(No Model.)

E. THOMSON.

ELECTRIC ARC LAMP.

No. 574,123. Patented Dec. 29, 1896.

FIG. 1.

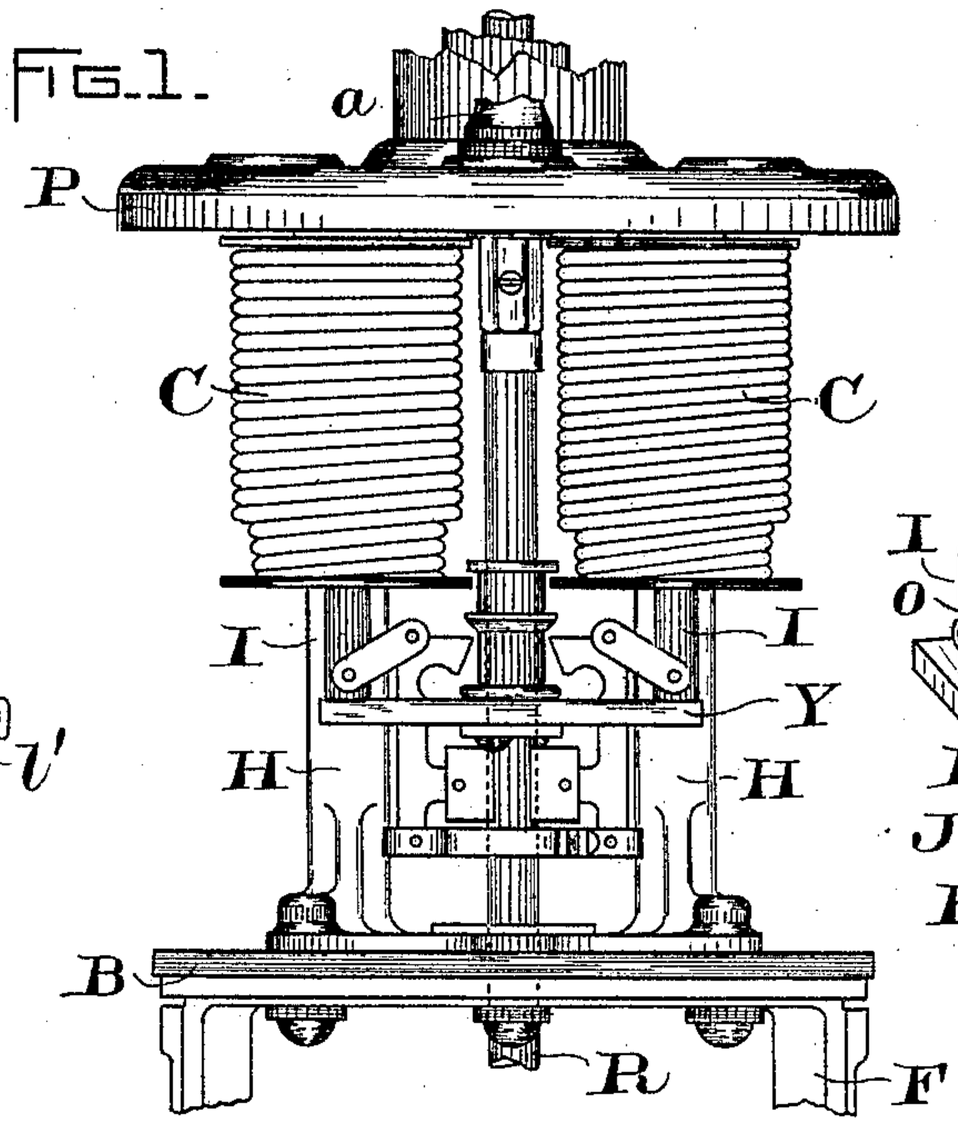


FIG. 4.

