(No Model.)

A. J. B. CANCE.

ELECTRIC LAMP.

No. 252,182. Patented Jan. 10, 1882.

Fig. 1.

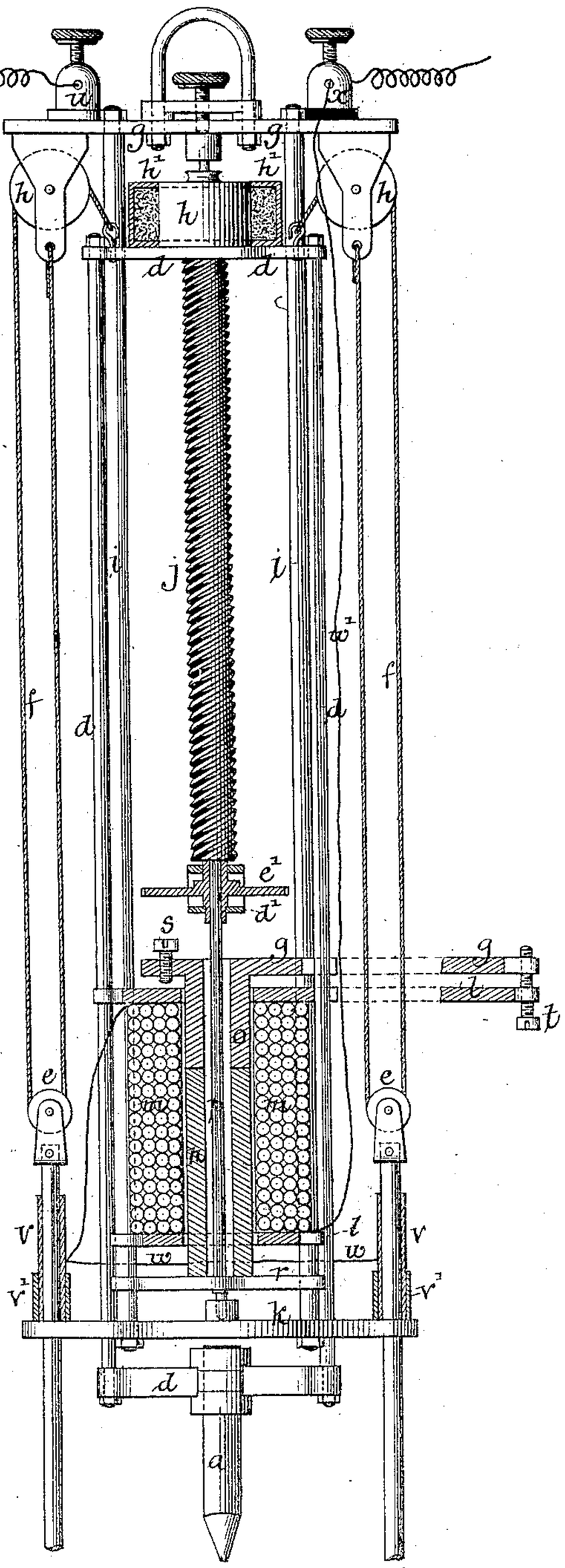


Fig. 3.

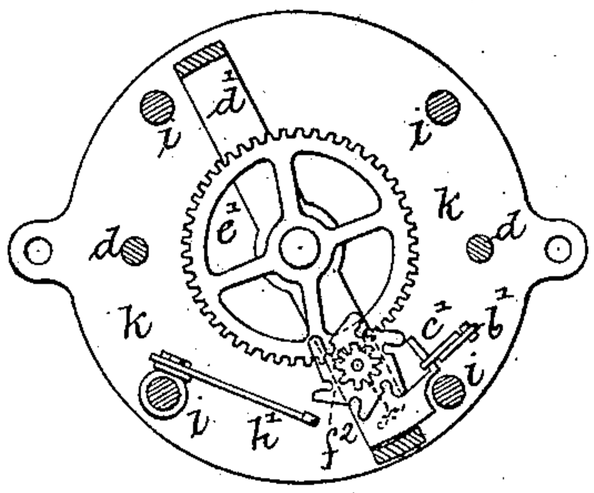


Fig. 2.

