(No Model.) 2 Sheets—Sheet 1.

E. PICKERING.

ELECTRIC ARC LAMP.

No. 306,517. Patented Oct. 14, 1884.

Fig. 1

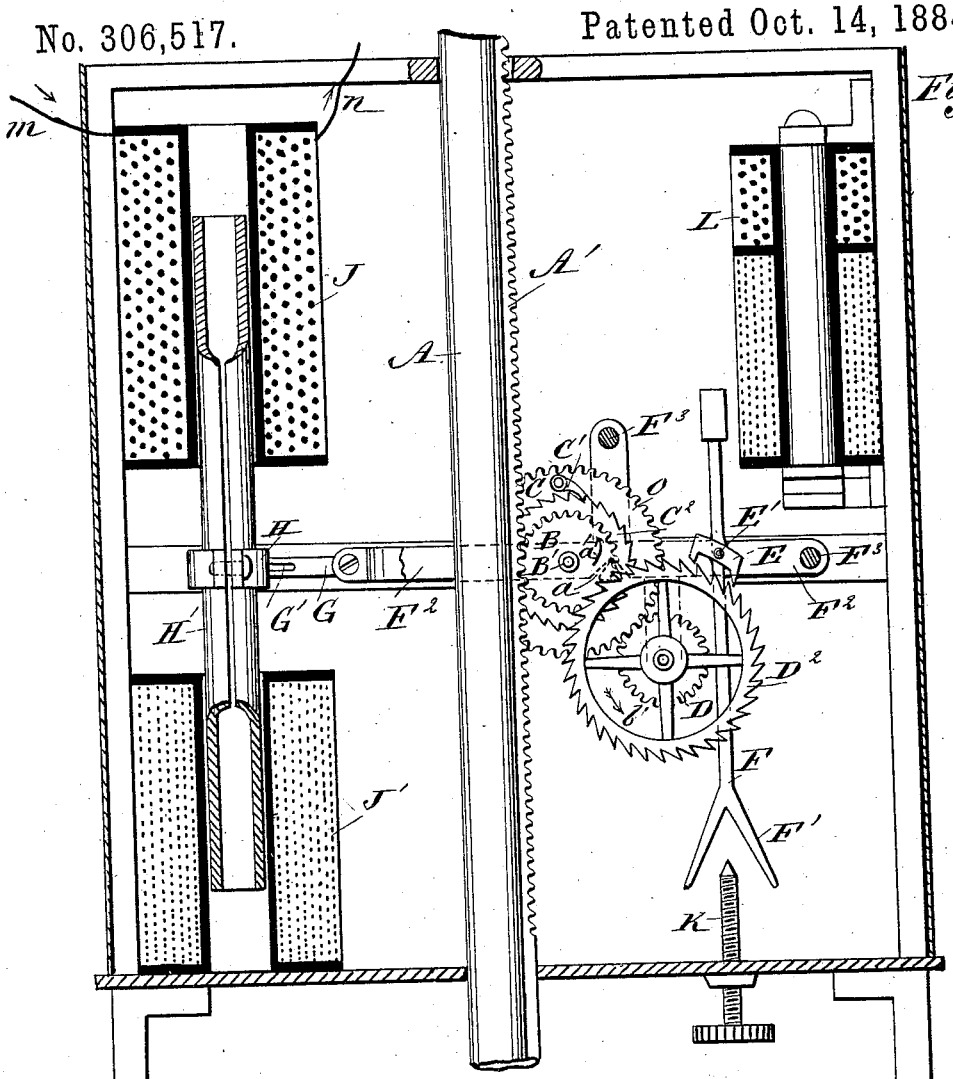
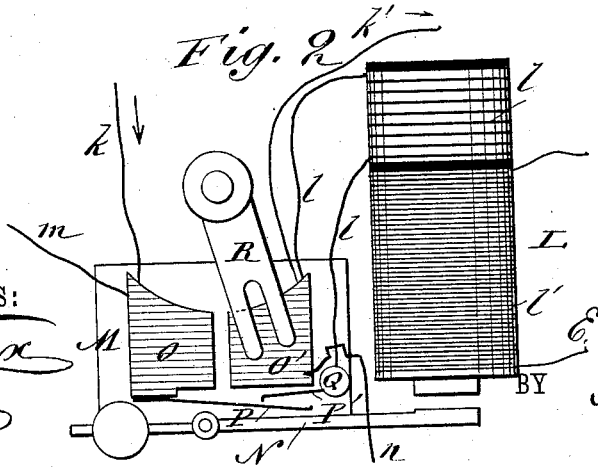


