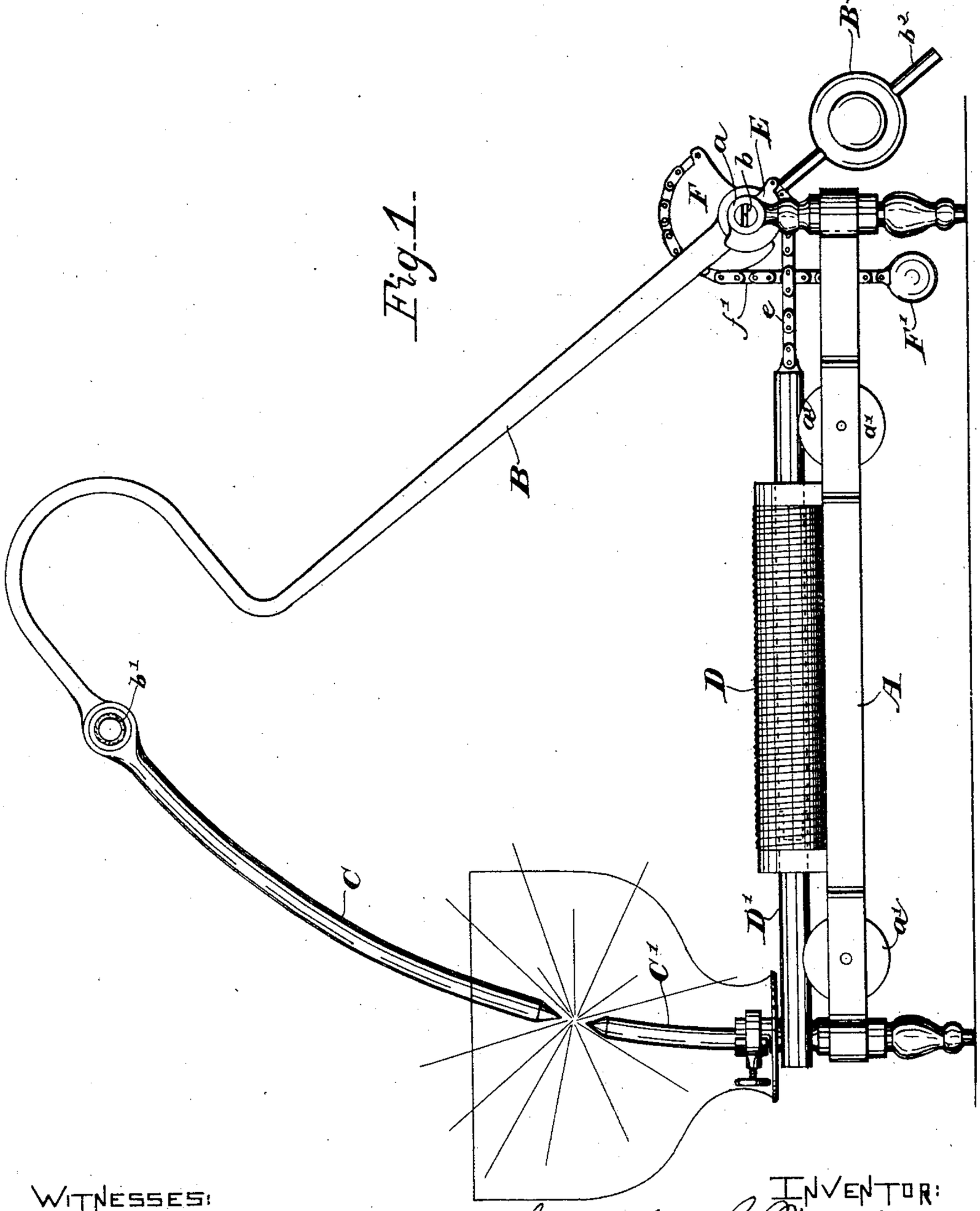
(No Model.) 2 Sheets—Sheet 1.

S. G. WOOLLEY.

ELECTRIC ARC LAMP.

