(No Model.) 2 Sheets—Sheet 1.

H. B. SHERIDAN.

ELECTRIC LAMP.

No. 253,776. Patented Feb. 14, 1882.

Fig. 1

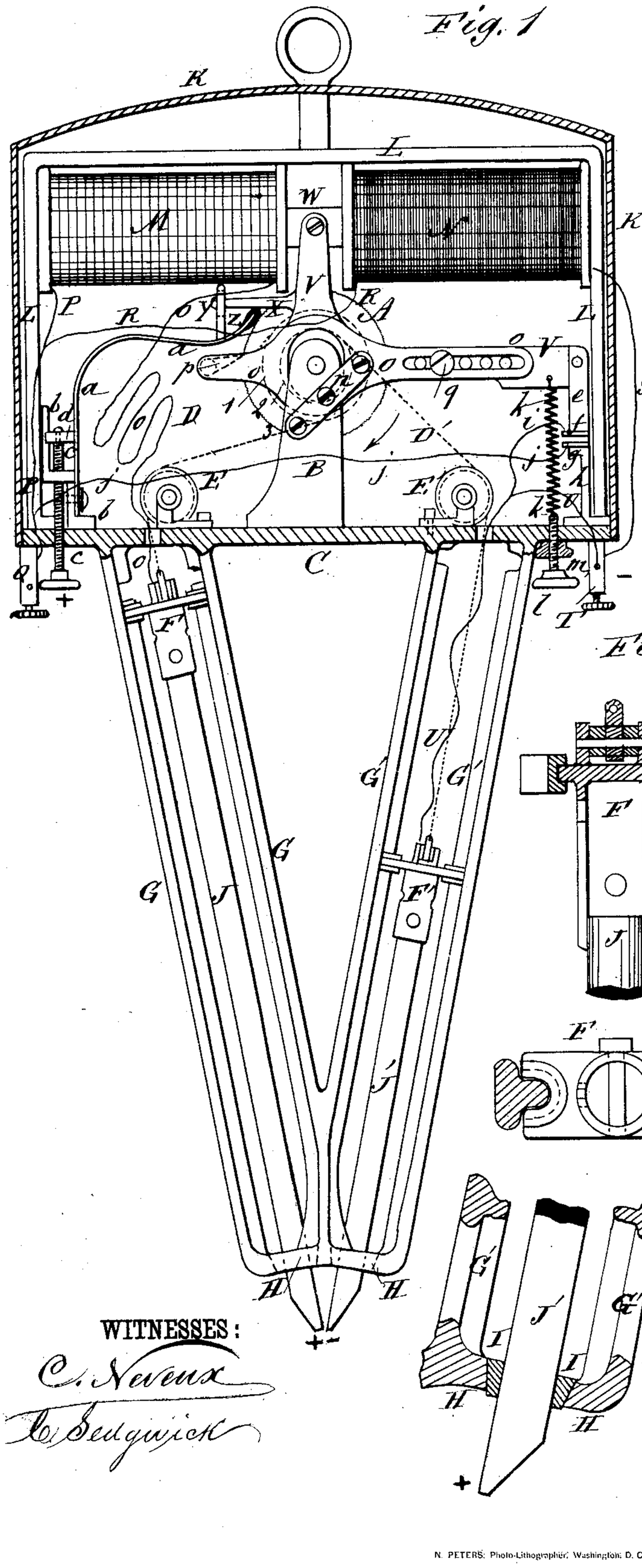

Fig. 2

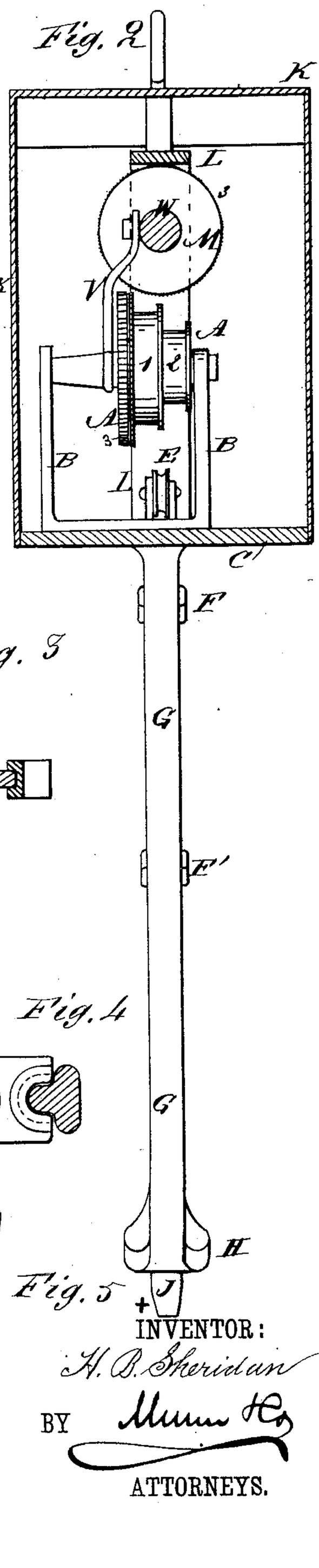

Fig. 3

Fig. 4

Fig. 5

WITNESSES:

C. Neveux

E. Sedgwick

INVENTOR:

