(No Model.) 2 Sheets—Sheet 1.

O. P. LOOMIS.

ELECTRIC ARC LAMP.

No. 369,194. Patented Aug. 30, 1887.

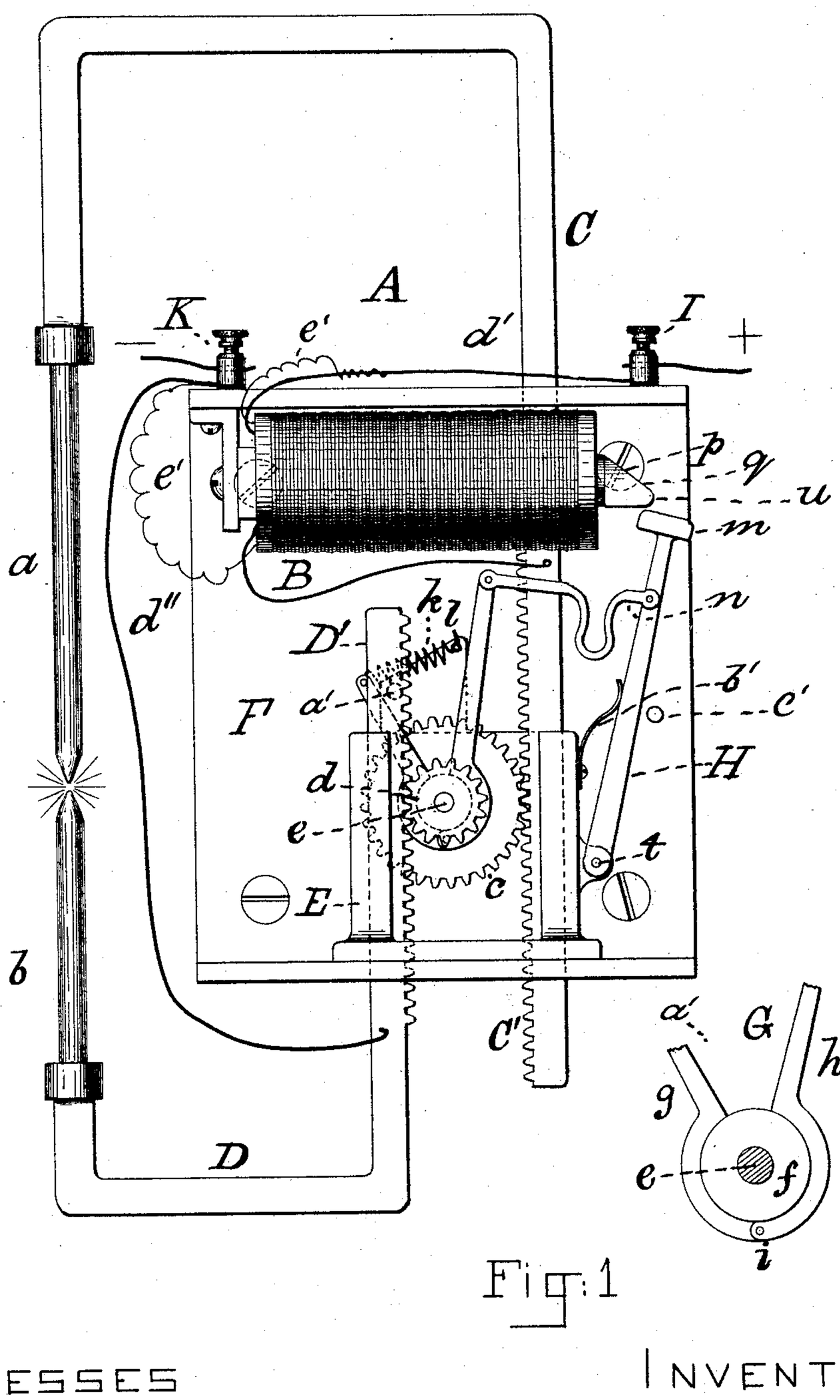

Fig. 1

WITNESSES

John F. Nelson

Wm. H. Barwick.

