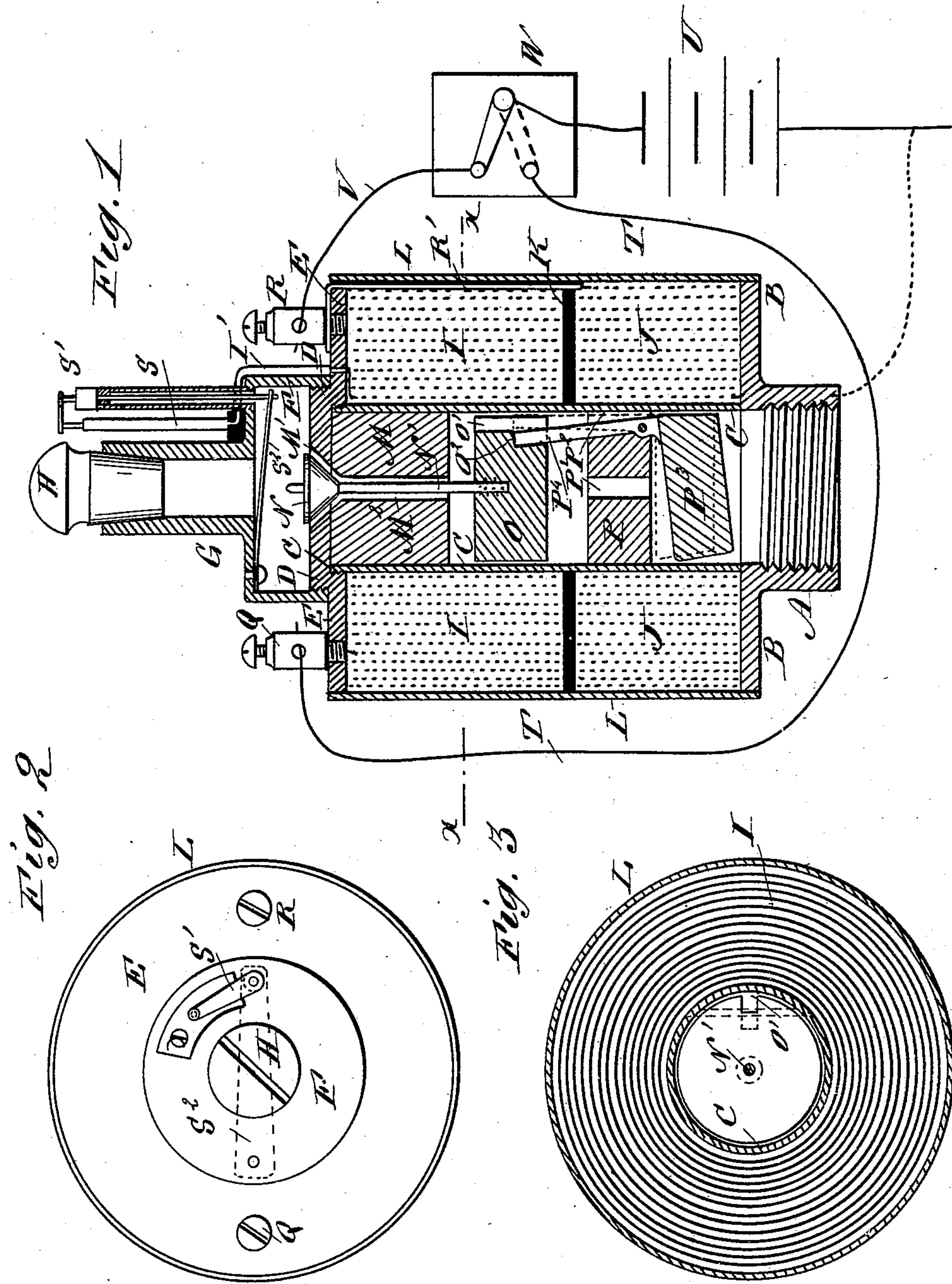


(No Model.)

J. B. ENTZ.
ELECTRIC GAS LIGHTER.

No. 374,528.

Patented Dec. 6, 1887.



WITNESSES:

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ELECTRIC GAS-LIGHTER.

SPECIFICATION forming part of Letters Patent No. 374,528, dated December 6, 1887.

Application filed April 5, 1887. Serial No. 233,726. (No model.)

To all whom it may concern:

Be it known that I, JUSTUS B. ENTZ, of the city, county, and State of New York, have invented new and useful Improvements in Electric Gas-Lighters, of which the following is a full, clear, and exact description.

My invention has reference to that class of burners in which the gas is automatically turned on and a spark produced at the burner-tip to ignite the same on closing the lighting-circuit, and on closing the extinguishing-circuit the gas is turned off.

The invention has for its object to provide new and useful improvements in this style of burner, whereby it is rendered more compact, efficient, and economical; and to this end the invention consists in certain novel features of construction and combinations of parts, hereinafter fully described, and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an enlarged vertical sectional view of an electric gas-lighter embodying my improvements. Fig. 2 is a plan view of the same; and Fig. 3 is a sectional plan view on the line *x x*, Fig. 1.

The threaded metal coupling-sleeve A on the base of the burner is adapted to be screwed on the gas-pipe, as usual, and is formed with the wide annular flange B. To the sleeve A, around its inner edge, is secured the upright tubular shell C, preferably of thin metal, the upper end of which is screwed into a recessed disk, D, forming a gas-tight joint.

The disk D is formed with a wide annular flange, E, corresponding in size and parallel with that on the lower coupling-sleeve, A, and is formed with an external thread, on which is screwed down to the flange E, to form a gas-tight joint, the cap F, carrying the burner-tube G and tip H.

