W. E. FACER.

Electric Gas-Lighting Apparatus.

No. 210,245. Patented Nov. 26, 1878.

Fig. 1.

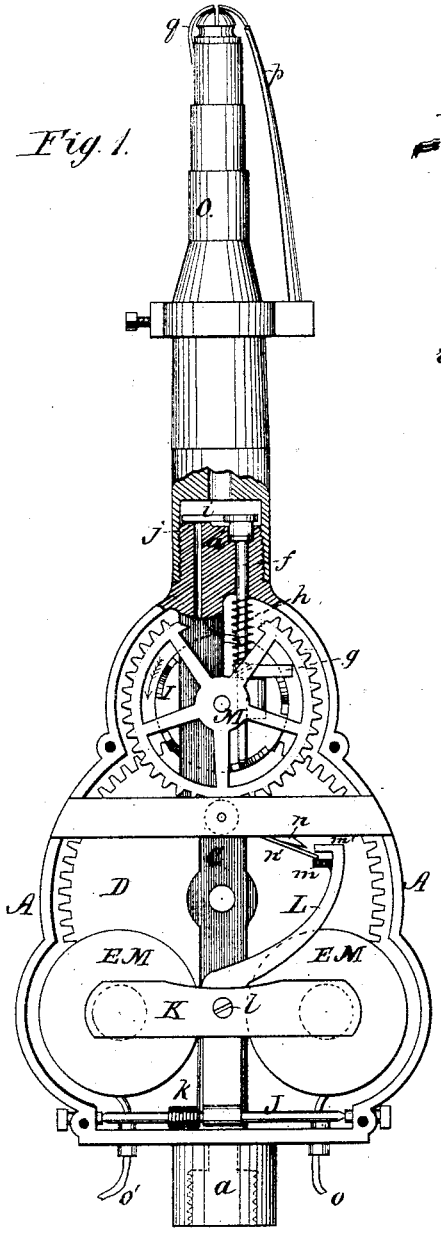


Fig. 3.

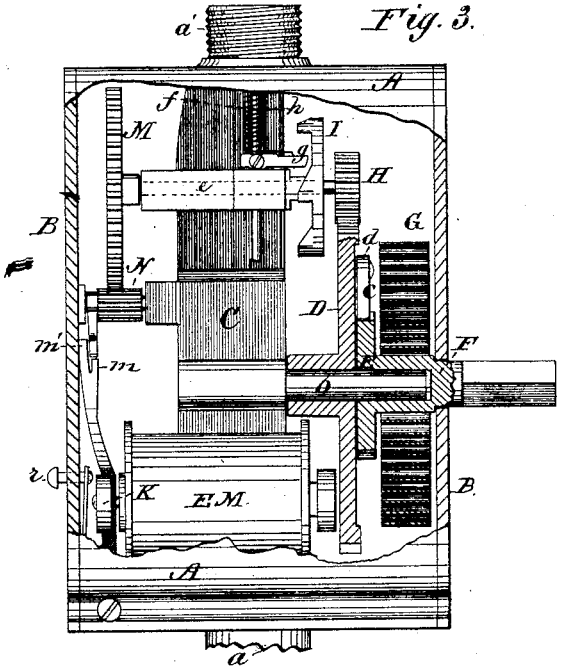
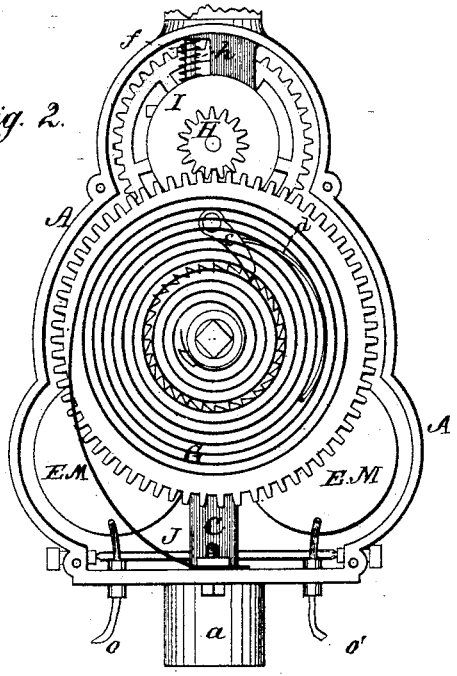


Fig. 2.