INVENTOR

Osborn P. Loomis,

By Wm. Robinson

Attorney.

(No Model.) 2 Sheets—Sheet 2.

O. P. LOOMIS.

ELECTRIC ARC LAMP.

No. 369,194. Patented Aug. 30, 1887.

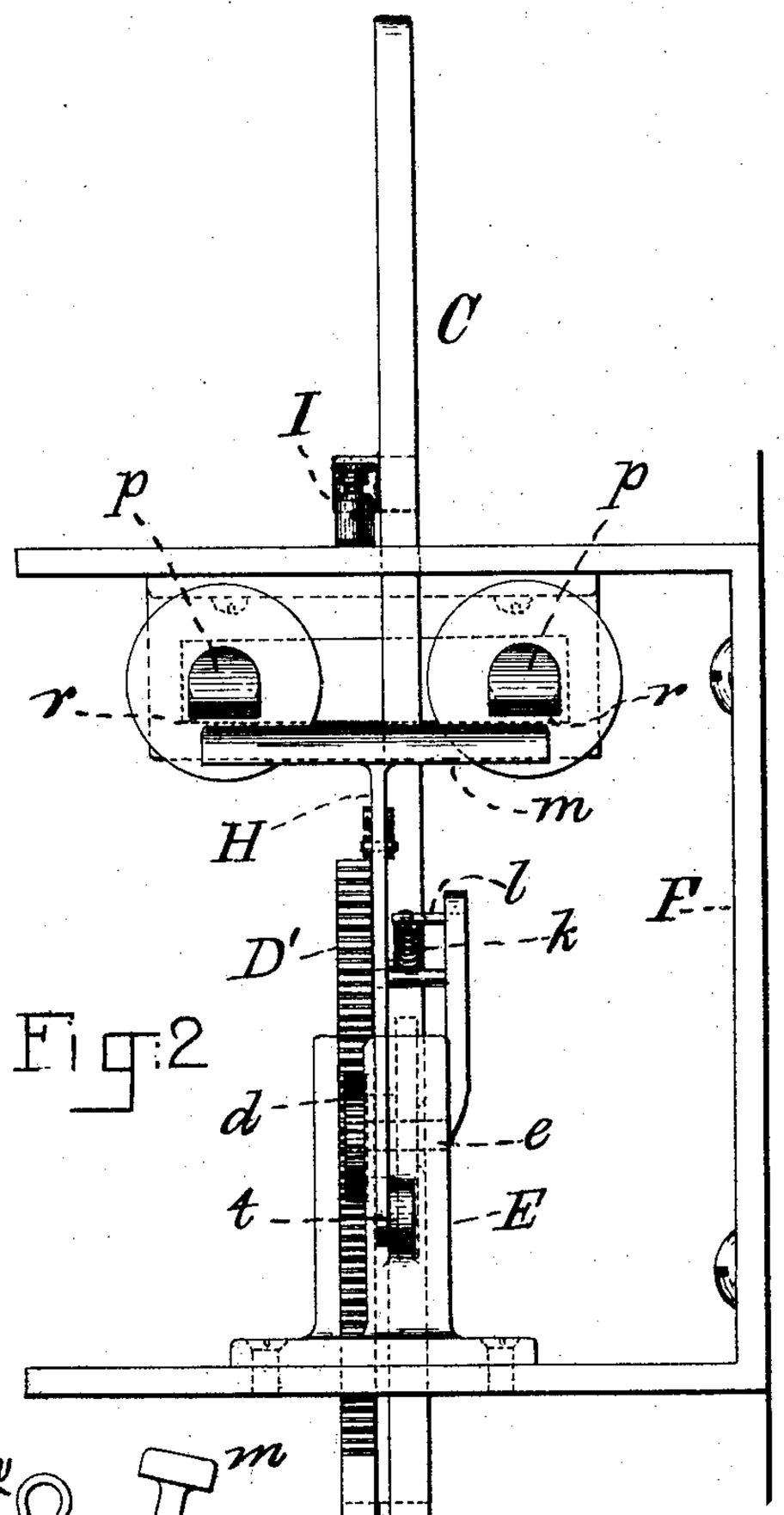