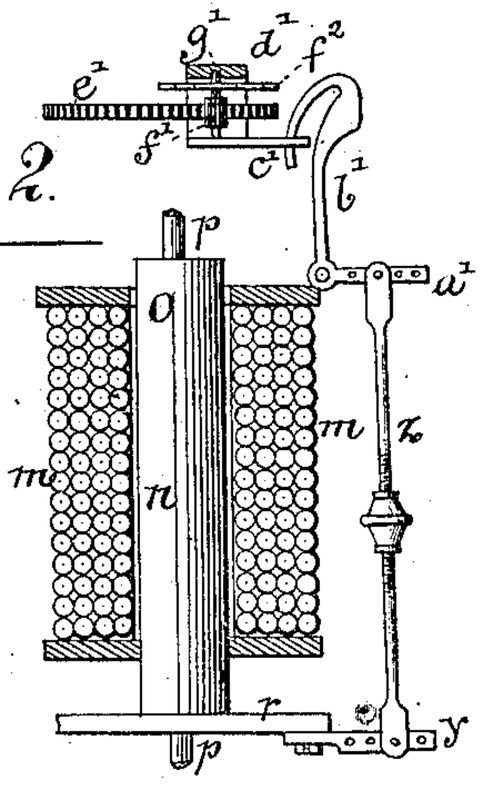


Fig. 4.

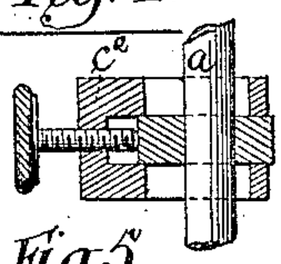
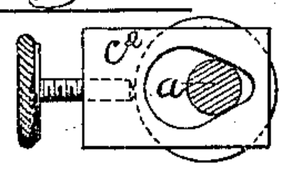
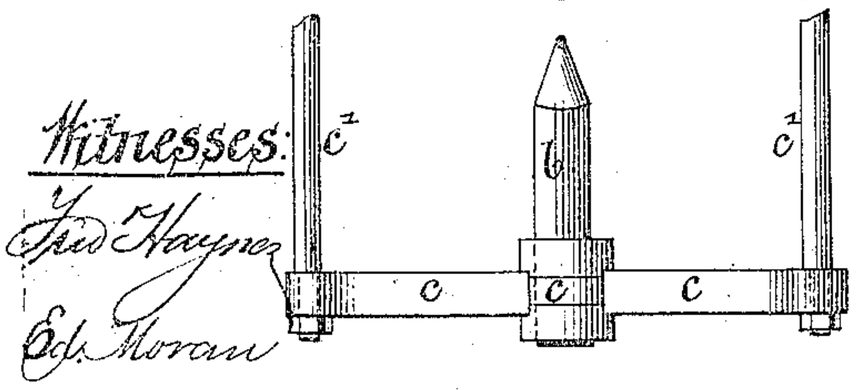


Fig. 5.





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UNITED STATES PATENT OFFICE.

ALEXIS JEAN BAPTISTE CANCE, OF PARIS, FRANCE.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 252,182, dated January 10, 1882.

Application filed October 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALEXIS JEAN BAPTISTE CANCE, of Paris, in the Republic of France, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to electric lamps of the voltaic-arc kind; and it consists in novel mechanism for effecting the movement of the carbons toward each other as they are consumed, and for regulating such movement so as to maintain a fixed luminous point.

Figure 1 in the drawings represents a vertical section of an electric lamp with my improvements. Fig. 2 is a partial vertical section of the devices for feeding the carbons. Fig. 3 is a plan of the feeding devices. Figs. 4 and 5 are detail views, which will be hereinafter explained.