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IMPROVEMENT IN ELECTRIC GAS-LIGHTING APPARATUS.

Specification forming part of Letters Patent No. **210,245**, dated November 26, 1878; application filed April 4, 1878.

To all whom it may concern:

Be it known that I, WILSON E. FACER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and Improved Electric Gas-Lighting Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a side view of the complete device, with one of the removable plates detached and the connection of the burner shown in section. Fig. 2 is a side view from the opposite side, with one of the removable plates detached. Fig. 3 is a side view taken at right angles to Figs. 1 and 2, the case being broken away and the main drive-wheels shown in section.

The object of my invention is to provide an electric gas-lighting apparatus which, by the simple opening and closing of an electric current, shall turn on and light the gas or shut it off, the same being designed, principally, for lighting street-lamps, but capable of application to other purposes.

The invention is an improvement upon that form of apparatus in which a clock mechanism, consisting of a coiled spring with spur-gear and escapement, is the moving force, and a pair of magnets in electric circuit the means for controlling the force.

My improvement consists in casting the gas-conduit in one and the same piece with the containing-case, and utilizing said conduit for a support for the operating parts of the device; in the peculiar construction and arrangement of the driving mechanism; in the peculiar construction and arrangement of the cut-off valve and its actuating mechanism; and in the peculiar arrangement of the magnets, driving mechanism, escapement, and cut-off valve with respect to the case and central conduit, the said parts being arranged for compactness and general improvement in the organization of the device, all as hereinafter more fully described.

In the drawing, A represents the outside case, which is provided with removable plates B B, and may be of any suitable form. Centrally within the case is cast a vertical gas-conduit, C, opening below the case, with a screw-threaded end, *a*, adapted to be screwed on the end of the gas-pipe, and opening above the case, with a screw-threaded end, *a'*, adapted to receive the burner and its connections. This central conduit constitutes a support for and carries all the operating parts of the apparatus. To the same, in the lower portion of the case, is firmly attached the cross-bar sustaining the two electro-magnets, so that said electro-magnets occupy a position upon opposite sides of the conduit. Just above the magnets is fixed to the conduit C a horizontal stud, *b*, upon which is arranged a loose gear-wheel, D, carrying pawl *c* and spring *d;* and upon the outer end of the stud is arranged a ratchet-wheel, E, firmly attached to a sleeve, F, and arranged to engage with the pawl of the loose gear-wheel. The outer end of this sleeve is squared to receive a key, and about the same is coiled the main driving-spring G, one end of which is attached to the sleeve and the other to the case.

As the sleeve is wound by the key the spring is constricted and the ratchet-teeth are caught and held by the pawl, so that the tension of the said spring is imparted to the wheel D. This loose wheel meshes at the top with a small pinion, H, fixed to a horizontal shaft, *e*, journaled in an offset from the gas-conduit; and beside this pinion, and upon the same shaft, is fixed a vertical disk or wheel, I, having upon its side spurs or cam-teeth, inclined upon one side. Just beside this wheel is arranged a vertical shaft, *f*, carrying a rigid horizontal arm, *g*, and surrounded by a spiral spring, *h*, which exerts both a torsional and longitudinal strain. This vertical rod extends through the upper connection, *a'*, for the burner, and has attached a cut-off or valve, *i*, which, as the rod rocks, passes over or away from orifices arranged in a raised seat, *j*, so as to let on or turn off the gas. Now, as the wheel I is revolved by the mainspring, its action is made intermittent by the action of an escapement, hereinafter described. As, however, one of its spurs or teeth strikes with its

inclined face the arm *g* it rocks shaft *f*, and turns the cut-off or valve *i* away from the gas-orifices, allowing the gas to flow, in which position the devices remain until the escapement is moved again. As soon as it is moved the shaft *e*, carrying the wheel I, moves a space, and in removing its lateral spur or tooth from the arm *g*, the spring around the shaft *f* causes the said shaft to rock, throwing the said arm *g* between two teeth of the wheel, and causing the cut-off *i* at the upper end of the shaft to pass over and close the orifices through which the gas passes to the burner.

Each one of the teeth of the wheel I, it will be seen, serves to let on the gas, while the intervening spaces cause the valve to close.