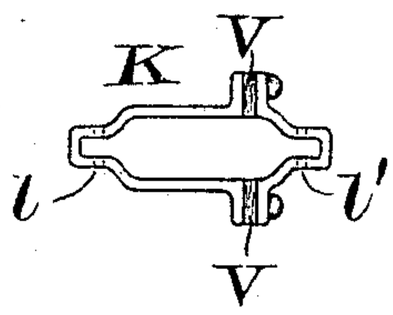


FIG. 3.

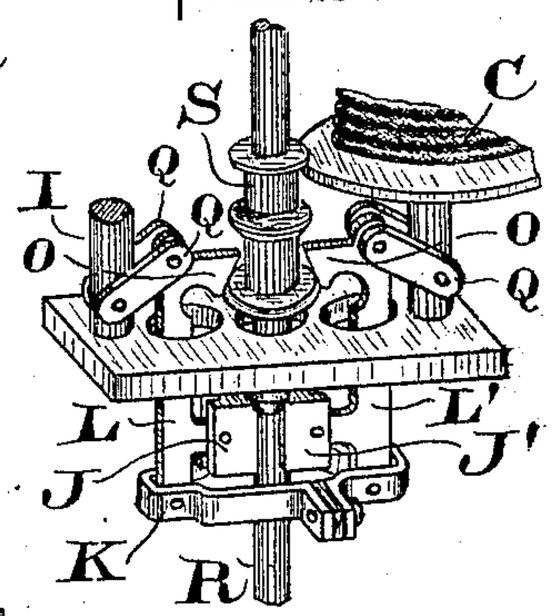
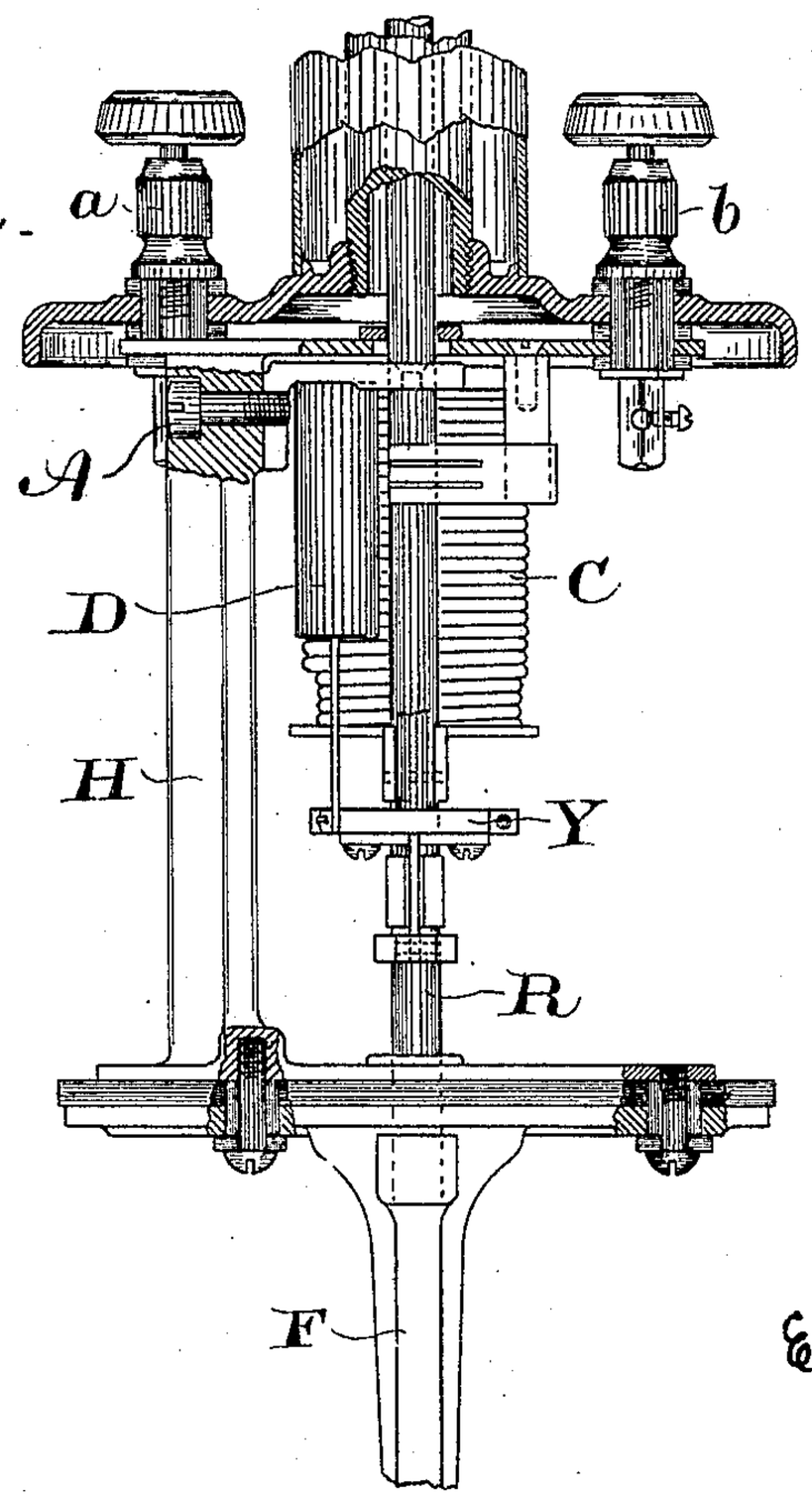