Fig: 2

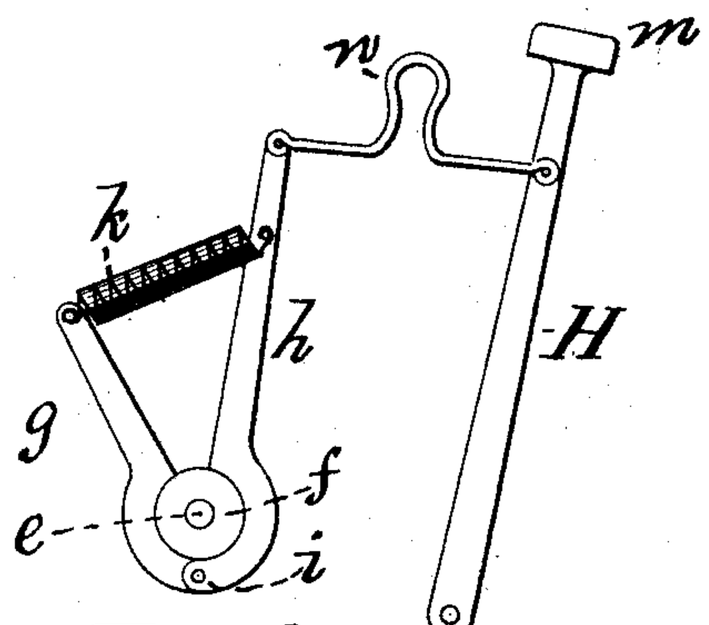

Fig: 3.

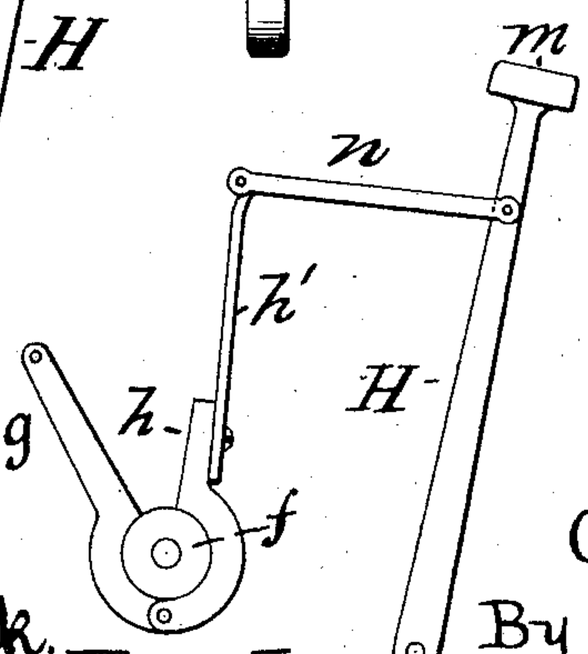

Fig: 5

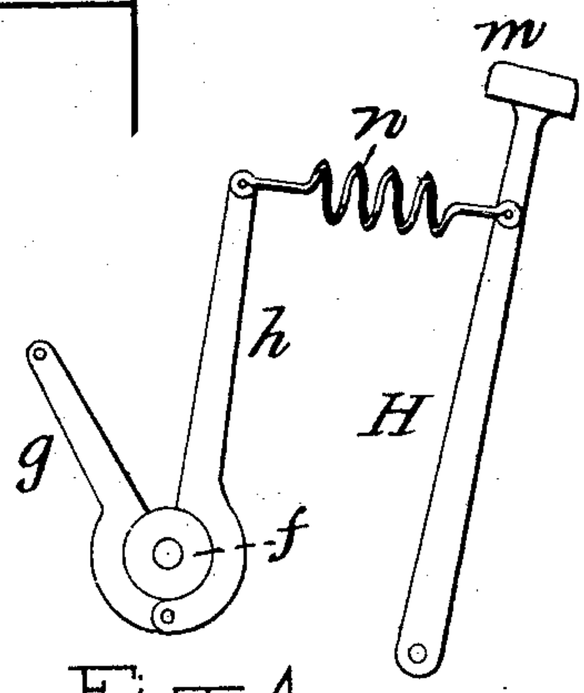

Fig: 4

WITNESSES.