Fig. 2



WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

E. Pickering

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

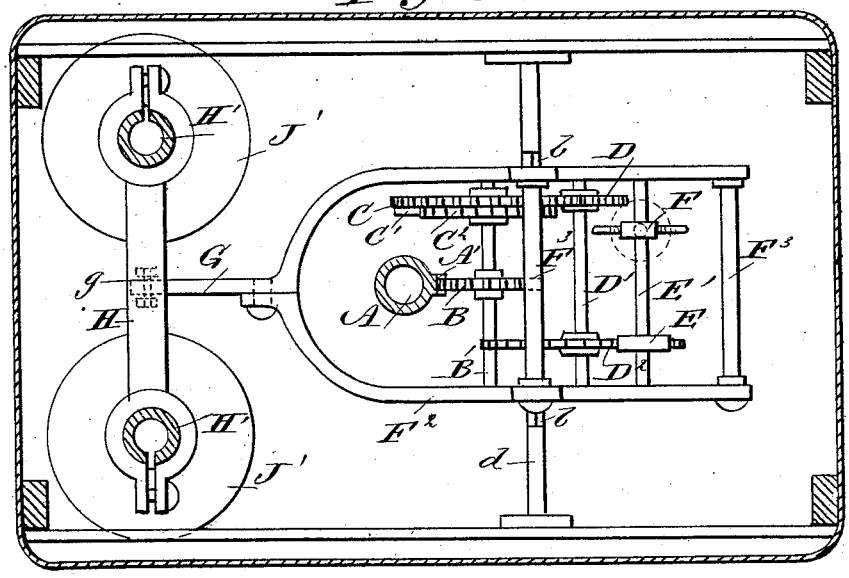

Fig. 5

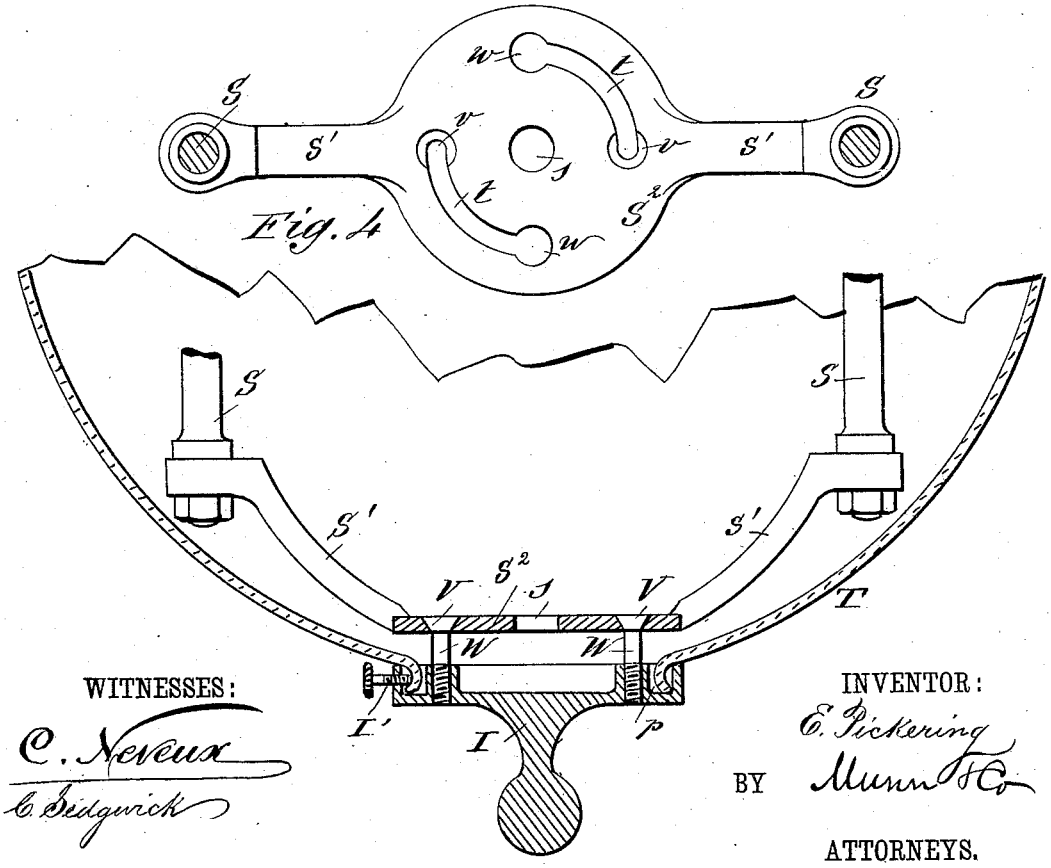

Fig. 4

WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

E. Pickering

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWARD PICKERING, OF BROOKLYN, NEW YORK, ASSIGNOR TO MAURICE J. HART, OF NEW ORLEANS, LOUISIANA.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 306,517, dated October 14, 1884.

