(No Model.) 3 Sheets—Sheet 1.

J. BROCKIE.

ELECTRIC ARC LAMP.

No. 534,852. Patented Feb. 26, 1895.

Fig. 1.

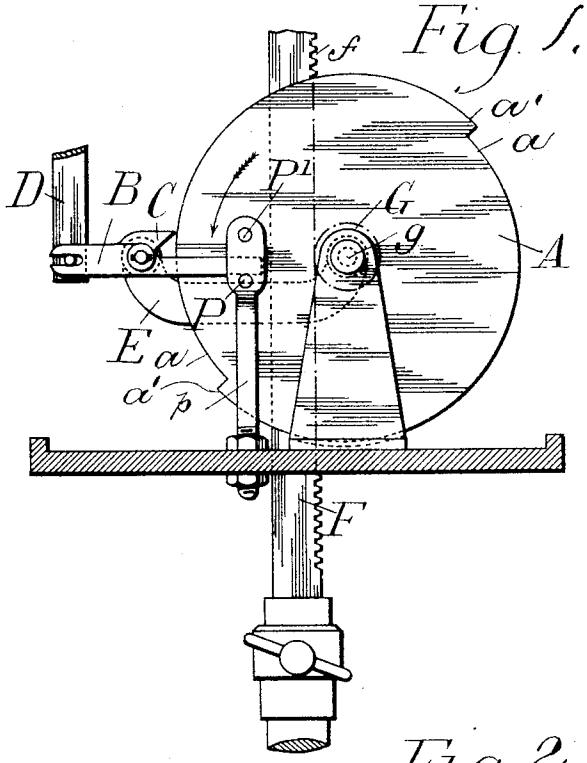
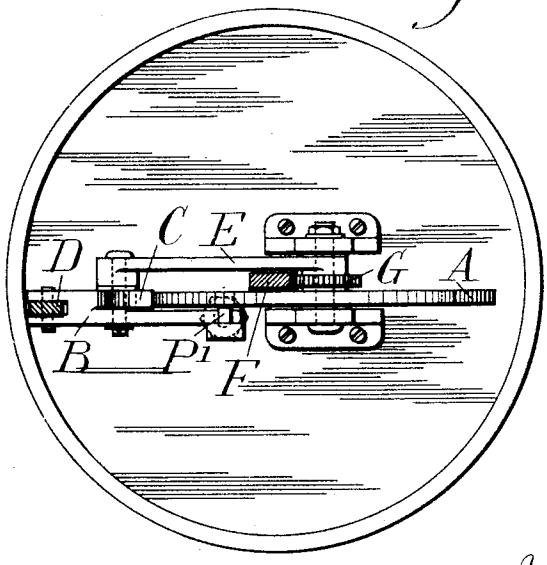


Fig. 2.



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Inventor:
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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

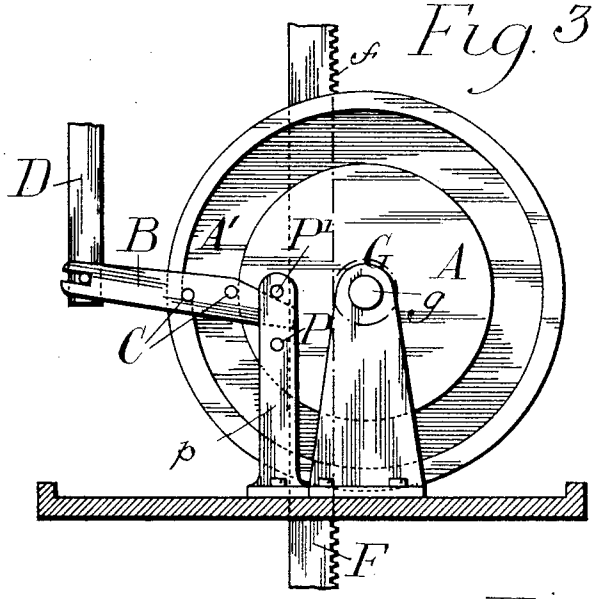
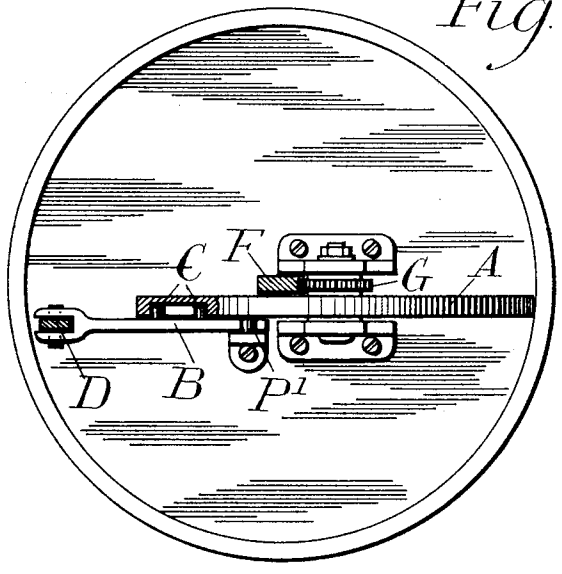


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 5.