H. B. Sheridan

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 6

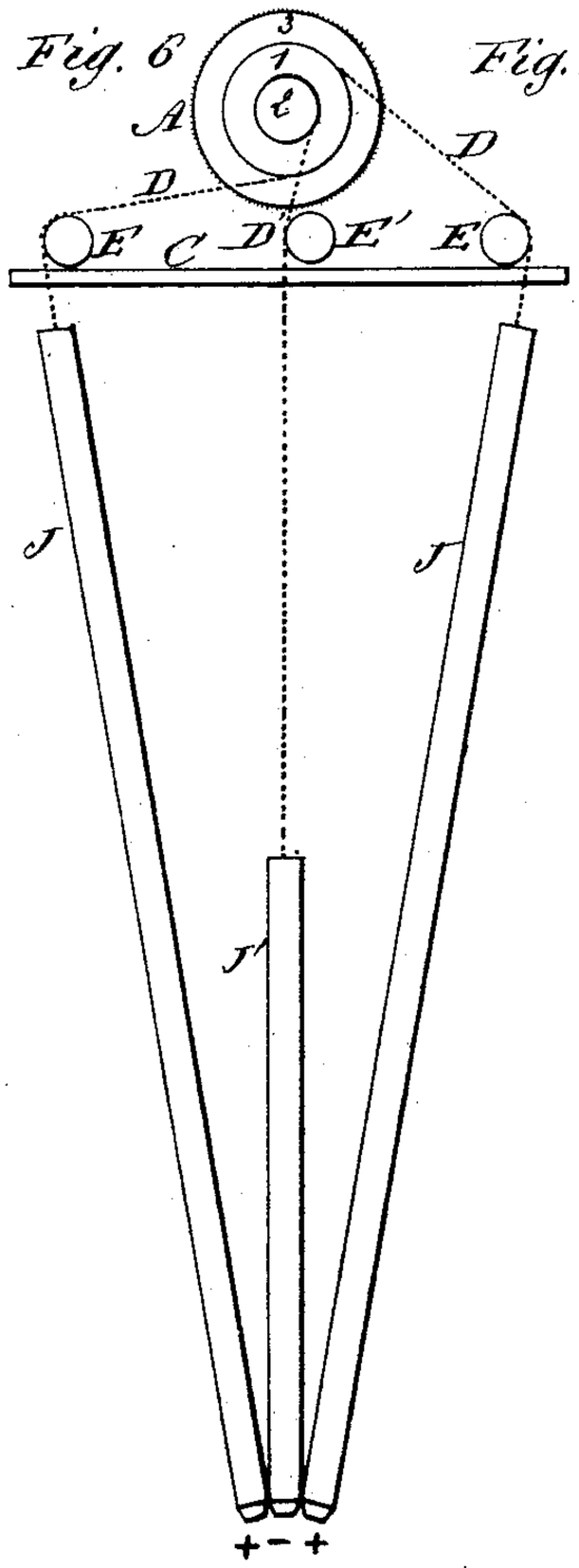


Fig. 7

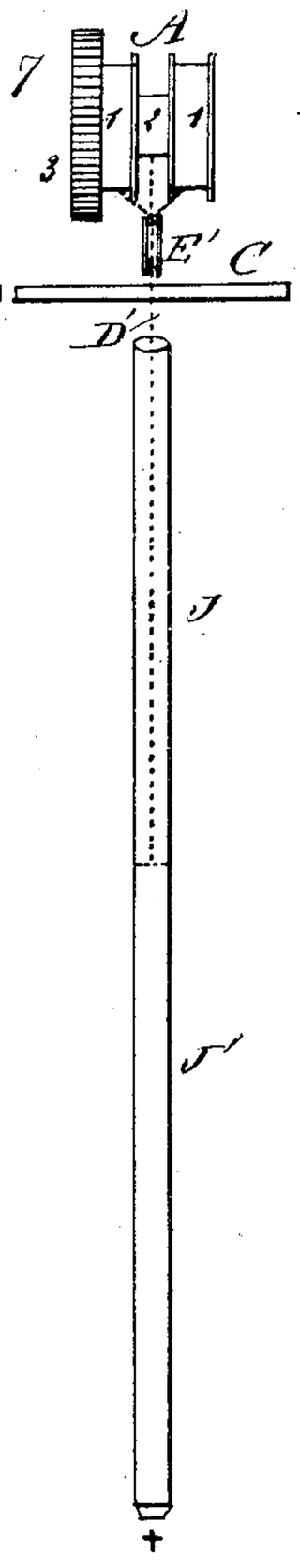


Fig. 10

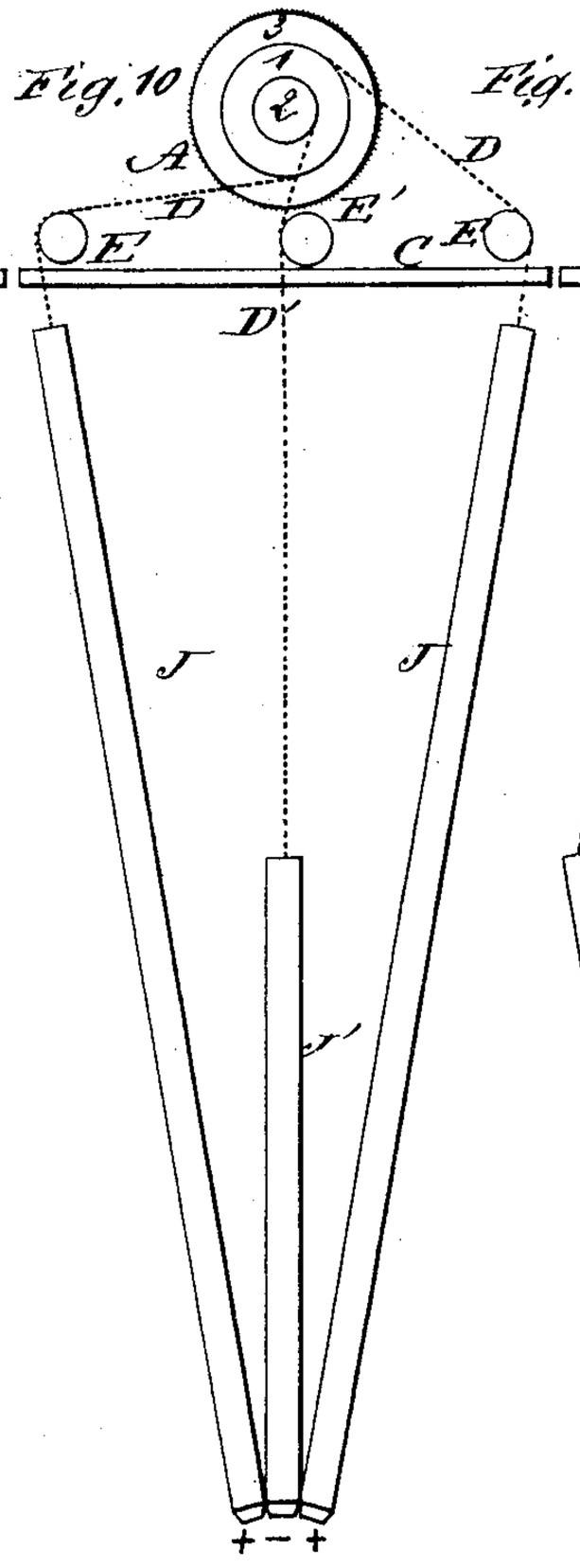


Fig. 11

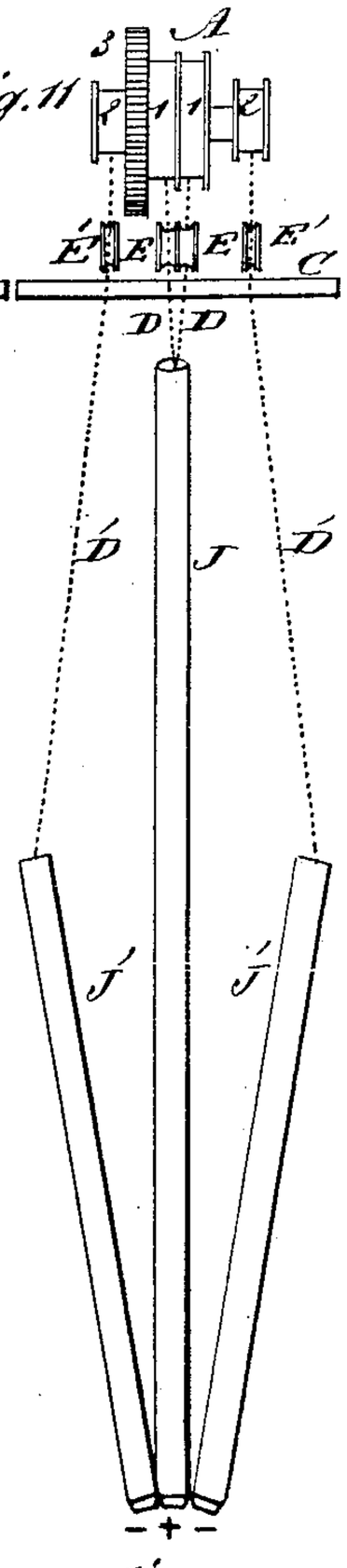


Fig. 13

Fig. 8

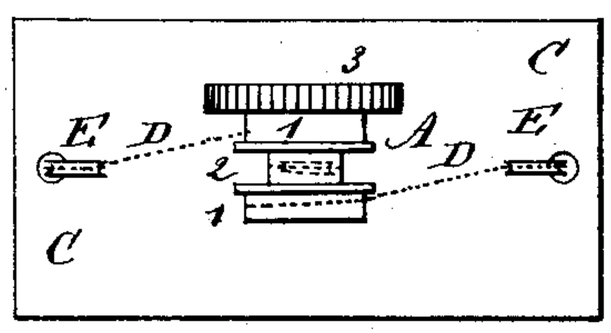


Fig. 9

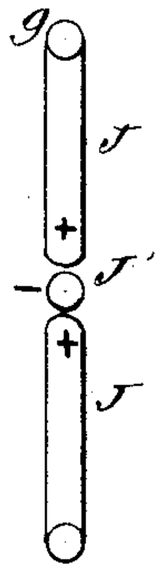
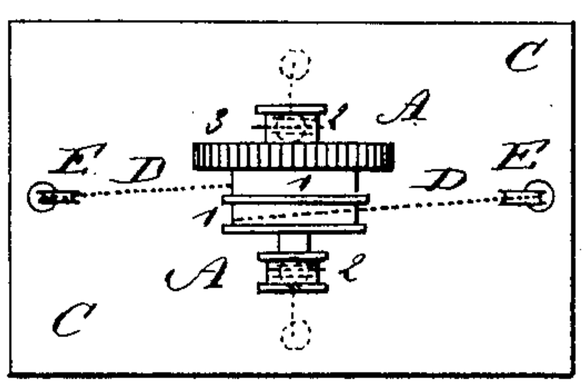
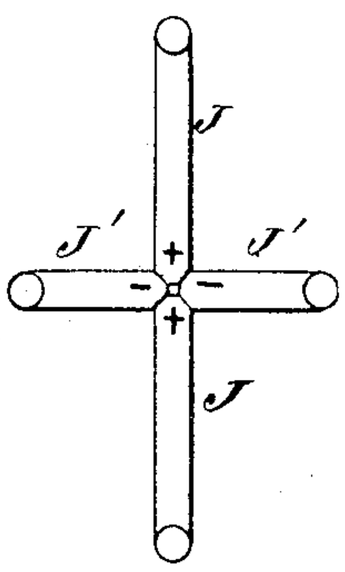


Fig. 12





WITNESSES:

C. Neveux

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INVENTOR:

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY B. SHERIDAN, OF CLEVELAND, OHIO.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 253,776, dated February 14, 1882.

Application filed October 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. SHERIDAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Electric Lamps, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a front elevation of my improvement. Fig. 2, Sheet 1, is a side elevation of the same. Fig. 3, Sheet 1, is a sectional elevation