As may be seen in the drawings, the carbons *a b* are secured firmly in two holders, *c c'* and *d*, formed of rods united by cross-heads. The first holder, *c c'*, which carries the lower carbon, *b*, has attached to its upper part pulleys *e e*, under each of which passes one of two suspension-cords, *f*, of which one of the extremities is attached at a fixed point to the upper platform, *g*, of the framing of the apparatus, while the other passes over a pulley, *h*, and is attached to the second carbon-holder, *d*, in which is secured the upper carbon, *a*. The carbon-holder *d* has secured upon it a motor-weight, *h*, around which is a box, *h'*, containing a variable quantity of granulated lead, and guided in its descent, but prevented from turning, by the columns *i* of the framing. This weight contains a central female thread, so that it constitutes a nut to a screw, *j*, having a thread of rapid pitch, which is incapable of longitudinal movement, but capable of turning on its axis, the pivots at its extremities being fitted to bearings in the upper and lower platforms, *g* and *k*, of the framing. The weight *h* tends constantly to produce the descent of the upper carbon and to turn the screw *j*, at the same time tending, by the action of the cords *f*, to raise the lower carbon. The tendency is therefore to bring the two carbons toward each other.

The two platforms *g* and *k* above mentioned are secured together by the four columns *i*, which guide the weight *h* and its contained nut, the said columns and platforms constituting the fixed framing of the apparatus. The lower platform, *k*, of this framing carries two supports, *l*, which sustain a coil, *m*, in the interior of which is a core, *n*, which is tubular and may move freely. This core is terminated at its upper part by a prolongation, *o*, of the same form, made of copper and of a length proportioned to the magnetic intensity desired to be obtained. The screw *j* is terminated at its lower end in a prolongation, *p*, in which its lower pivot is formed, and which passes through the hollow core *n*. The prolongation is made of copper to prevent any magnetic effect. The weight of the core *p* may be more or less lightened by the application to it of spiral springs.

The coil *m*, placed in the circuit of the light, constitutes the regulator. To this end the core *n* carries at its upper and lower ends cross-heads *q r*, which rise and fall with it and are guided by the columns *i*. An adjustable stop-screw, *s*, screwing through the upper cross-head, *q*, and capable of abutting against the upper head of the bobbin of the coil *m*, serves to regulate in the first place the position of the core in the interior of the coil, and afterward the position of the escapement-wheel which stops the movements of the carbons, as will be hereinafter described. A second adjustable stop-screw, *t*, applied at the other extremity of the same cross-head limits the separation of the carbons, and consequently the length of the arc.

The operation of the lamp is as follows: Before lighting, the carbons are in contact. The current arriving in the apparatus by the binding-screw *u* on the top of the framing passes through the framing and thence to the upper carbon-holder, *d*, and to the upper carbon, *a*. The contact between the carbons being made, the current passes through the lower carbons, *b*, and the lower cross-head, *c*, and along the rods *c'* of its holder. These rods *c'* slide easily through fixed guides *v* on the lower platform, *k*, of the framing. These guides are insulated from the framing at *v'*, but not from the rods, and they are connected by a conducting-wire,