FIG. 2.



WITNESSES.

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UNITED STATES PATENT OFFICE

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 574,123, dated December 29, 1896.

Application filed August 21, 1896. Serial No. 603,448. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electric-Arc Lamps, (Case No. 430,) of which the following is a specification.

My present invention relates to improvements in arc-lamp mechanisms whereby simplicity and ease of construction are secured as well as certainty of action.

Figures 1 and 2 are side elevations of the mechanism, Fig. 2 being partly in section. Fig. 3 is a perspective view of the mechanism particularly concerned in regulating the feed of the carbon. Fig. 4 is a detail.

In Fig. 1, P is the top plate, and B the base-plate, of the lamp-mechanism box, the latter having depending side pieces for supporting the lower carbon. (Not shown in the figure.) The upper plate P carries the terminal binding-posts of the lamp *a b* (see Fig. 2) and is insulated from them. The lower frame F of the lamp is also insulated from the mechanism contained between the plates P and B, it being understood that a surrounding sheet-metal casing (not shown in the figure) is used to inclose the parts. Joining the two plates P and B, though insulated from them, is a frame or casting H H, which sustains the parts of the lamp mechanism proper. At A, Fig. 2, is a screw which passes through the frame H and sustains the solenoids C C, through which the current of the lamp passes. These magnets may be either in series with the arc and conveying the current to it, or they may be compound-wound or differential magnets. Entering the open ends of the coils C C are two iron cores I I, yoked together in the usual manner by a soft-iron yoke Y, as best seen in Fig. 3. These parts form the magnetic element of the mechanism, which is raised or lowered by the resultant of the attraction of the coils C C and gravity. A central carbon-holding rod R passes between the coils C C, and is arranged to be clutched and lifted when the magnet-cores I I rise through the intervention of a special clutch, which forms a main feature of my invention, while a dash-pot D, the plunger of which is attached to the yoke Y, Fig. 2, and the casing or body of which is secured to the fixed framework of the lamp, serves to check too violent motions.

The special clutching device of my invention is seen in Fig. 3, where the carbon-feeding rod R or the carbon pencil itself is gripped by a pair of jaws J J′, bearing laterally thereon. These jaws are pivoted to levers L L′ by a lug or extension extending from the levers toward the rod R and entering a slot in the jaws J J′. The levers L L′ are fulcrumed or pivoted at their lower ends in a frame K and at their upper free ends are pivoted to small links Q Q. The links turn on a pivot carried either directly or indirectly by the cores, being thus free to swing upon a pivot on the cores I I. This of course might be replaced by any other pivotal arrangement carried by the magnetic structure or whose movements were controlled thereby. The position of the pieces Q Q is normally on a line above and at an angle to the horizontal.