of one of the carbon-holders. Fig. 4, Sheet 1, is a plan view of a carbon-holder, showing the guides in section. Fig. 5, Sheet 1, is a sectional elevation of a part of the lower end of the guides. Figs. 6, 7, 8, and 9, Sheet 2, show a modification in which three carbons are used. Figs. 10, 11, 12, 13, Sheet 2, show a modification in which four carbons are used.

This invention relates to an improvement in electric lamps, and has for its object to obtain a steadier light than has heretofore been found practicable. In this improvement, the electrodes or carbons meeting in a converging direction and being separated in a diverging direction, the separation of the carbon points will be only a fraction of the distance through which the carbons are moved, and the voltaic arc will be produced underneath by the separation of the electrodes or carbons through which an electrical current is passing, and can be more precisely regulated than under the conditions or methods now generally used in electric lamps.

K represents the cover or case that incloses the feeding mechanism of the lamp, and which is attached to a plate, C. To the plate C are also attached the ends of an arched or U-shaped bar, L, to the upper parts of the arms of which are secured the two magnet-coils, M N. The coils M N are unequal in resistance, and are placed opposite to or in line with each other horizontally, and at a little distance apart.

A represents the three-part cone-pulley, which is journaled to the U-shaped frame B, attached to the bed-plate C of the lamp. To the parts 1 and 2 of the cone-pulley A are fastened chains D D′, which pass over guide-pulleys E E′ and are attached to the carbon-holders F F′. The carbon-holders F F′ slide up and down upon guides G G G′ G′, attached at their upper ends to the bed-plate C. The pairs of guides G G G′ G′ incline toward each other, and terminate in a plate, H, through which are formed guide-holes for the passage of the carbons, the said holes being lined with fire-clay, cement, or other suitable material, as shown at I in Fig. 5. The positive carbon J is connected by its holder F and chain D with the part 1 of the cone-pulley A. The negative carbon J′ is connected by its holder F′ and chain D′ with the part 2 of the cone-pulley A. The convergence of the guides G G G′ G′ is such that the points of the carbons J J′ will meet a little below the terminal plate H at the lower ends of the said guides.

The part 1 of the cone-pulley A is twice the diameter of the part 2, and the chains D D′ are wound upon the said parts in the same direction, so that when the said cone-pulley A is revolved in the direction of the arrow the two chains D D′ will be unwound, and the carbons J J′ will be fed downward in a converging direction, and will meet at a little distance below the plate H. When the cone-pulley A is revolved in the opposite direction the chains D D′ will be wound upon the parts 1 2 of the cone-pulley A, and the carbons J J′ will be separated in an upward diverging direction, the amount of separation between the carbon points caused by a given upward movement of the carbons being less or greater according as the carbons diverge at a less or greater angle.

