(No Model.)

L. BRIANNE.

ELECTRIC ARC LAMP.

No. 475,289. Patented May 24, 1892.

Fig. 1.

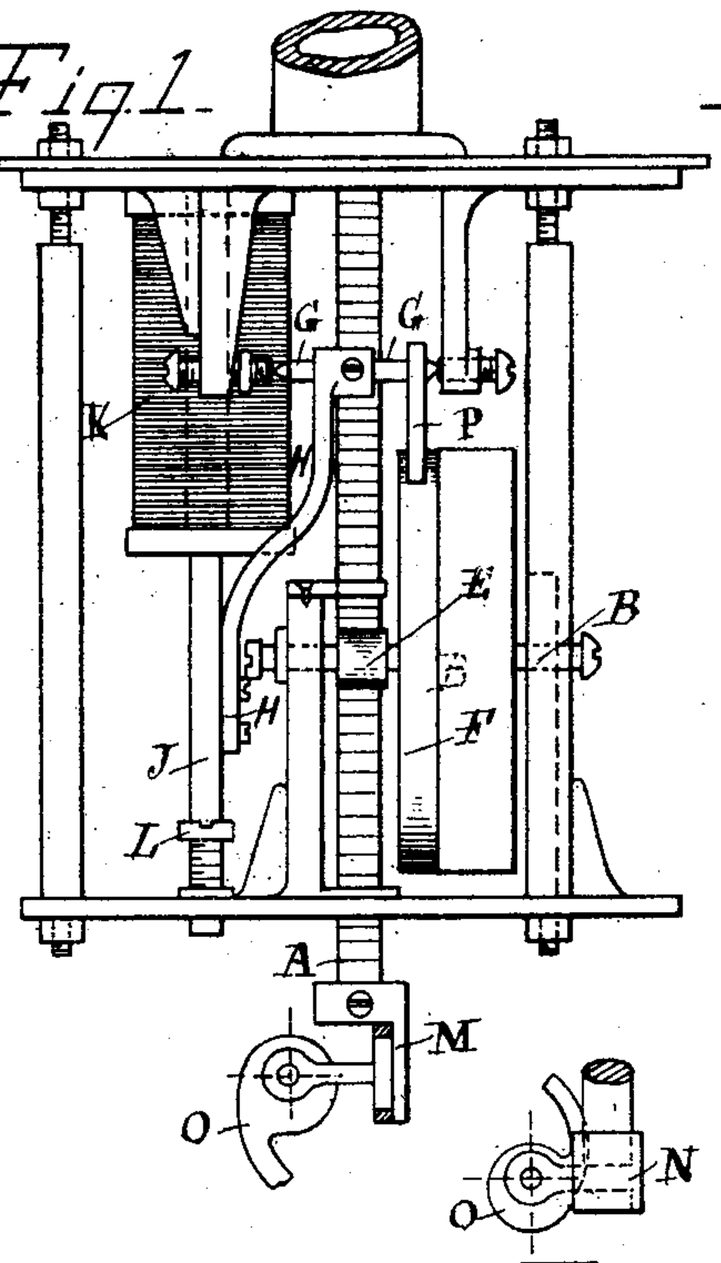

Fig. 2.