John F. Nelson

Wm. H. Bairwick,

INVENTOR

Osborn P. Loomis,

By Wm. Robinson,

Attorney.

UNITED STATES PATENT OFFICE.

OSBORN P. LOOMIS, OF SOMERVILLE, MASSACHUSETTS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 369,194, dated August 30, 1887.

Application filed December 18, 1886. Serial No. 221,956. (No model.)

To all whom it may concern:

Be it known that I, OSBORN P. LOOMIS, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Electric-Arc Lamps, (for which I have not obtained a patent in any country,) of which the following is a specification.

My invention relates to improvements in rack-feeding electric-arc lamps; and the object of my invention is to produce an improved feeding device for the purpose of feeding the carbons toward each other more steadily than in other lamps, thus greatly diminishing the flickering of the flame.

The nature of my invention will be understood from the description which follows, reference being made to the accompanying drawings, which form a part of this specification, in which—

Figure 1 represents a side elevation of an electric lamp illustrating my invention; Fig. 2, a back elevation of the same, showing, however, the front of the electro-magnet; and Figs. 3, 4, and 5 show modifications in details of construction.

Similar letters of reference indicate corresponding parts in all the figures.

A is a focusing arc lamp, in which B is the operating electro-magnet, C the rack-frame which carries the upper or positive carbon rod, *a*, and D the rack-frame which carries the lower or negative carbon rod, *b*. The pinions *c* and *d* are secured to the pivotal shaft *e*. The pinion *c*, which engages the rack C′ of the frame C, has approximately twice as many teeth as the pinion *d*, which engages the rack D′ of the frame D in order that the upper carbon may be fed forward twice as rapidly as the lower one to make allowance for the more rapid consumption of the upper carbon. The racks C′ and D′ are held in place by and slide in dovetail grooves in the support or frame E, which is secured to or forms a part of the base F.

The racks C′ and D′ (or at least the carbon rods) are of course insulated from each other in any suitable or well-known manner; but as this forms no part of my invention it is not deemed necessary to herein specifically show the method of insulating. To the pivotal shaft *e* is also secured the drum or friction-wheel *f*, around which passes the friction-clutch G, made in two parts, *g h*, pivoted together at *i*. The leg *g* of the clutch G is connected by the spring *k* to the pin *l*, secured to the base F, Fig. 1; or said spring may connect the legs *g* and *h*, drawing the same together and causing them to firmly clutch the friction-wheel *f*, and thus prevent the revolution of the same, as shown in Fig. 3.

The armature-lever H, carrying the armature *m* at its upper end, is connected to the leg *h* of the clutch G by means of the connecting-rod *n*, which is preferably elastic.

The projecting cores of the magnet B are beveled off at their upper sides, as shown at *q*, Fig. 1, and the lower sides of the same present plane surfaces *r*, Fig. 2. The armature *m* has its upper surface, which moves opposite the flat sides of the cores, somewhat rounded, and the pivotal point *t* of the armature-lever is on a line which, drawn perpendicularly, would pass inside of the external portion of the core of the magnet, as shown. By this arrangement the armature *m*, when attracted by the flat sides of the cores, approaches nearer to said cores the farther it passes the points *u* thereof. It will be observed that the greatest pulling power exerted by the magnet is at the points *u* of the cores; but since the armature approaches closer to the cores when it has passed said points *u* the tendency is to thus equalize the force exerted upon said armature at whatever relative point it may be in the course of its sweep in proximity to said cores.

The magnet B is wound in the usual manner with a main circuit of coarse wire and a shunt-circuit of fine wire. The main circuit may be traced from the + post I by the wire *d′* around the magnet B to the rack-frame C, through the carbons *a b* and frame D, and thence by the wire *d″* to the — post K. The fine-wire shunt-circuit *e′ e′* passes from the post I around the magnet B to the post K in the usual manner.