The shaft *f* has a slight longitudinal movement, and, while the spring about the same serves to rock it, it also, by pressing against the arm of said shaft, forces it downwardly, and causes the cut-off *i* to be held flat and tight against its seat, to prevent leakage.

To secure the easy turning of said cut-off a boss is formed about the shaft *f*, near the cut-off, which fits in and rests upon a lubricated packing in a corresponding cup-shaped recess, and serves also the additional function of preventing the leakage of gas from passing downward into the works.

To prevent corrosion and stiff working, the cut-off and its seat should be made of nickel or other non-corrosive material.

I will now proceed to describe the escapement whereby the intermittent action of the cut-off devices is controlled. In adjustable pivot-screws in the sides of the case, near the bottom, is arranged a rock-shaft, J, to which is rigidly attached an arm bearing the armature K, which plays upon the poles of the magnets. This armature is held away from the magnets by a coiled spring, *k*, and the distance of the movement of said armature away from the magnet is defined by a stud, *l*, which is fixed to the conduit C, and, after passing through the armature, terminates in a head, which operates as a stop to the same. Rising from the armature is an arm, L, having two faces, *m m'*, arranged in different vertical planes, and in also different horizontal planes.

Upon the horizontal shaft *e*, opposite the wheel I, is fixed a large gear-wheel, M, which meshes, in turn, with a small pinion, N, whose shaft carries an arm, *n*, having a spring-extension, *n'*, which is arranged to strike the faces *m m'* of the arm L.

Now, if we suppose the gas to be turned off, with the arm *g* resting between the teeth of the wheel I, and the spring-arm *n* resting upon the lower face, *m*, of the arm L, the action of the apparatus would be as follows: A current transmitted through the insulated wires *o o'* to the magnet causes it to attract the armature. As the armature moves inwardly the face *m* of its arm is removed from the plane of the spring-arm *n* and *m'* brought into range therewith, in the rear of the spring-arm. The spur-gear being freed, it moves from the action of the mainspring, and the inclined tooth of wheel I deflects arm *g* and opens the valve, the spring-arm *n* striking the face *m'* of the arm L at the end of its revolution, and being stopped thereby until the circuit is again broken, when the arm L, from the tension of its spring, moves away from the magnets and allows the spring-arm to be shifted from the face *m'* to *m*. The next movement of the armature from the current produces the same effect upon the operating mechanism; but instead of causing the tooth of wheel I to deflect arm *g*, the tooth passes by arm *g*, and, in allowing it to drop between two teeth, from the action of its spring causes the cut-off to move in the opposite direction and shut off the supply of gas.

When the gas is turned on by the devices thus described, it is lighted through insulated platinum connections *p q*, located upon the burner O, by means of an independent battery-current, controlling all of the lamps of a given section.

To operate any one street-lamp independently of the rest, and without employing a battery-current, a spring-seated knob, *r*, Fig. 3, extends through an opening in the case, and when pressed upon causes the armature to approach the magnet and operate the escapement.

The chief advantages of my invention, as compared with others of this class, are its compactness and the easy removability of its parts for inspection, cleansing, or repairs.

Having thus described my invention, what I claim as new is—

1. The gas-conduit C, cast in one piece with the outer case, and combined with the operating devices, as described, so as to support the same, substantially as set forth.

2. The vertical gas-conduit having stud *b*, combined with the wheel D, arranged loosely thereon and carrying pawl and spring, the ratchet-wheel E, with attached squared sleeve F, and driving-spring G, connected at one end to the sleeve F and at the other to the case, substantially as shown and described.

3. The combination, with the case A and removable burner O, of the wheel I, arranged to be driven by the actuating mechanism, the vertical rock-shaft *f*, having rigid arm *g*, spiral spring *h*, and cut-off *i*, arranged between the removable burner and the case to control the flow of gas, substantially as described.

4. The sliding rock-shaft *f*, surrounded by a packing at its upper end, and having a cut-off, *i*, and arm *g*, combined with a spiral spring, *h*, arranged to exert both a torsional and longitudinal tension, substantially as described.

5. The combination, with case A, having central conduit, C, of the magnets E M, located one upon each side of said conduit, to-

gether with the operating mechanism, as described, having its driving-spring and main drive-wheels at one end of said magnet and upon one of said conduits, and having its escapement at the other end of said magnets and upon the opposite side of the conduit, and its cut-off or valve intermediate between said escapement and main drive-wheels, substantially as shown and described.

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