w, which is also connected with one end of the wire of the coil *m*, the other end of which is connected by a conducting-wire, *w'*, with an insulated binding-screw, *x*, on the upper platform, *g*, of the framing. From the rods *c'* the current passes by the guides *v* and the wire *w* through the coil *m* and wire *w'* and out by the binding-screw *x*. In passing through the coil the current actuates the core *n*, which rises suddenly, determining the separation of the carbons in the following manner: The lower cross-head of the core carries an arm, *y*, to which is attached a rod, *z*, of adjustable length, which connects with one arm, *a'*, of an elbow-lever which is articulated to the framing, and whose other arm, *b'*, is widened and presents a curved slot in which is engaged a finger, *c'*, forming a rigid portion of a frame, *d'*, which is fitted loosely on the prolongation *p* of the screw *j*. Inside of this frame *d'* is a toothed wheel, *e'*, the hub of which is journaled loosely in the said frame and keyed to the prolongation *p* of the screw *j*. This wheel, which turns with the screw, gears with a pinion, *f'*, the arbor *g'* of which is fitted to bearings in the frame and carries the escapement-wheel f^2, which turns toward a stop-spring, *h'*, attached to the platform *k*, or turns away therefrom, according as the carbons approach or retire from each other. I preferably give the wheel the special form represented in Fig. 3, which permits it to perform both the function of brake and stop. Two consecutive notches of this wheel are in effect separated by a tooth upon which the stop-spring presses, and which suffices to stop the wheel when the magnetic variation due to the drawing together of the carbons has not been sufficient to bring the notch opposite the stop-spring, and facilitates thus a subsequent drawing together. At the instant of lighting, the core is caused to rise quickly. It takes with it the rod *z*, which causes the elbow-lever *a' b'* to move, so that the slot in the arm *b'* of the said lever pushes the frame *d'*, which contains the escapement-wheel, against the stop-spring *h'*, which then enters one of the notches of the said wheel and prevents it and the pinion *f'*, which is fast to it, from turning. This pinion, always engaged with the wheel *e'*, causes the latter to turn a certain distance in the direction opposite to that in which the weight or nut *h* tends to turn the screw *j*. As this wheel *e'* is fast on the screw, the latter turns with it, and causes the weight or nut *h* to rise a certain distance, and to raise the upper carbon-holder, *d*, and upper carbon, *a*, while the lower carbon-holder, *c c'*, and its carbon descend a corresponding distance. The separation of the carbons being thus made, the arc is produced, the magnetic intensity of the coil diminishes as the carbons are consumed, the core tends to descend, and the escapement-wheel tends to move away from the stop-spring until it escapes therefrom, permitting an approach or advance of the carbons according to their consumption. The same effects are constantly reproduced, and the regular operation of the apparatus is assured until the carbons are completely used, or the extinction of the light is desired.

I will mention besides that the coil and hollow core above described may be replaced by an equivalent device, consisting of an ordinary electro-magnet inverted. The prolongation *p* of the screw then passes freely through the breech of said magnet and the armature placed at the lower part. The armature, acting like the hollow core previously described, is connected with the rod *z*, hereinabove described, which acts upon the feeding mechanism, and the apparatus operates in the same manner. The advantage of this arrangement is that it admits of the employment of a finer wire and of giving more sensitiveness to the regulator.

The lamp represented in the drawings is principally intended to operate alone in a circuit, although two or several such may be placed in the same circuit, nevertheless, in the latter case, I prefer to replace the magnetic apparatus above described by an induction apparatus, in order to better assure the working of the lamps. The lamp is combined for operating with continuous currents, in which case the carbon with positive pole is used twice as fast as the other. To employ alternative currents, with which the consumption of the carbons is equal, it suffices to make the diameter of the suspension-pulleys *e* of the lower carbon-holder of equal size with those of the pulleys *h*.

I will add that the centering of the carbons in their holders is very simple. The cross-head of each holder has in it a hole of a diameter sufficient to receive the largest carbon that may be employed, and there is fitted to it a clamp which embraces it, and which has in it a hole as large or larger, terminating on one side in an angular projection, as shown in Figs. 4 and 5. The carbon passes through the three holes—viz., two in the clamp and two in the cross-head—and a screw screwing through the head of the clamp permits it to be drawn aside on the cross-head and to clamp the carbon, which is thus always exactly centered and held without danger of breakage, whatever may be its diameter.

What I claim as my invention is—

The combination, with the carbon-holders, the motor-weight *h*, and its contained nut, of the screw *j*, having a prolongation, *p*, and an attached toothed wheel, *e'*, the coil *m*, and its hollow core *n*, the rods *z*, and lever *a' b'*, the frame *d'*, fitted loosely to the screw *j*, the pinion *f'*, escapement-wheel f^2, and stop spring *h'*, substantially as and for the purpose herein described.

ALEXIS JEAN BAPTISTE CANCE.

Witnesses:

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