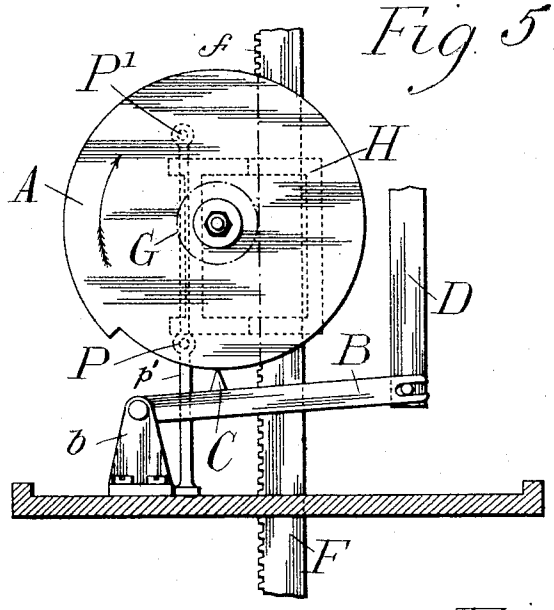
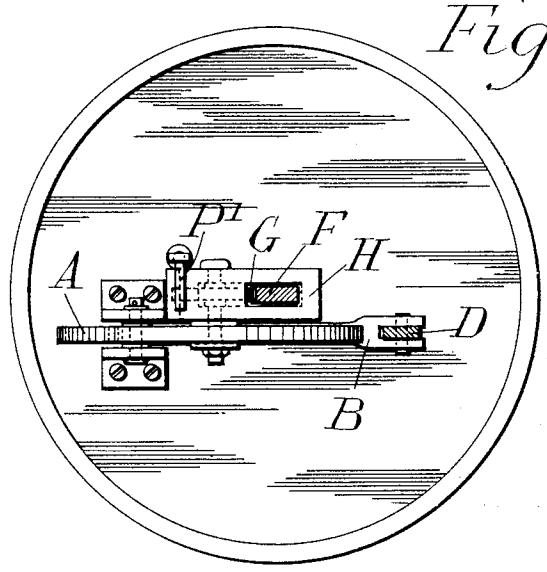


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES BROCKIE, OF FOREST HILL, ENGLAND.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 534,852, dated February 26, 1895.

Application filed November 13, 1894. Serial No. 528,610. (No model.) Patented in Belgium November 3, 1894, No. 112,533; in Hungary November 21, 1894, No. 1,635; in Italy November 26, 1894, LXXIII, 417, and in Austria December [illegible] 1894, No. 6,226.

To all whom it may concern:

Be it known that I, JAMES BROCKIE, a citizen of England, residing at 12 Tyson Road, Forest Hill, Kent, England, have invented an Improvement in Electric-Arc Lamps, (for which I have obtained Letters Patent in Belgium, dated November 3, 1894, No. 112,533; in Austria, dated December 4, 1894, No. 6,226; in Italy, dated November 26, 1894, Vol. LXXIII, 417, and in Hungary, dated November 21, 1894, No. 1,635,) of which the following is a specification.

In many electric arc lamps the carbons are separated so as to strike the arc, and afterward, as they become consumed, are allowed to approach each other by the action of a clutch governed by a solenoid or electromagnet this clutch in one attitude grasping and holding and in other attitudes releasing the carbon holder or some part connected to it. The action of such clutch arrangements is attended by a difficulty which may be thus explained. Whenever the clutch gives such release that the part which it holds can move at all, there is nothing to prevent that part from moving too far before it can be clutched again. It is consequently necessary to apply in connection with clutches some controlling or retarding mechanism which is more or less complex, costly and liable to derangement and wear.

The object of my invention is to overcome the difficulty above referred to by simply modifying the formation of the part on which the clutch acts, so as to dispense entirely with controlling or retarding mechanism.

I shall describe my invention applied in connection with several known forms of clutch arrangements.

Referring to the accompanying drawings, Figure 1 is a side elevation of one form of clutch illustrating my invention. Fig. 2 is a plan view thereof, partly in section. Fig. 3 is a side elevation of a modified form of a clutch. Fig. 4 is a plan view thereof, partly in section. Fig. 5 is a side elevation of another form of clutch, and Fig. 6 is a plan view thereof.

Referring to Figs. 1 and 2 of the drawings, the letter A indicates a wheel mounted on a shaft *g* journaled in suitable bearings carried by the lamp frame and having rigidly mounted on its shaft *g* a pinion G. F indicates the carbon rod being formed on one side with a rack *f* which meshes with the pinion G as shown. The periphery of the wheel G is shown in said Fig. 1 as being formed in two sections, formed as parts of a spiral curve, each of said sections gradually receding from the center of the wheel from the point *a* to the point *a'*. Secured to the frame of the lamp is an upright standard *p* provided with laterally projecting stop pins P, P', between which rests one end of a lever B, the other end of which is pivotally connected to the lower end of an armature D adapted to be actuated by a solenoid or electromagnet, not shown, which is arranged in the lamp circuit. The lever B is provided with a pointed or tapered tooth that normally is in engagement with the periphery of the wheel A and holds the latter against rotation. To the lever B, at a point intermediate its ends, is pivotally secured one end of a link E, the other end of which is loosely journaled on the shaft *g*.