Surrounding the rod R is a loose sleeve S, having at its lower end a flange which, when the magnetic mechanism and clutch are lowered, engages on inclined surfaces carried by lugs or projections O O on the levers L L′ at their upper ends. The upper end of the sleeve has a flange which prevents it dropping too far. This is effected by the flange catching upon the fixed supports, which may be and are here shown as the flanges of the magnet-spools. The middle flange of the sleeve S also prevents it from being carried too far up, so that the sleeve has what may be called a "restricted free motion vertically." The levers L L′ pass through openings in the horizontal magnetic yoke Y, through which the rod R also passes.

The frame K is shown separately in Fig. 4, the points of pivoting of the levers L L′ being marked *l l′*. I also provide an adjustment or means for varying the distance apart of the points *l l′*, which may consist of any suitable device which lengthens or shortens the framework K. I have shown a division of the frame into two parts and the separation of the parts by packings V V, the thickness of which may be varied. This adjustment is useful in taking up for wear of the clutch-

surfaces or in setting the parts originally in proper working position.

Assuming now that there is no current in the magnet-coils C C, the cores I I and yoke Y will be at their lowest position, in which the inclined surfaces O O of the levers L L′ rest on the lower flange of the sleeve S in such position that the jaws J J of the clutch are wedged open and the rod is free to move. This is the feeding condition when the current in C C has been so reduced as to cause release of the cores I I and yoke Y. On an increase or accession of current the first effect is to relieve the inclined surfaces O O from the lower flange of the sleeve S. The weight of the parts pulled upward by the raising of the cores I I causes the clutch to lock upon the rod R with great firmness and certainty, owing not only to the leverage obtained in the levers L L′ themselves, but also to the inclined position of the connecting-pieces Q Q, which tend to approach the horizontal and thus get a toggle-grip. The jaws J J′ are situated much nearer the lower pivots than the points of attachment of the connecting-pieces Q Q, and thus the leverage magnifies the force available for clutching three or four times. The angle given to the pieces Q Q with respect to the horizontal will, if it be small, cause an increase in the power of the clutch, while yet it is easy to make the angle such that the proper effect may be obtained. At the same time the release of the clutch for feeding on the weakening of the current is secured with great delicacy by the engagement of the inclined surfaces O O upon the lower flange of the sleeve S. This sleeve on the upward movement of the parts is itself carried or lifted, though this is not essential to the action of the mechanism, but is merely a convenience in preventing the necessity for allowing the lower flange to pass through the yoke-piece Y.

The lamp-circuit connections and other parts are not shown, as they are obviously the same as those employed in arc-lamps, the present invention relating chiefly to the improvement in the clutch mechanism for controlling the movements of the carbon rod.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric-arc lamp, a pair of solenoids for regulating the lamp, and cores connected by a yoke coöperating with the solenoids, in combination with a clutch comprising a pair of levers connected with the cores by toggle-levers, and having portions engaging with the carbon rod; the whole arranged to increase the grip of the clutch as the cores are drawn upward.

2. A clutch for an electric-arc lamp, comprising a frame having levers pivoted therein at one end, toggle-levers connected with the other end of the first levers and also to the solenoid-cores, and a gripping part engaging with the carbon rod and situated nearer the fixed end of the levers than the movable end.

3. A clutch for an electric-arc lamp, comprising a frame to which the lower ends of a pair of levers are pivoted, toggle connections between the solenoid-cores and the upper ends of the levers, a sleeve sliding upon the carbon rod and having projecting portions coöperating with the upper ends of the levers, and a portion of the levers organized to grip the carbon rod.

4. A clutch for an electric-arc lamp, comprising a frame of adjustable length having a pair of levers pivoted at their lower ends therein, the upper ends of the levers connected to the solenoid-cores by links or toggles, and a pair of jaws actuated by the levers for gripping the carbon rod.

In witness whereof I have hereunto set my hand this 18th day of August, 1896.

ELIHU THOMSON.

Witnesses:
JOHN W. GIBBONEY,
AUGUSTINE R. EVEREST.