No. 310,630. Patented Jan. 13, 1885.

Fig. 1.



WITNESSES:

Chas. St. Leonard.

E. H. Bradford

INVENTOR:

Leonidas G. Woolley,

per L. Bradford,

his Attorney.

(No Model.) 2 Sheets—Sheet 2.

S. G. WOOLLEY.

ELECTRIC ARC LAMP.

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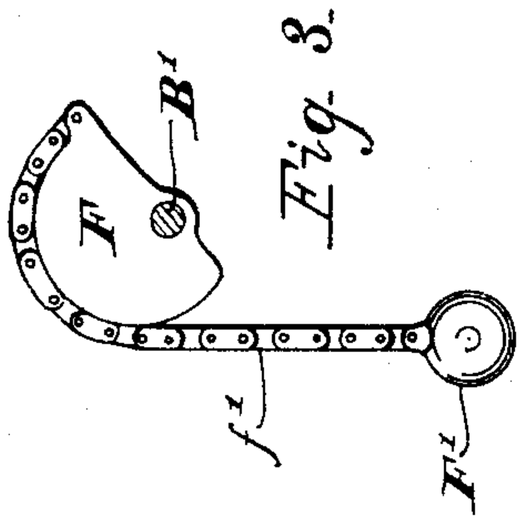

Fig. 3.

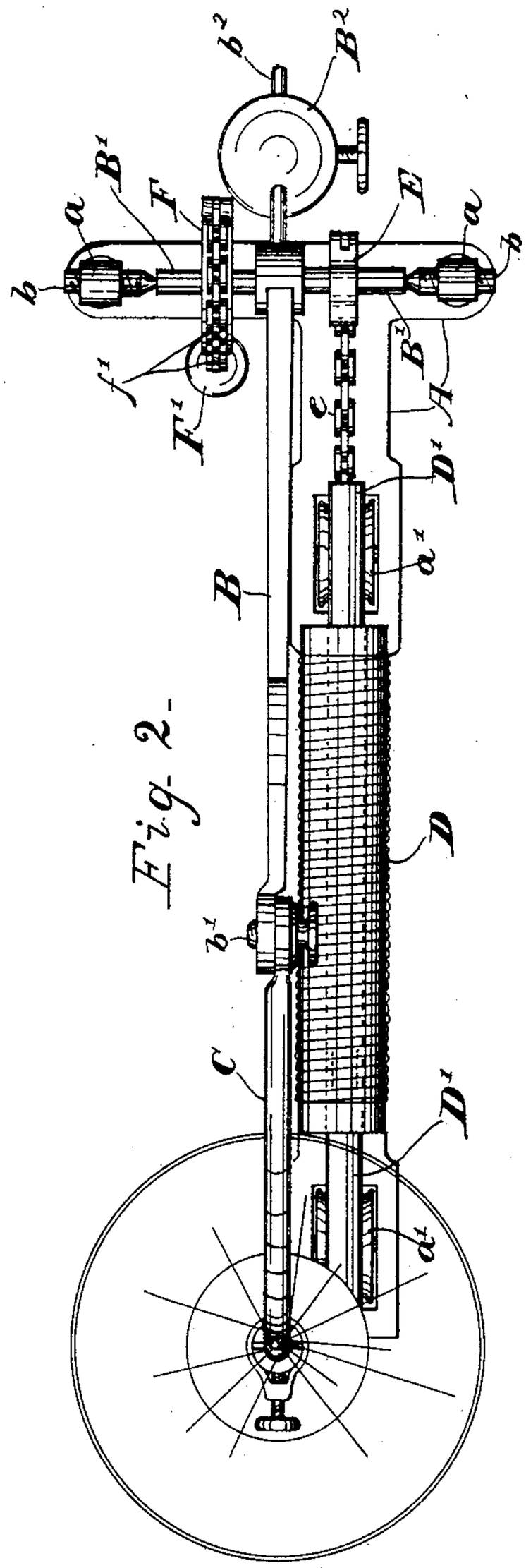

Fig. 2.