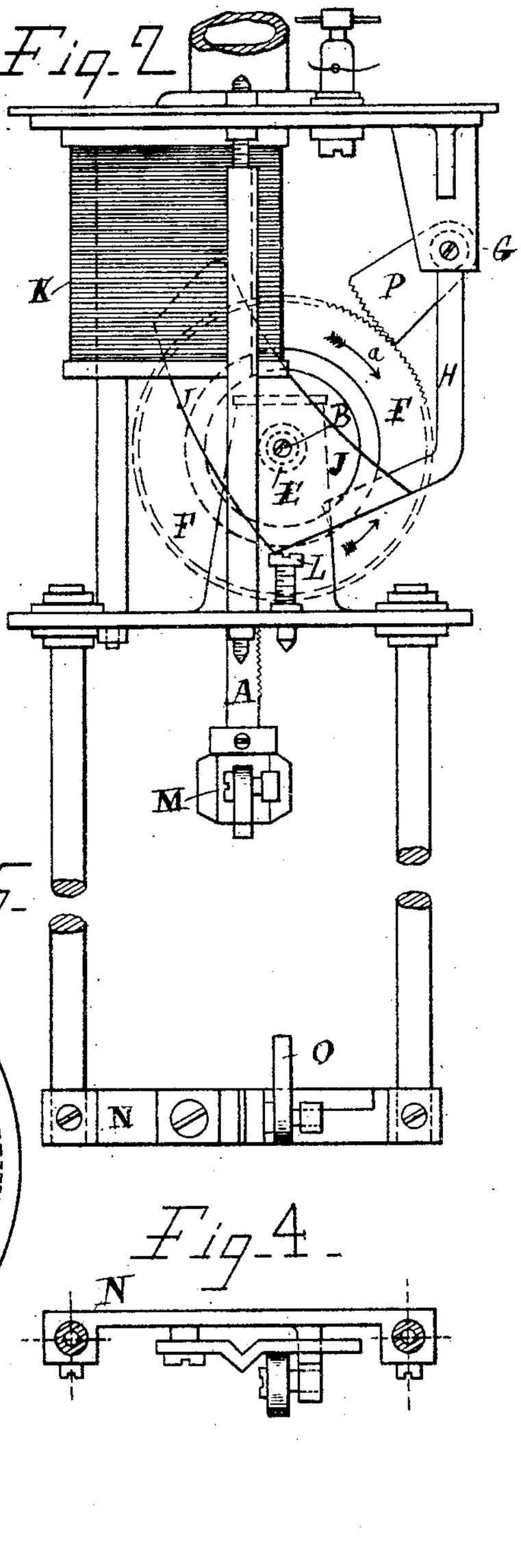

Fig. 3.

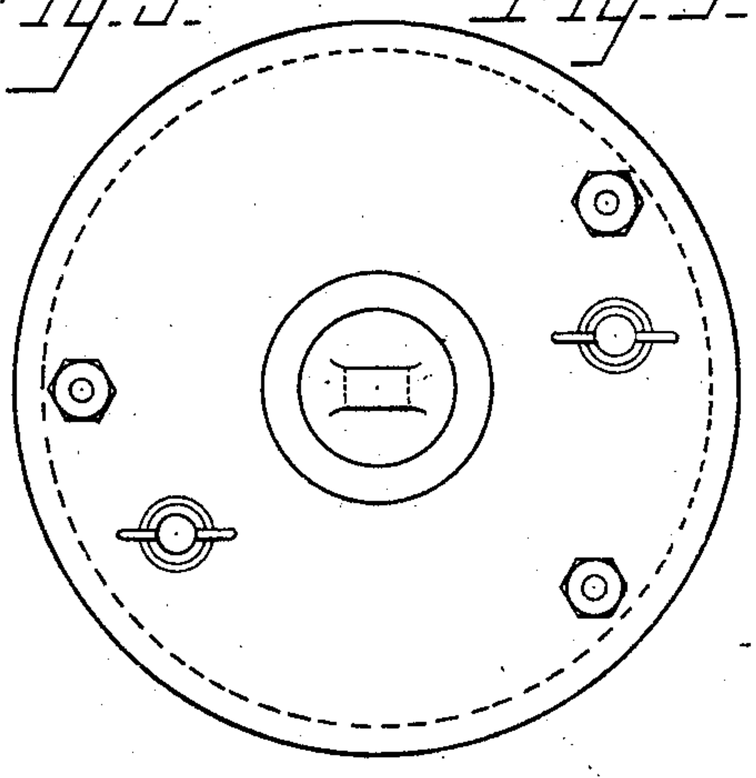

Fig. 5.

Fig. 4.

WITNESSES

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LUCIEN BRIANNE, OF PARIS, FRANCE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 475,289, dated May 24, 1892.

Application filed July 28, 1891. Serial No. 401,021. (No model.) Patented in France July 12, 1890, No. 206,963; in Germany August 1, 1890, No. 56,345; in Austria-Hungary November 14, 1890, No. 32,479 and No. 56,900; in Belgium January 3, 1891, No. 93,327; in England January 5, 1891, No. 200; in Italy January 28, 1891, LVI, 438, and in Spain March 24, 1891, No. 11,661.

To all whom it may concern:

Be it known that I, LUCIEN BRIANNE, a citizen of the Republic of France, residing at Paris, France, have invented new and useful Improvements in or Connected with Electric-Arc Lamps, (for which Letters Patent have been granted in France, No. 206,963, dated July 12, 1890; in Germany, No. 56,345, dated August 1, 1890; in Austria-Hungary, No. 32,479 and No. 56,900, dated November 14, 1890; in Belgium, No. 93,327, dated January 3, 1891; in Great Britain, No. 200, dated January 5, 1891; in Italy, Vol. LVI, No. 438, dated January 28, 1891, and in Spain, No. 11,661, dated March 24, 1891,) of which the following is a specification.

My invention relates, mainly, to regulating mechanism for electric-arc lamps, and is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a front elevation, and Fig. 3 is a plan of a regulating mechanism for electric-arc lamps constructed according to my invention. Fig. 4 is a detail view of the lower-carbon holder. Fig. 5 is a side elevation of Fig. 4.

The advantages resulting from my improvements are great simplicity and durability, combined with a degree of sensitiveness which adapts it for working under any conditions with either continuous or alternating currents.