Application filed February 15, 1884. (No model.)

To all whom it may concern:

Be it known that I, EDWARD PICKERING, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Electric Lamp, of which the following is a full, clear, and exact description.

The object of my invention is to provide certain new and useful improvements in the devices for regulating the carbon sticks in electric lamps; also, to provide certain new and useful improvements for automatically cutting out any lamp when desired, and also to provide a new and useful improvement for holding the globe on the lamp-frame.

The invention consists in the peculiar construction and arrangement of parts, as hereinafter fully described, and pointed out in the claims.

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 is a longitudinal sectional elevation of the box containing the regulating mechanism of the lamp, part of the said regulating mechanism being shown in elevation and part in section. Fig. 2 is a side view of the switch mechanism for automatically cutting out the lamp. Fig. 3 is a sectional plan view of the lamp-regulating mechanism. Fig. 4 is a longitudinal sectional elevation of the globe-holder. Fig. 5 is a sectional plan view of the same.

The upper carbon is secured to the lower end of a vertically-movable rod, A, suitably guided in the lamp-frame, which rod is provided with a rack, A′. The said rack engages with a cog-wheel, B, mounted on a shaft, B′, on which is loosely mounted a cog-wheel, C, to which a pawl, C′, is pivoted, which rests on the toothed edge of a ratchet-wheel, C^2, mounted rigidly on the shaft B′. The cog-wheel C engages with a cog-wheel, D, mounted on the shaft D′, carrying a toothed wheel, D^2, the teeth of which engage with a pallet, E, secured on a shaft, E′, on which a pendulum-bar, F, is mounted, the said pendulum-bar having its lower end, F′, forked. The shafts B′ D′ E′ are journaled in the side pieces of a U-shaped or other frame, F^2, the sides of which are united by suitable cross-pieces, F^3. Each side bar of the frame F^2 is provided at or near the middle with a V-shaped notch, *a*, in the bottom edge, into which notches the knife-edges *b*, formed on a transverse bar, *d*, of the frame of the lamp, pass. From one end of the frame F^2 an arm, G, projects, which is provided with a longitudinal slot, G′, through which a transverse pin, *g*, passes, which unites two downwardly-projecting lugs of a cross-bar, H, on each end of which a magnet-core, H′, is clamped, the upper ends of the cores H′ passing into the central longitudinal apertures of magnets J, and the lower ends of the said magnet-cores H′ passing into the longitudinal central apertures of magnets J′, which are wound with finer wire than the magnets J, and are in shunt-circuits of the magnets J. A screw, K, held in the bottom of the frame projects upward between the shanks of the forked end F′ of the pendulum-bar F. A magnet, L, is held on the side of the frame, and is wound with coarse wire *l* and with fine wire *l*′. The part wound with the wire *l* is in the main circuit when the lamp is cut out, and the part wound with the fine wire *l*′ is in a derived circuit from the spools J.

On a plate, M, of insulating material the armature N of the magnet L is pivoted, and on the said plate M two metal contact-plates, O and O′, are held, which are separated from each other. A contact-spring, P, secured to the bottom edge of the metal plate O, projects under the bottom edge of the metal plate O′, and a contact-spring, P′, secured to a button, Q, projects under the bottom edge of the plate O′ and over the free edge of the contact-spring P. A forked switch-lever, R, is pivoted above the plates O and O′ in such a manner that the two prongs of the said lever can rest, respectively, on the said plates O and O′. The metal plate O is connected with the line-wire *k*, and the plate O is connected with one end of the wire forming the coils of the magnets J by a wire, *m*. The other end of the wire, forming the coils of the magnets J, is connected by a wire, *n*, with the plate O′, to which plate O′ the other line-wire, *k*′, is connected. The opposite ends of the wire *l* of the magnet L are connected with the plate O′ and with the button Q, respectively.