The operation of the device above described is as follows: When the lamp is not in circuit and therefore not burning the solenoid armature or core B rests on the lower stop pin P, the carbons being then in contact. When the lamp is put in circuit the electromagnet or solenoid is excited attracting the armature D upward. At the first part of the upward movement of the armature the outer end of the lever B is raised forcing the tooth C against the periphery of the wheel A and rotating said wheel in a direction opposite to that shown by the arrow. As the wheel A rotates the pinion G is rotated in the same direction, thus raising the carbon rod F and establishing the arc. As the carbon is consumed the resistance of the arc increases, the attractive power of the electro-magnet or solenoid is lessened, and the armature descends, and in its descent, the pressure of the tooth against the periphery of the wheel A is relieved, when the wheel will begin to rotate in the direction of the arrow, thus lowering the carbon rod F. After a slight movement a part of the periphery of the wheel A of a larger radius presents itself to the tooth and arrests the rotation of the wheel before the

arc is destroyed. When the wheel has been rotated far enough to cause the tooth C to engage the portion of the wheel *a* there will ensue a sudden descent of the carbon rod, causing a momentary extinction and renewal of the arc, but as this can only occur once in several hours, it involves no serious objection.

In Figs. 2 and 3, I have illustrated a modified form of clutch, but the principle of operation is the same as that before described. As illustrated in said figures instead of providing the lever B with a tooth that engages the eccentric periphery of the wheel A, I provide said lever with two laterally projecting pins C that project into a groove A′ cut in the face of the wheel A, the outer side or wall of which groove is formed of spiral curvature, the radius of said wall gradually decreasing in a direction opposite to that indicated by the arrow, as shown. When the circuit is closed through the lamp the armature D is raised, raising the outer end of the lever B and causing the pins C to bind against the walls of the groove A′, and thus rotate the wheel A in the direction to raise the carbon rod F, thus establishing the arc. As the carbon is consumed the armature D is lowered, as before described, lowering the lever B and slightly disengaging the pins C from engagement with the walls of the groove A, when the weight of the rod and its carbon will rotate the wheel A in the direction of the arrow and lower said carbon, until the spirally formed wall of the groove, owing to its decreased radius, will bind against the stop pins C and arrest the further rotation of the wheel.

Referring to Figs. 5 and 6 the lever B is pivotally secured to the armature D, in the manner before described, while its other end is pivoted to a support *b* mounted on the lamp frame, the tooth C engaging the under side of the wheel A, as shown. The wheel A is formed with a spiral periphery, but instead of mounting it in fixed bearings, as shown in Figs. 1 and 2, I journal it in a vertically movable frame H that is limited in its upward and downward movement by stop pins P, P′, carried by a vertical standard *p′* mounted on the lamp frame.

When the circuit is closed through the lamp the armature D is raised, not only causing the tooth C to bear against the periphery of the wheel A, but also lifting said wheel and the frame H and establishing the arc. As the carbon is consumed the armature D is lowered, and with it the lever B, until the frame H rests upon the stop pin P, when the tooth C slightly disengages the periphery of the wheel, permitting it to rotate in the direction of the arrow, until the gradually increasing radius of the wheel causes the periphery of the same to be again engaged by said tooth and arrests the rotation of the wheel.

Having described my invention, what I claim is—

1. In an electric arc lamp, the combination with a carbon rod, of a feed wheel for actuating the same, said feed wheel being provided with a spiral rim, a lever provided with a projection adapted to engage said spiral rim, and an armature connected to said lever and operating to throw said projection into and out of engagement with said rim, substantially as described.

2. In an electric arc lamp, the combination with a carbon rod provided with a rack, of a feed wheel for actuating the same, said feed wheel being provided with a spiral rim and operating to rotate a pinion gearing with said rack, a lever provided with a projection adapted to engage said spiral rim, and an armature connected to said lever and operating to throw said projection into and out of engagement with said rim, substantially as described.

3. In an electric arc lamp, the combination with a carbon rod provided with a rack, of a feed wheel for actuating the same, said wheel being provided with a spiral periphery and operating to rotate a pinion gearing with said rack, a lever pivoted at one end to a fixed bearing and provided with a tooth adapted to engage the under side of the periphery of said wheel, a vertically movable frame in which said wheel is journaled, stops to limit the movement of said frame, and an armature connected to said lever and operating to engage and disengage said wheel, substantially as described and for the purpose specified.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 29th day of October, A. D. 1894.

JAMES BROCKIE.

Witnesses:

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