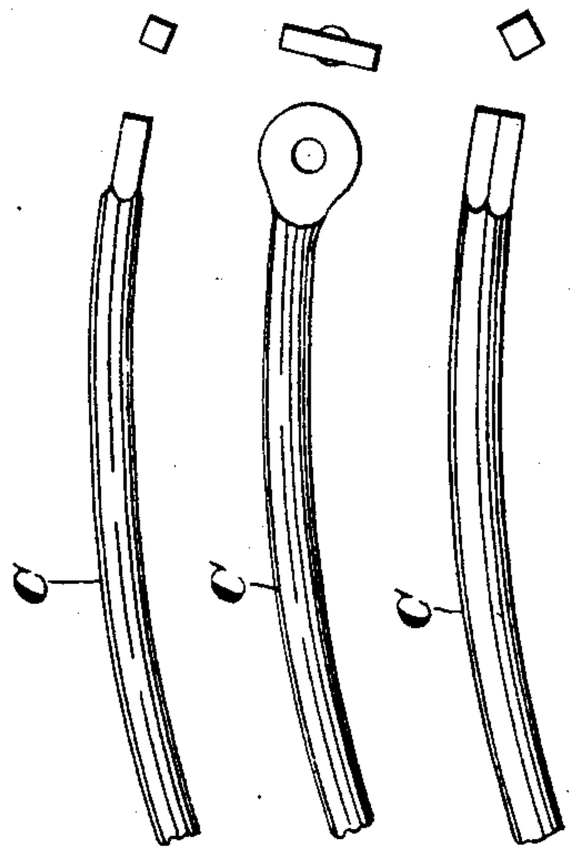

Fig. 4.

WITNESSES:

Chas. N. Leonard.

E. W. Bradford.

INVENTOR:

Leonidas G. Woolley,

per C. A. Bradford,

his attorney

UNITED STATES PATENT OFFICE.

LEONIDAS G. WOOLLEY, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE OHIO POWER AND LIGHT COMPANY, OF DAYTON, OHIO.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 310,630, dated January 13, 1885.

Application filed August 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, LEONIDAS G. WOOLLEY, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My present invention relates to certain details of construction and novel arrangement of the operating mechanism of an electric lamp, all as hereinafter described, and pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of an electric lamp embodying my invention; Fig. 2, a top or plan view of the same; Fig. 3, a detail elevation showing a cam-segment which forms one of the features of my invention and the weight attached thereto; and Fig. 4, a view showing a portion of several carbons, the ends of which are of different forms, but all adapted to be used with my improved lamp.

In said drawings, the portions marked A represent the frame-work of the lamp; B, an arm or bar pivoted thereon and carrying the carbon; C C′, the carbons; D, the solenoid, and E F segments or wheels on the shaft to the arm B.

The frame-work A is preferably a solid casting of suitable form mounted on suitable legs or a base, but may be any frame-work of the required strength and rigidity.

The arm or bar B is mounted on the pivot-shaft B′ and carries the carbon C, which it is adapted to carry forward as the latter is consumed, in the manner which will be presently described. The shaft B′ to said arm is mounted preferably on pivots *b* passing through lugs *a* on the frame A, and which are so constructed as to operate with the least possible amount of friction, so that the movement of the arm B shall be steady and uniform as the carbon is consumed.

In order to relieve the solenoid from the strain and labor of holding up the weight of the arm B and carbon C, I extend from said arm on the opposite side of the pivot-shaft a rod, b^2, on which I mount a weight, B^2, which about or quite balances said arm and carbon. As the carbon is consumed I maintain the equipoise by means of the segment F and weight F′, as will be hereinafter described.

The carbons C C′ are curved, so as to occupy an arc of a circle struck from the center of the pivots *b*, and thus that their points shall always be in the same relation without reference to the length of said carbons or the distance that said points are apart, as plainly shown in Fig. 1. I have also provided a new method of fastening the carbons to the arm.