In carrying out my invention I construct the regulator of two cast-iron or copper plates, between which are fitted the parts of the apparatus. One pole is connected to the frame of the apparatus and the other to the lower-carbon holder, which is insulated from the other parts of the apparatus. A rack A, Figs. 1 and 2, carrying the upper carbon, gears with a pinion E, on the arbor B of which is a toothed fly-wheel F. Above this pinion is an arbor G, carrying a brass lever H, fixed to an iron armature J. On the arbor G is keyed a toothed sector P, which can engage or disengage the fly-wheel F and impart movement thereto or leave it free, according to whether the armature J is leaving the solenoid-coil K or is returning thereto. The solenoid K is formed of fine wire mounted in derivation upon the terminals, through which the electric current enters and quits. I can also provide a place on this coil for winding a coarse wire traversed by the main current and utilize the result as differential or auxiliary action. The theoretical form of this solenoid and of its armature is circular. Facility of construction alone has brought about the particular form of these parts. This circular form has for its object to utilize the entire play of the armature, and consequently by reducing it by means of levers to increase its power of action on the rack.

The operation of the apparatus is as follows: Suppose it to be at rest, as shown in the drawings. The armature J, Figs. 1 and 2, not being subjected to any influence, has been drawn by its weight outside the coil as far as the stop-screw L. In this movement it has caused the toothed sector P, which is fixed to the same arbor, to engage the fly-wheel F and impart a rotary movement to it in the direction of the hands of a watch, as shown by the arrow *a*. This rotary movement of the fly-wheel F has been transmitted through its common arbor to the pinion E, which by this means has raised the rack A to a certain extent. (The upper carbon has thus been moved to the necessary distance for lighting.) When the current flows, the carbons not touching there is no outlet for it, except through solenoid K of fine wire of great resistance, which it renders active. The armature J is quickly attracted and completely enters the coil firmly, drawing along the toothed sector P. This latter disengages the fly-wheel F, which becomes free and allows the rack to draw it along by its weight until the descent places the carbons in contact. By reason of this contact forming short circuit the current to a great extent abandons the passage of greater resistance through the solenoid K. Immediately afterward the armature J, not being sufficiently influenced by the magnetic action, falls by its weight into the position of rest, already described, thereby, through the medium of the toothed sector P, fly-wheel F, and pinion E, raising the rack A to the extent

necessary to separate the carbons and to cause the illuminating-arc to be produced slightly smaller than the normal arc. The current continuing to pass, the carbons become consumed, the distance between them increases, and the arc, becoming more resistant, compels the current to increase its derivation through the solenoid K. This increase is transferred through an attraction of the armature J, which re-enters progressively and proportionately to the consumption of the carbons up to a point intermediate of its course, where the toothed sector P disengages the fly-wheel F. This point of escapement is the point of electric equilibrium, and consequently of regulation. It corresponds to the normal arc. On the least increase in the consumption of the carbons the sector P liberates the fly-wheel F, which, being subjected to the weight of the rack A, tends to turn in the direction of the arrow *b* to allow it to descend and bring the carbons closer together. As the distance between them diminishes the resistance of the arc will lessen the derivation through the solenoid K, which allows its armature to slightly exert itself. This recoil movement again places the sector P in contact with the fly-wheel F, which is thus again retained until a fresh consumption of carbons reproduces a like operation. The liberation and the re-subjection of the fly-wheel F by the sector P is so rapid that the former has only turned to the extent of an angle equal to one tooth of its periphery. This angle corresponds to a descent of the rack proportionate to a movement of the fly-wheel to the extent of one tooth divided by the relation of the diameters of the fly-wheel F and pinion E, which allows of attaining the desired softness of descent. Moreover, the weight of the fly-wheel F softens these different movements by its inertia. Thus, notwithstanding the consumption of the carbons, the normal distance is maintained by the liberation, tooth by tooth, of the fly-wheel F, allowing the progressive descent of the rack. If during the action special conditions should require it, the armature J may leave its regulating-point and assume its position of rest, thus separating the carbons to a lighting distance. This is very important, as it mechanically avoids the adherence of the carbons, which is a defect of existing regulators. The regulating action is very powerful and insures a practical working hitherto unknown. The construction of all the parts contributes to diminish the chances of accidents. The carbon-holders M N, Figs. 2, 4, and 5, which are very simple and strong and clamped together by operating an eccentric O, are protected from disarrangement, which would be very dangerous to the safety of the apparatus.

Contrary to almost every existing apparatus, the weight mechanically separates the carbons and the current brings them together, whereby an absolutely effective working is insured.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

The combination, with the solenoid K, traversed by a derived current, of the movable armature J, sector P, fly-wheel F, pinion E, and rack, substantially as set forth.

LUCIEN BRIANNE.

Witnesses:
EDOUARD POINENY,
HECTOR DU FRENJ.