If desired, the carbons can be arranged to converge upward and diverge downward.

I have described my improvement as applied to a lamp having two carbons; but it can also be applied to a lamp having three carbons—two positive and one negative—as shown in Figs. 6, 7, 8, and 9. In this case the cone-pulley A must be made with two parts, 1, of equal size, to receive the two chains leading to the holders of the positive carbons J.

The improvement can also be applied to an arrangement of four carbons—two positive and two negative—the lower ends of all four carbons converging downward to a point and being separated by an upward-diverging movement. In this case the cone-pulley A must be made with two larger parts, 1, and two smaller parts, 2. This arrangement is shown in Figs. 10, 11, 12, and 13. This arrangement is designed for lamps supplied from a generator of continuous current. When the lamps are to be supplied from a generator of alternating current the parts 1 2 of the cone-pulley A, around which the chains D D′ are wound, should be of the same diameter, and the carbons J J′ should be of the same length.

Carbons of convenient size will be used.

To the carbon-holder F is attached the end of a conduction-wire, O, the other end of which is connected with the end of the low-resistance coil M. With the other end of the coil M is connected the end of a conducting-wire, P, the other end of which is attached to the positive binding-post Q. With the conducting-wire P is connected a branch conducting-wire, R, the other end of which is connected with the end of the high-resistance coil N. With the other end of the coil N is connected the end of a conducting-wire, S, the other end of which is connected with the negative binding-post T. To the negative binding-post T is also attached the end of a conducting-wire, U, the other end of which is attached to the carbon-holder F′. With this construction the high-resistance coil N is always in the line-curcuit, but the low-resistance coil M is in a line-circuit only when a connection is made through the carbons J J′.

To the journal of the cone-pulley A, at the side of the largest part 3 of the said pulley, is pivoted at its angle a right-angled lever, V, the upper end of which is pivoted to the center of the armature W, the end parts of which slide in the magnet-coils M N.

Upon the middle part of the upright arm of the lever V, at the side opposite the horizontal arm of the said lever, is formed a horizontal arm, X, to the outer end of which is secured by a screw, Y, an upright plate, Z. The plate Z is slotted vertically to receive the screw Y, so that the said plate Z can be moved up and down, as may be required. The lower end of the plate Z rests upon a spring, *a*, the inner end of which rests upon the face of the part 3 of the cone-pulley A. The part 3 of the cone-pulley A is made a little larger than the part 2, and has its face provided with small teeth.

The outer or lower end of the spring *a* is secured to the lower part of the standard *b*, the lower end of which is secured to the base-plate C. The standard *b* is made with an offset in its middle part, and has a screw-hole formed through the said offset to receive the hand-screw *c*, which passes up through a hole in the base-plate C.

To the upper end of the screw *c* is swiveled a block, *d*, the inner edge of which rests against the outer side of the spring *a*, so that the tension of the said spring can be regulated by turning the said screw *c*. The outer edge of the block *d* is notched to receive the upper part of the standard *b*, to prevent the said block *d* from being turned by the turning of the screw *c*

To the outer end of the horizontal arm of the angled lever V is attached a downwardly-projecting non-conducting bar, *e*, which has a small copper plate, *f*, attached to its lower end. Directly opposite and at a little distance from the copper plate *f* is placed a corresponding copper plate, *g*, which is attached to the upper end of the non-conducting standard *h*. The lower end of the standard *h* is secured to the base-plate C. To the copper plates *f g* are attached the ends of the conducting-wires *i j*. The other end of the wire *i* is secured to the negative binding-post T, or to the wire U, leading to the said binding-post T. The other end of the wire *j* is secured to the positive binding-post Q, or to the wire P, leading to the said post Q. With this construction, when the bar *e* moves downward and brings the copper plate *f* in contact with the copper plate *g* a direct connection will be formed between the binding-posts Q T, and consequently with the line-circuit.