Around the upper portion of the shell C is wound the wire forming the upper electro-magnetic coil, I, and around the lower portion of the shell C is wound the wire forming the lower electro-magnetic coil, J. The two electro-magnetic coils are insulated from each other by a collar, K, of non-conducting material, surrounding the shell C, extend out flush

with the outer edges of the upper and lower flanges, E B, and are inclosed therebetween by an outer cylindrical casing, L, fitted over the coils and flanges.

In the upper end of the central shell, C, is fixed a cylindrical piece, M, of soft iron, which is thus surrounded by the upper portion of the upper electro-magnetic coil, I, and forms its core-section.

The disk D is formed with a central depression, M', forming a seat for the valve N, and the piece M with a vertical aperture, M², leading downward therefrom, in which plays the stem N' of the valve. The aperture M² is made somewhat larger than the valve-stem, in order to provide a passage for the gas to the burner-tube G and tip H when the valve is open.

To the lower end of the valve-stem N is attached a soft-iron cylindrical block, O, which is somewhat smaller than the interior of the shell C, to leave a passage for the gas, and is adapted to move vertically therein with the valve when acted upon as an armature by the upper electro-magnet, composed of the coil I and core-section M.

Within the upper part of the lower coil, J, also is fixed a soft-iron core-section, P, having a central vertical passage, P', for the gas and formed with a vertical side slot, P², in the lower end of which is pivoted a lug on the swinging soft-iron block or armature P³. Said lug is prolonged to form a dog, P⁴, which is received loosely in a side slot, O', in the upper movable armature, O, and is adapted to automatically engage a shoulder, O², formed at the inner side of the slot O' by the weight of the attached armature P³ when the armature O is raised by the action of the upper magnet.

Two binding-posts, Q R, are arranged on the top flange, E, and are insulated therefrom in any suitable manner. The post Q is connected with one terminal of the upper coil, I, and the post R by an insulated conductor, R', running downward within the outer casing, L, with one terminal of the lower coil, J. The other terminal of the upper coil, I, is connected by an insulated conductor, I', with the fixed contact S of the spark-producer, which contact is supported on, while insulated from, the cap F in any suitable manner.

The movable contact S' is of the usual de-

scription, and is in continuous electric connection with the ground through its holding-spring S^2 or its guide-tube, the cap F, shell C, sleeve A, and through the gas-pipe on which the same is held. The other terminal of the lower coil, J, is grounded through the sleeve A in like manner.

To the binding-posts Q R are connected wires T V, respectively, leading to the two contacts of a suitable switch, W, which in turn is connected with one pole of a battery, U, the other pole of which is suitably grounded. With this arrangement, when the gas is to be lighted, the switch W is turned to connect the upper coil, I, through the binding-post Q and wire T, with the battery. An earth-circuit is thus made from the battery through connecting-wire to switch W, through wire T, post Q, upper coil, I, wire I', contacts S and S', thence to the ground, as described, and back to the battery. The upper electro-magnet being thus active, the armature O is raised, opening the valve N and permitting the gas to flow from the burner-tip, and is prevented from falling back by the engagement of the swinging dog P^1 with the shoulder O^2 , thus keeping the valve open. The armature O at the same time is drawn up to the fixed core-section M, when its valve N, or a projection thereon, strikes the holding-spring S^2 , thereby raising the movable contact S' , breaking the circuit, and producing a spark which ignites the gas. When the circuit is thus broken, however, the upper magnet becomes inactive, allowing the armature O to fall with the valve until checked by the dog P^1 and the circuit is again closed. This operation is repeated, producing a succession of sparks, until the gas is ignited, when the switch W is turned to break the circuit.

To extinguish the light, the circuit is closed by the switch through the lower coil and connections. The lower magnet, then becoming active, quickly raises the swinging armature P^3 into contact with the core-section P, disengaging the dog P^1 from the shoulder O^2 on the armature O, allowing the same to fall by gravity, aided by the attraction of the lower magnet, and close the supply-regulating valve.

The tubular shell C, in connection with the

core-sections M P, really forms a continuous hollow or chambered core for both magnets, and is made separate from the core-sections only as a matter of convenience in manufacture. For the same reason it may be made of a different metal therefrom, it having no appreciable effect upon the magnets, owing to its thinness. By thus winding the coils upon a hollow core within which the valve-operating devices are located an extremely simple and compact burner is produced at a low cost.

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

1. The combination, with the sleeve having the upper and lower core sections, the electro-magnetic coils surrounding the same, and the valve and its operating armature, of a second armature pivoted to swing within the core, and a dog for engaging the valve-operating armature operated by the swinging armature, substantially as shown and described.

2. The combination, with the pipe-coupling sleeve, the hollow shell, the annularly-flanged disk on the upper end of the sleeve, having a central opening forming a valve-seat, and carrying the binding-posts, the electro-magnetic coils surrounding the sleeve, a valve closing the valve opening and provided with a stem extending down into the sleeve, and the valve-operating devices within the sleeve, of the cap upon the disk supporting the burner-tube, the insulated fixed contact extending adjacent to the burner-tube, the vertically-movable contact extending into the cap, and a supporting spring for said movable contact in the path of the said valve, substantially as set forth.

3. The combination, with the sleeve, the upper and lower core-sections, the electro-magnetic coils surrounding said sleeve, the upward-opening valve, and the vertically-movable armature for operating it, of a second armature movable within the core and provided with means for holding the valve-armature in its raised position, substantially as set forth.

JUSTUS B. ENTZ.

Witnesses:

THOS. B. GRATACOP,
J. F. MOORE.