O. A. ROSS.

ARC LAMP.

APPLICATION FILED MAY 29, 1902.

999,340. Patented Aug. 1, 1911.

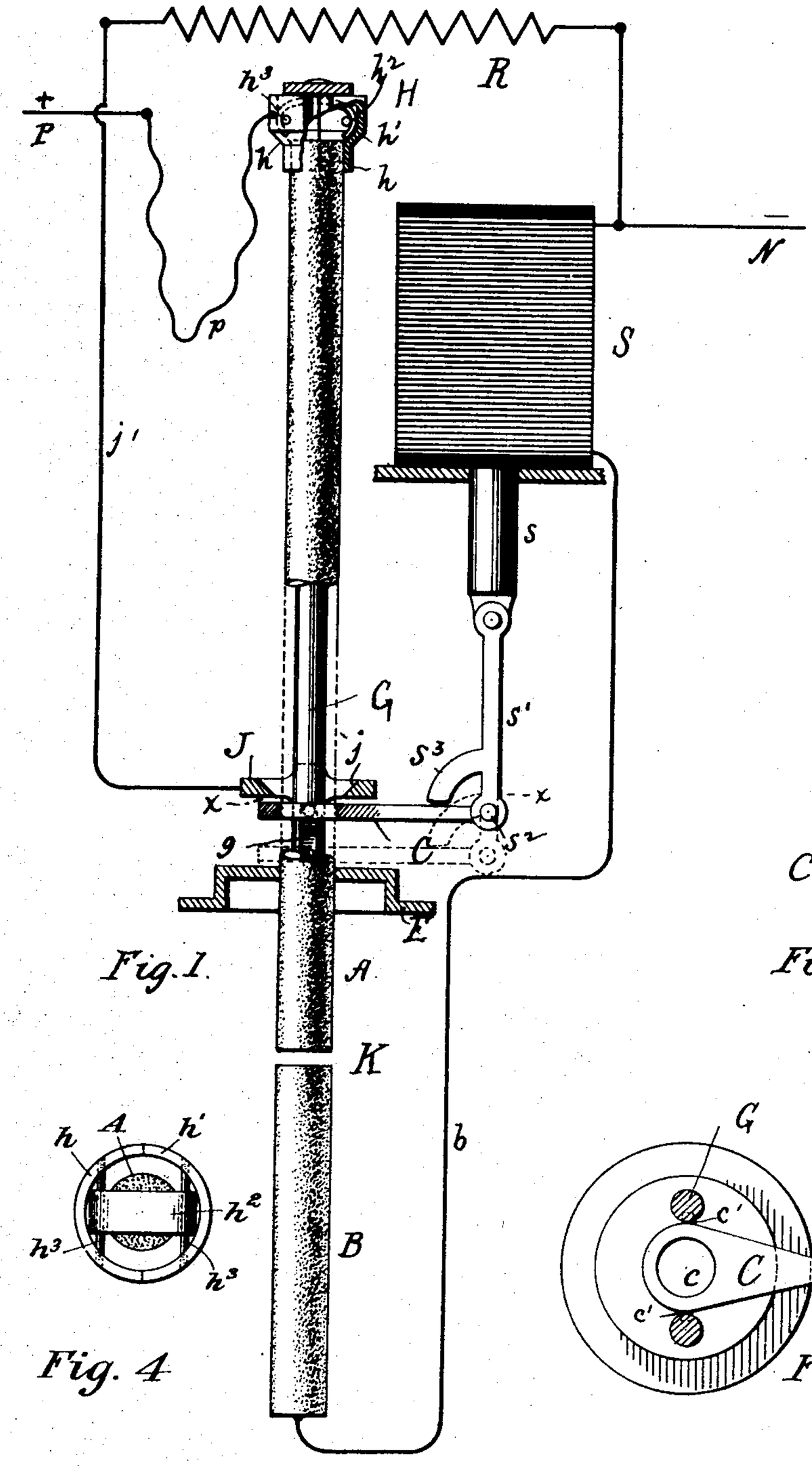

Fig. 1.