The mode of operation is as follows: When there is no current passing, the spring *k* draws the leg *g* of the clutch G up against the stop *a′*, and at the same time the spring *b′* presses the armature-lever H back against the stop *c′*. Thus the clutch G is opened, and the friction-roller *f* being free to turn therein, the weight

of the frame C brings the carbons *a b* together. When the current passes, however, and the magnet B becomes magnetized, it attracts its armature *m*, which, through the connection *n*, presses the leg *h* of the clutch G forward, and thus firmly clutches the friction-roller *f* between the two legs *g h* of said clutch. The armature continuing its sweep toward the body of the magnet, the leg *g* is carried away from its stop *a'*—that is, the clutch G, through the friction-roller *f*, turns the pivotal shaft *e* and the pinions *c d*, secured thereto. This movement raises the frame C and lowers the frame D, thus separating the carbons *a b* and establishing the arc. As the carbons burn away and the arc becomes greater, the current through the magnet B becomes weaker and the armature recedes until the leg *g* of the clutch G reaches and presses against the stop *a'*. The pressure of the spring *b'* then causes the continued recession of the armature until the clutch opens and allows the friction-roller *f* to turn, which turning is caused by the weight of the descending frame C, which by its descent brings the carbons nearer together. This movement also, of course, by decreasing the length of the arc, increases the current through the magnet B, which again strongly attracts its armature, and thus causes the clutch G to firmly grasp the friction-roller *f*, thus arresting the approach of the carbons and drawing them apart if they have accidentally approached too closely together. Thus, as is evident, the alternate opening and closing of the clutch causes a regular and steady feeding of the carbons toward each other as they burn away.

In practice the turning of the friction-roller *f* in the clutch is very slow, each impulse being almost infinitesimal.

I find that a much more uniform feeding of the carbons is secured by making the connection *n* of some elastic substance, since by this means when the clutch releases its hold there is always a light pressure exerted by the spring-connection, which prevents the mechanism from moving too far or too suddenly. In Figs. 1 and 3, I show this elastic connection *n* as a flat spring bent into the form of an arch. In Fig. 4 it is shown as a somewhat stiff spiral spring, and in Fig. 5 the leg *h* of the clutch is made partly of the elastic spring *h'*, in which case the connection *n* may be inelastic.

In illustrating my invention I have shown it as applied to a focusing rack-feeding lamp; but it is manifest that I may apply it to any construction of electric lamp to which it may be adapted without departing from the spirit of my invention.

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

1. The combination, in a rack-feeding electric lamp, of a feed-controlling clamp or clutch consisting of two parts hinged together, a friction-wheel embraced and controlled by said clutch, a spring joining the two legs of said clutch and causing them to firmly embrace said friction-wheel, a fixed stop to limit the movement of one leg of said clutch, the armature-lever connected to the other leg of said clutch, and a spring throwing said armature-lever in one direction and thereby opening said clutch, substantially as described.

2. In a focusing arc lamp, the combination, substantially as described, of the following elements: the two carbon-bearing rack-frames, two pinions engaging the same, one of said pinions having approximately double as many teeth as the other, a friction-wheel fixed on the pinion-shaft, a clutch consisting of two parts hinged together and embracing said friction-wheel, a fixed stop adapted to limit the sweep of one leg of said clutch, a spring pressing the same firmly against said friction-wheel, an armature-lever with its armature connected to said clutch, an electro-magnet moving said armature lever in one direction and a spring moving it in the opposite direction.

3. The combination, in an electric lamp, of a feed-controlling clamp or clutch consisting of two parts hinged together, a releasing-stop, an actuating or controlling armature, and an interposed elastic connection between one leg of said clutch and the armature-lever, substantially as and for the purpose set forth.

OSBORN P. LOOMIS.

Witnesses:
WM. ROBINSON,
WM. H. BARWICK.