Instead of the usual clamp into which the round ends of the carbons are inserted I have flattened the end which is to be attached to the arm, formed a hole therein, and am thus enabled to attach it to said arm by means of a simple thumb-screw, *b′*, as shown in Figs. 1 and 2. The hole is also shown in one portion of Fig. 4. It is important that the ends should be flattened for another reason—viz., that the carbon C must always be in perfect position, or it will, as it advances, get out of the proper relation to the carbon C′. By having the ends of the carbon of another than a round form, and the end of the arm B similarly formed, when the two are placed together they are always brought into the same position, and by having the supply of carbons all made alike no further attention need be paid to the matter of adjustment.

The solenoid D operates in the usual and well-known manner to regulate the approach of the carbon C toward the carbon C′ as said carbons are consumed; but its arrangement in relation to the other parts of the lamp and the means of attaching it to the arm B, I regard as novel. Said solenoid is of considerably greater length than those ordinarily used, and is placed in a horizontal position, as shown, instead of vertical, as has been usual. The core D′ passes loosely through it, and is supported by the anti-friction rollers *a′* in the frame A. It is thus permitted to move back and forth with the least possible friction. Said core is connected to the shaft B′ through the medium of the small cord or chain *c* and the segment E, and operates thereon reversely to

the weight of the arm B and carbon C. The unusual length of the solenoid D is for the purpose of obtaining as near as possible a uniform pull on the shaft B′ by the core D′ of said solenoid throughout its entire movement.

The segment F is set eccentrically on the shaft B′ and has a small weight, F′, suspended therefrom by means of the chain or cord *f*″. This small weight is for the purpose of moving the carbon forward as it is consumed and the action of the solenoid thus weakened by the consequent increasing of the length of the arc. As the carbon is consumed it becomes lighter, and the eccentric formation of the segment is to equalize this varying weight, the action of the weight F′ being greater as the carbon grows shorter and the arm approaches a more nearly horizontal position. Thus the weight B^2 does not have to be moved, and the equipoise between the arm and carbon and said weight is maintained.

I regard myself as the first inventor of a differential device for this purpose, and therefore do not desire to be understood as limiting myself to the form shown, as other forms may be employed.

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

1. The combination, in an electric lamp, of the carbon-carrying pivoted swinging arm, a cam-segment on the same shaft therewith or attached thereto, and a weight suspended to said segment, whereby as the carbon is consumed and said arm approaches a more nearly horizontal position the lost weight is compensated for, substantially as set forth.

2. In an arc lamp and in combination with the fixed carbon thereof, the curved carbon secured to the pivoted and balanced arm or lever, the compensating balance for the carbon and the attached core and operating solenoid, substantially as described.

3. In an arc lamp, the combination of a counterbalanced arm or lever carrying one of the carbons, an electro-magnet operating upon said arm in opposition to the weight of the carbon to restrain its movements toward the opposite carbon, and a compensating device acting in opposition to the counter-weight, and with a force increasing in proportion to the consumption of the carbon and its diminution in weight, substantially as described.

4. In an electric lamp, a curved carbon provided with a flattened or angular portion for attachment to the holder to prevent the displacement of the carbon, substantially as described.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 25th day of August, A. D. 1883.

LEONIDAS G. WOOLLEY. [L. S.]

In presence of—
C. BRADFORD,
CHAS. N. LEONARD.

Corrections in Letters Patent No. 310,630.

It is hereby certified that Letters Patent No. 310,630, granted January 13, 1885, upon the application of Leonidas G. Woolley, of Indianapolis, Indiana, for an improvement in "Electric Arc Lamps," was erroneously issued to "The Ohio Power and Light Company, of Dayton, Ohio," as assignee; that said Letters Patent should have been issued to *The American Electric Headlight Company, of same place;* and that the proper correction has been made in the files and records of the case in the Patent Office and should be read in the Letters Patent to make the same conform thereto.

Signed, countersigned, and sealed this 14th day of July, A. D. 1885.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:
M. V. MONTGOMERY,
Commissioner of Patents.