To the lower ends of the side bars or rods, S, of the lamp-frame a cross-piece, S′, is fastened, which is provided with a central plate,

S^2, having a central aperture, *s*, through which the lower carbon passes, and with two or three quadrant-slots, *t*, the said slots terminating at the diametrically-opposite ends in circular apertures *w*, and having countersunk circular recesses *v* at the opposite ends. The curved bottom rim of the globe T is held in an annular groove, *p*, of a plate, I, by screws I'. The said plate I is provided with two upwardly-projecting pins, W, arranged diametrically opposite each other, each pin being provided at its upper end with a beveled head, V. The globe is held on the plate I, and if it is to be fastened to the frame of the lamp the plate I is held in such a manner that the heads V of the screws W can be passed through the apertures *w* at the ends of the slots *t*. After the said pins W have been passed through the apertures *w*, the plate I is given a quarter-turn, whereby the pins W will pass to those ends of the slots *t* provided with the countersunk recesses *v*. If, then, the plate I is released, it will move downward until the heads V of the pins W rest in the countersunk recesses *v* at the ends of the slots *t*, thereby holding the globe on the lamp-frame. The magnet-cores H' are made hollow, and each provided with a longitudinal slot, and are filled with chips of iron wire, whereby they are made more sensitive.

The operation of the lamp-regulating mechanism is as follows: If the tension of the current in the lamp is too great, the shunt-magnets J will be excited, and will draw the magnet-cores H' downward, thereby moving the corresponding end of the frame F^2 downward and the opposite end upward. The weight of the upper-carbon holder A revolves the wheel B in the direction of the arrow *a'*, and, by means of the pawl C', the wheel C is revolved in a like manner, and revolves the wheel D in the direction of the arrow *b'*. As the frame carrying the pendulum-bar F is raised, the forked end F' of the pendulum-bar will be raised above the screw K, thus permitting the said pendulum-bar to swing. The said pendulum-bar, in swinging, permits the ratchet-wheel D to revolve the distance of one or more teeth, thus allowing the carbon-holder A to descend, the carbon points are brought together, the tension is decreased, and the magnets J become excited and swing upward the frame F^2, whereby the end carrying the pendulum-bar is lowered, whereby the point of the screw K will pass in between the shanks of the forked end of the said pendulum-lever, thus preventing the pendulum-lever from rocking. If the pendulum-lever cannot rock, it prevents the wheel D^2 from revolving, and thereby locks the other wheels in place, and thus holds the carbons in place. If the points of the carbons are again consumed, the strength of the current in the derived circuit increases, and the above operation is repeated. The screw K can be adjusted to act sooner or later on the fork F' of the pendulum-rod F. If the resistance in the lamp is very great, for some reason or other, the magnet L becomes excited and its armature N is attracted, and the spring P is pressed against the spring P', thereby cutting out the lamp, as the circuit will then be from the line-wire *k* through the plate O, the springs P and P', the contact-button Q', the wire *l*, the plate O, and the line-wire *k'*. If the resistance is removed, the lamp will be cut in circuit again, as then the armature N is released, the contact of the springs P and P' is broken, and the circuit will be as follows: from the line-wire *k* to the plate O, the wire *m*, the coil J, the wire *n*, the plate O', and the line-wire *k'*. If it is desired to cut out any lamp and to keep it cut out, the switch-lever R is turned in such a manner that the prongs of its fork rest on the plates O and O'. The line-wire will then be short-circuited through the plates O and O' and the forked switch-lever R.

I am aware that a carbon-holder has been operated by a train of gearing in a pivoted frame, and therefore do not claim such invention.

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

1. In an electric lamp, the combination, with a carbon-holder provided with a rack, of a cog-wheel engaging with the rack, which cog-wheel is mounted on a swinging frame to which the magnet-cores for regulating the lamp are fastened, a ratchet-wheel mounted in the swinging frame, a pendulum pivoted in the swinging frame, and provided with a pallet engaging with the ratchet-wheel, which pendulum has its lower end forked, and of a screw projecting upward between the shanks of the forked end of the pendulum, which screw serves to regulate the oscillations of the pendulum, substantially as herein shown and described.

2. In an electric lamp, the combination, with a plate for receiving and holding the lower end of the globe, of two studs projecting up from the said plate and provided with heads at their upper ends, and of a plate held in the lamp-frame and provided with two quadrant-slots of such size that the heads on the studs cannot pass through them, the said slots terminating at their diametrically-opposite ends with enlargements of sufficient size to admit the heads on the studs of the plate on which the globe is held to pass, substantially as herein shown and described.

3. In an electric lamp, the combination, with the plate I, adapted to receive and hold the bottom of the lamp-globe, of the headed studs W, projecting upward from the plate I, the plate S^2, held on the bottom of the lamp-frame, and provided with two quadrant-slots, *t*, terminating at their diametrically-opposite ends in apertures *w* and at their other ends in countersunk recesses *v*, substantially as herein shown and described.

Witnesses:
OSCAR F. GUNZ,
C. SEDGWICK.

EDWARD PICKERING.