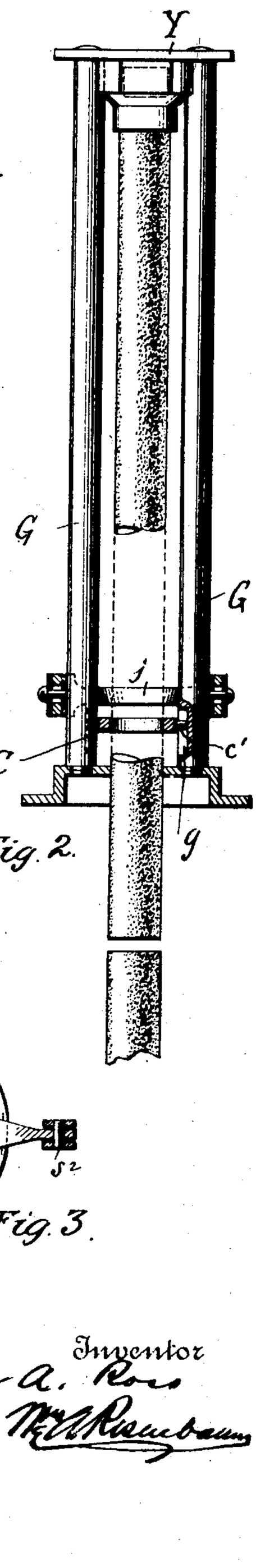

Fig. 2.

Fig. 4

Fig. 3.

Witnesses

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OSCAR A. ROSS, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ALBERT H. MEADS, OF CHICAGO, ILLINOIS.

ARC-LAMP.

999,340. Specification of Letters Patent. Patented Aug. 1, 1911.

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To all whom it may concern:

Be it known that I, OSCAR A. ROSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a full, clear, and exact description.

This invention relates to electric lamps of the arc type, and especially to that class operated from a constant potential generator.

The object of the invention is to provide a new and improved lamp of this description.

My invention is fully illustrated in the accompanying drawing, wherein:

Figure 1 represents a part sectional front elevation of the operative parts of my improved lamp; Fig. 2 a side view of the same; Fig. 3 is a sectional view taken on line *x*—*x* of Fig. 1, and Fig. 4 is a plan view of the carbon holder.

Like letters refer to like parts in each.

A represents the positive carbon or electrode, partly broken away to show the operative mechanism.

B is the negative electrode.

S is a solenoid of ordinary type, provided with armature *s*, and connecting link *s'*, by means of which latter the movements of the armature are transmitted to the clutch C, through the pin s^2. The clutch has a circular opening *c*, through which the positive carbon feeds. The lugs *c'*, on the sides of the clutch C, work in slots *g*, milled in the carbon guide rods G. The link *s'* is provided with a curved lug s^3, which, by striking upon the upper face of the clutch serves to prevent it from falling below a horizontal position when released by solenoid S, and pins *c'* are at the bottom of slots *g'*. The holder H for the positive carbon is composed of two halves *h*, *h* held together by a spring h^2, the ends of which engage pins h^3 secured in the two members of the carbon holder. This carbon holder slides in guide rods G. Its beveled edge *h'* is shaped to fit seat *j* of contact piece J, and prevent further downward movement of the positive electrode A, when it has been nearly consumed. The lamp terminals are represented at P and N by the usual signs + and —. A flexible cord *p*, connects the positive terminal with carbon holder H, enabling the carbon to feed without hindrance. Contact piece J is connected to one end of resistance coil R by wire *j'*. The other end of the coil, together with one terminal of solenoid S, is wired to the negative lamp terminal N. The negative electrode B is connected with solenoid S by wire *b*. The operating parts are shown in the position they would assume at the instant before the arc is fully drawn. The guides G are insulated from the frame of the lamp and are secured at the bottom to an insulated support E, and at the top to yoke Y, also insulated. No feeding mechanism is necessary for the negative electrode in this type of lamp—preferably an inclosed arc. The frame, supports, inclosing globe, etc., are of ordinary construction and need not be here described.

