

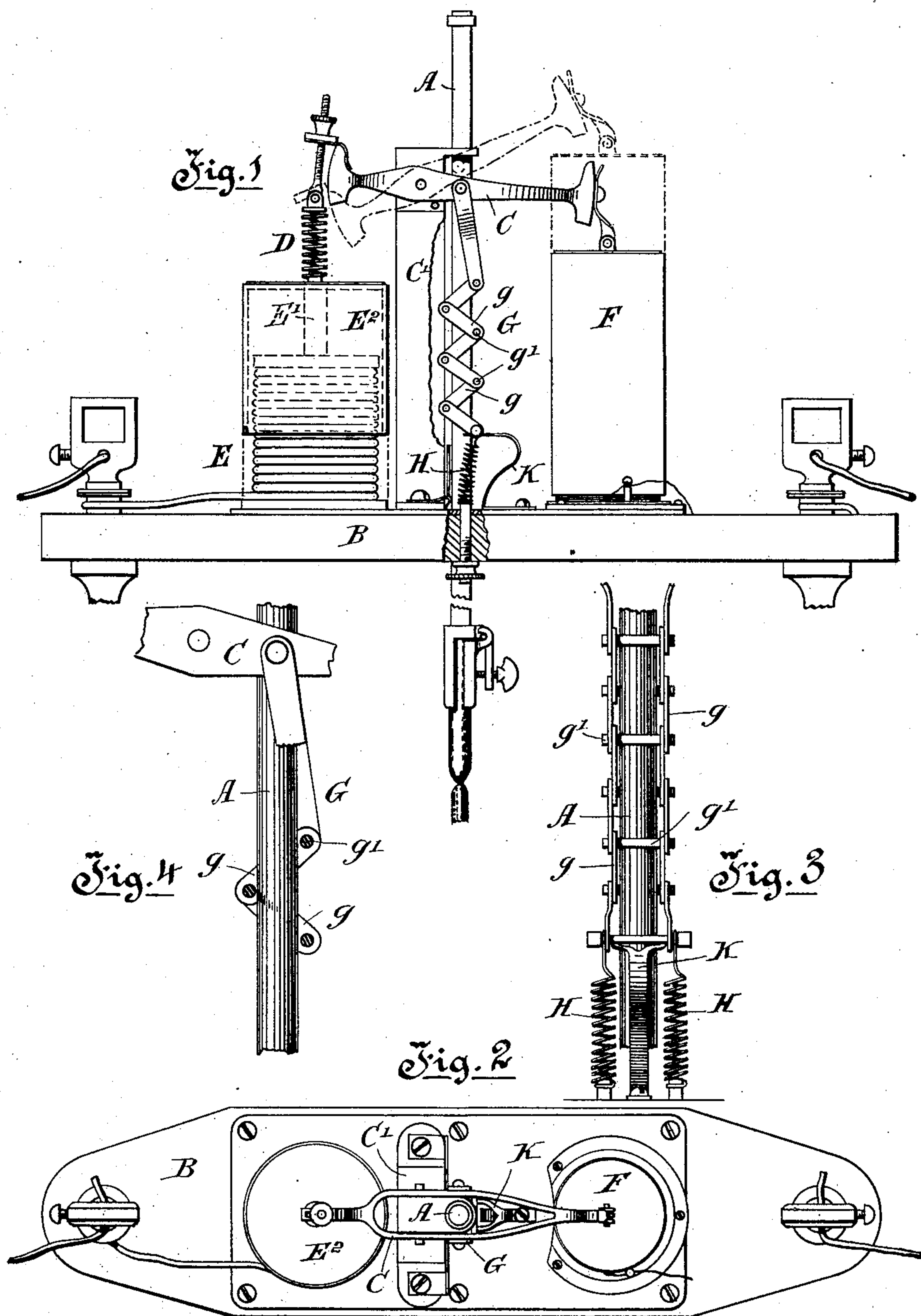
(No Model.)

E. E. HIGGINS & J. JAMES.

ELECTRIC ARC LAMP.

No. 377,615.

Patented Feb. 7, 1888.



Witnesses:-
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UNITED STATES PATENT OFFICE.

EDWARD E. HIGGINS AND JOHN JAMES, OF ST. JOHNSBURY, VERMONT,
ASSIGNORS TO THE STANDARD ELECTRIC COMPANY OF VERMONT, OF
SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 377,615, dated February 7, 1888.

Application filed March 24, 1887. Serial No. 232,326. (No model.)

To all whom it may concern:

Be it known that we, EDWARD E. HIGGINS and JOHN JAMES, both of St. Johnsbury, in the county of Caledonia and State of Vermont, have jointly invented certain new and useful Improvements in the Feed Mechanism of Electric-Arc Lamps; and we do hereby declare that the following is a full, clear, and exact description of the same.

The invention has reference to the mechanism used in electric-arc lighting to feed the upper carbon; and its object is to produce for that purpose a device which shall give to such carbon an even and nearly-continuous downward motion, and afford complete immunity from the regular synchronous "pumping" of the carbons frequently observable in an arc-light circuit, this arising from the variation in force of the solenoids from the fluctuations in the current on the main line, and to further obviate the flickering due to irregular movements from the same cause of the rocker-arm, clutch, and rod.