To the outer part of the horizontal arm of the angled lever V is attached the upper end of a spiral spring, *k*, the lower end of which is attached to the upper end of the screw *l*. The screw *l* passes through the base-plate C, and has a hand-nut, *m*, screwed upon it below the said plate C, to lock the said screw securely in any position into which it may be adjusted to give any desired tension to the spring *k*.

To an arm, *n*, attached to or formed upon the upper part of the standard B, is pivoted a lever, *o*, which has a cross-slot in its forward arm to receive the journal of the cone-pulley A and allow the said lever *o* to move upon its pivot. To the end of the forward arm of the lever *o* is pivoted a pawl, *p*, which rests upon and engages with the teeth of the part 3 of the cone-pulley A. The other or rear arm of the lever *o* is connected with the horizontal arm of the angled lever V by a screw, *q*, which passes through a slot in the said lever *o* and screws into a hole in the said lever V. Several holes are formed in the arm of the lever V to receive the screw *q*, so that the point of connection between the levers V *o* can be adjusted at a greater or less distance from the pivoting-point of the said lever *o*, as may be required. When the lamp is burning an electric current passes from the positive binding-post Q, along the wire P, through the low-resistance coil M, along the wire O to the carbon J, through the carbons J J′, along the wire U to the negative binding-post T, and on through the line-circuit. At the same time a branch or second current passes from the positive binding-post Q, along the wire R, through the high-resistance coil N, along the wire S

to the negative binding-post T, and on through the line-circuit. The passage of the electric currents through the carbons brings the adjacent points of the said carbons to a glow-heat, and at the same time the low-resistance coil M attracts the armature W and causes the said armature to move farther into the said coil M. The forward movement of the armature W moves the lever V forward and presses the plate Z down upon the spring *a* and the spring *a* down upon the part 3 of the cone-pulley A, turning the said cone-pulley forward, or in the inverse direction of the arrow. The forward movement of the cone-pulley A winds the chains D D′ upon the parts 1 2 of the said cone-pulley A and separates the carbons. This separation of the carbons, in connection with the passing electrical current, produces the voltaic arc.

The lamp will continue to burn with the various parts in the positions described until the points of the carbons become so much separated by combustion that the electrical current through the coil M becomes weaker than the electrical current through the coil N. When this occurs the coil N becomes the stronger and attracts the armature W, causing the said armature W to move out of the coil M and into the coil N, and moving the lever V in the same direction. This movement of the lever V raises the plate Z from the spring *a* and moves the lever *o* in the same direction, the pawl *p* engaging with a tooth of the part 3 of the cone-pulley A and turning the said cone-pulley in the direction of the arrow, and lowering the carbons.

On account of the levers V *o* having different fulcrums while being connected together, the pawl *p* will travel faster and farther than the holding-plate Z, and the cone-pulley A will make its movement before being fully released from the spring *a*. As the current is restored to the coil M by the approach of the carbons the armature W is again moved forward and the plate Z is again pressed down upon the spring *a*, separating the carbons to the proper distance to produce the arc. These various movements occur so nearly simultaneously and continuously that there is no perceptible change in the location or intensity of the light until the carbon-holders can move down no farther and the carbons are so far separated by combustion as to break the circuit through them. When this occurs the coil N attracts the armature W and moves the levers V *o*, but cannot restore the circuit through the coil M, as the carbons cannot move any farther downward, so that the armature W will pass so far into the coil N that the movement of the lever W will bring the copper plate *f* in contact with the copper plate *g*, so that the electrical current will pass through the wires *j i* and on through the line-circuit. By this arrangement one lamp in a series can go out without in any way affecting the burning of the other lamps in the said series.

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

In an electric lamp, the combination, with the base-plate C and the carbon-holders F F′, controlled by the movements of the cone-pulley A, of two or more pairs of converging guide-rods, G G G′ G′, connected at their lower ends by a plate, H, provided with cement-lined guide-perforations for the carbons, substantially as herein shown and described, whereby the carbons are made to approach each other on converging lines and separate on diverging lines, as set forth.

HENRY B. SHERIDAN.

Witnesses:

JAMES T. GRAHAM,

C. SEDGWICK.