The operation is as follows: When current is admitted to the lamp, the electrodes being in contact, it passes by wire *p* to holder H, thence through both electrodes and by wire *b* to solenoid S and to the negative terminal N. The armature *s* is thus drawn up, lifting one end of clutch C at s^2. The weight of the clutch holds the other, or free end, down, tilting the clutch until the positive carbon is gripped by the walls surrounding opening *c*. The electrode and clutch are then lifted by the upward pull of armature *s* until the lugs *c'* strike the upper ends of slots *g*. The upward movement being thus checked, the force still exerted by solenoid S tends to further tilt the clutch on lugs *c'*, which at that point constitute the pivotal center of the clutch. The positive electrode is thus firmly held by a force exerted equally on its opposite sides. In the position described, an abnormal increase of current in solenoid S simply results in gripping electrode A more firmly without lifting it further and rupture of the arc by excessive energization of the solenoid is in this manner prevented; and the electrode will be maintained in this position until the current strength has so diminished that the weight of the various parts serves to overcome the tractive force of the solenoid. In practice this condition does not occur, except when there is a practical cessation of current. As this weight is comparatively small, it is evident that a very considerable diminution of line current may be felt before the clutch releases the positive electrode. When the adjacent ends of the electrodes have been sufficiently consumed to cause the arc to break, the interruption of the circuit there-

tofore maintained between the lamp terminals demagnetizes solenoid S, allowing its armature, the clutch and the positive electrode to fall until contact is restored between the electrodes, when the arc will again be established in the manner before described. This intermittent feeding of the lamp will continue at long intervals until the positive electrode is consumed to the point where the face h' of holder H impinges upon seat j of the contact piece J. The downward movement of said electrode being thus checked, the circuit will be broken between the electrodes and the current shunted from contact J through wire j' and resistance R to the negative terminal N. As this resistance is practically equal in ohmic value to that of the established arc K, the equilibrium of the circuit is preserved and the other lamps thereon operate as usual. Whenever the clutch is released by solenoid S, should its free end fail to fall as rapidly as the opposite one, for any cause, the lug s^3 will strike the upper surface of the clutch, forcing the free end down and causing the clutch to assume a practically horizontal position from which the next upward stroke of the solenoid will cause the clutch to promptly grip and raise the carbon in the manner heretofore described. My present invention prevents the rupturing and restoring of the arc while the lamp is operating.

Generally speaking, my invention comprehends a form of clutch calculated to strike an arc of a given length and to preserve the arc by locking the positive carbon firmly at that point, so that it may be maintained irrespective of current variations or jarring and shaking of the lamp with occasional feeding, until the electrodes are nearly consumed, when the operating parts are short-circuited in a simple and novel manner, a resistance being automatically introduced at that time, to retain a constant current in the circuit. The means of retaining the electrodes in the same vertical line is also a feature of my invention.

Carbon electrodes commonly used in arc lamps frequently vary slightly from their stated diameter. As the length of the arc struck by my improved lamp is not dependent on a stop limiting the stroke of the solenoid, but is determined by the extent of the upward movement allowed the clutch trunnions in their slots, and as the clutch cannot commence such upward movement until the electrode is first gripped, it will be readily understood that any variation in the normal diameter of the positive electrode cannot change the desired length of arc. This constitutes another feature of my invention and is an important improvement on the mechanism of arc lamps with which I am familiar.

Having described my invention, I claim:—

1. An arc lamp comprising parallel rods, an electrode associated therewith, a holder for said electrode formed of two parts, a device within said parts adapted to hold them together.

2. An arc lamp comprising an electromagnet, two electrodes, a ring clutch, a support therefor, a trunnion connection between said clutch and support in the plane of the upper electrode, a movable part controlled by the electromagnet, a pivotal connection between said part and one end of the clutch, and a stop device on said movable part for engaging the end of the clutch under predetermined conditions.

3. An arc lamp comprising an electrode, two parallel rods by which it is guided, a clutch pivotally connected at one end to said parallel rods in the plane of said electrode, and an electromagnetic device associated with the other end of said clutch so as to vary its position.

4. An arc lamp comprising an electrode, two substantially parallel rods between which said electrode is located, a clutch provided with projections which enter elongated slots in said rods, and an electromagnet connected with said clutch.

In witness whereof, I subscribe my signature, in presence of two witnesses.

OSCAR A. ROSS.

Witnesses:
WM. H. CLARKE,
WALTER POULSON.