The invention may be briefly described as consisting, specially, in a spring connected with the outer case and core of the main solenoid and with one end of a rocking bar, the other end of which is connected with a shunt-magnet, and in the construction of the clutch for holding the upper carbon rod, such clutch being connected with a rocking bar and by springs with the base-plate of the lamp, a spring-trip being used in combination therewith to loosen the clutch. The solenoids or electro-magnets are such as are usually found in electric-arc lamps.

For full comprehension of the invention, reference must be had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a side view of the feed mechanism; Fig. 2, a plan view; Fig. 3, a detail of clutch and springs; and Fig. 4, a detail of parts of carbon holder, clutch, and rocking bar.

Similar letters of reference indicate like parts.

A is the carbon rod, of any usual and suitable construction, passing through the plate

B, upon which are mounted connections, operating magnets or solenoids, &c.

The mechanism for holding and imparting continuous downward motion to this carbon rod is as follows: To one end of the rocking bar C, pivoted to a stand, C', is attached a spiral spring, D, connected with the core E' and outer case, E², of the main solenoid E, and to the other end of this rocking bar is attached the core of the shunt-coil F.

G is the clutch, composed of a number of small metal bars, *g g*, toggle-jointed together by suitable rivets, *g' g'*, so that when the clutch is extended these rivets grip firmly the carbon rod A. The links forming the upper end of this clutch G are connected with the rocking bar C (which is made double to allow of the passage through it of the carbon rod A) at a point between the fulcrum of the bar and the shunt-coil F, and the lower ends of G are secured by springs H H to the base-plate B.

K is a spring-trip pressing against the lowermost of the rivets *g'* and acting to loosen it from the rod A.

The operation of the invention is as follows: The parts are normally in equipoise with the rocking bar C in the position shown in Fig. 1, and the upper carbon resting on the lower. So soon as the main current enters the solenoid E it draws on the core E' and outer case, E², and pulls down that end of the rocking bar C which is attached to E² by the spring D, thereby tightening the clutch G upon the carbon rod A and raising both, so as to establish the arc, the outer case, E², being thus also brought down onto the base B, where it will remain so long as the lamp is lighted. As the length and resistance of the arc increase with the consumption of the carbon, the force of the shunt-coil F is correspondingly increased, and it draws down its end of the rocking bar C, thereby lowering the clutch G, and with it the carbon rod A, until, by the action of the trip K, the grip of the clutch G is loosened and the rod slides slowly down, the spiral spring D yielding to such movement, and the downward movement will continue until it is checked by the weakening

of the shunt-coil F as the arc is diminished, when the retractile action of the spring D will at once draw down its end of the rocking bar C and cause the clutch to grip the carbon rod 5 and arrest its movement.

By the construction of clutch herein described—viz., a series of pairs of metal bars toggle-jointed together—the rod will be drawn up more evenly, and, which is of special value 10 in affording much greater delicacy of movement of the carbon, the total movement of the clutch is a fraction of the movement in the end bars.

It will be seen that by the construction 15 herein described—i. e., the substitution for the solenoid or magnet on main line of the spring D, in combination with the solenoid E (the office of which is to establish or originally draw the arc)—the consequences to the lights 20 of the fluctuations in the supply to the main solenoid are obviated. Again, in the ordinary construction, when the shunt-magnet has gained in power sufficiently to cause feeding of the carbon, the main solenoid is in its weakest condition and least able to check excessive feed. 25

With the construction herein described the retractile strength of the spring D is at a maximum, and will almost instantly act to check the feed and prevent too great a shortening 30 of the arc.

Having thus described our invention, we beg to state that what we claim is as follows:

1. In an electric-arc lamp, the combination, with the main solenoid or electro-magnet for 35 drawing the arc, of a shunt-coil or derived-

circuit magnet, a pivoted rocking bar connected at one end to core of said shunt-coil, a spiral spring connecting the other end of the rocking bar with the core of main solenoid, a clutch for the upper-carbon rod connected to 40 and operated by said rocking bar, a spring or springs for connecting said clutch to frame of lamp, and a spring-trip acting to assist in releasing the clutch from carbon rod, all substantially as described. 45

2. In the feed mechanism of an electric-arc lamp, a clutch constructed of four or more sets of flat metal bars with their sides parallel with the carbon-holder, the several sets being arranged in two lines along carbon rod on opposite sides and toggle-jointed or pivoted together by round bars extending across from one line of flat bars to the other to form a continuous chain or snake, the said round bars gripping the carbon rod, all substantially as 55 shown and described.

3. In the feed mechanism of an electric-arc lamp, the combination, with the stationary frame of same and the movable clutch, of a spring-trip independent of and acting on such 50 clutch only when the same is lowered upon it to disengage the clutch from the carbon rod, as set forth.

St. Johnsbury, Vermont, 16th day of March, 1887.

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Witnesses:

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