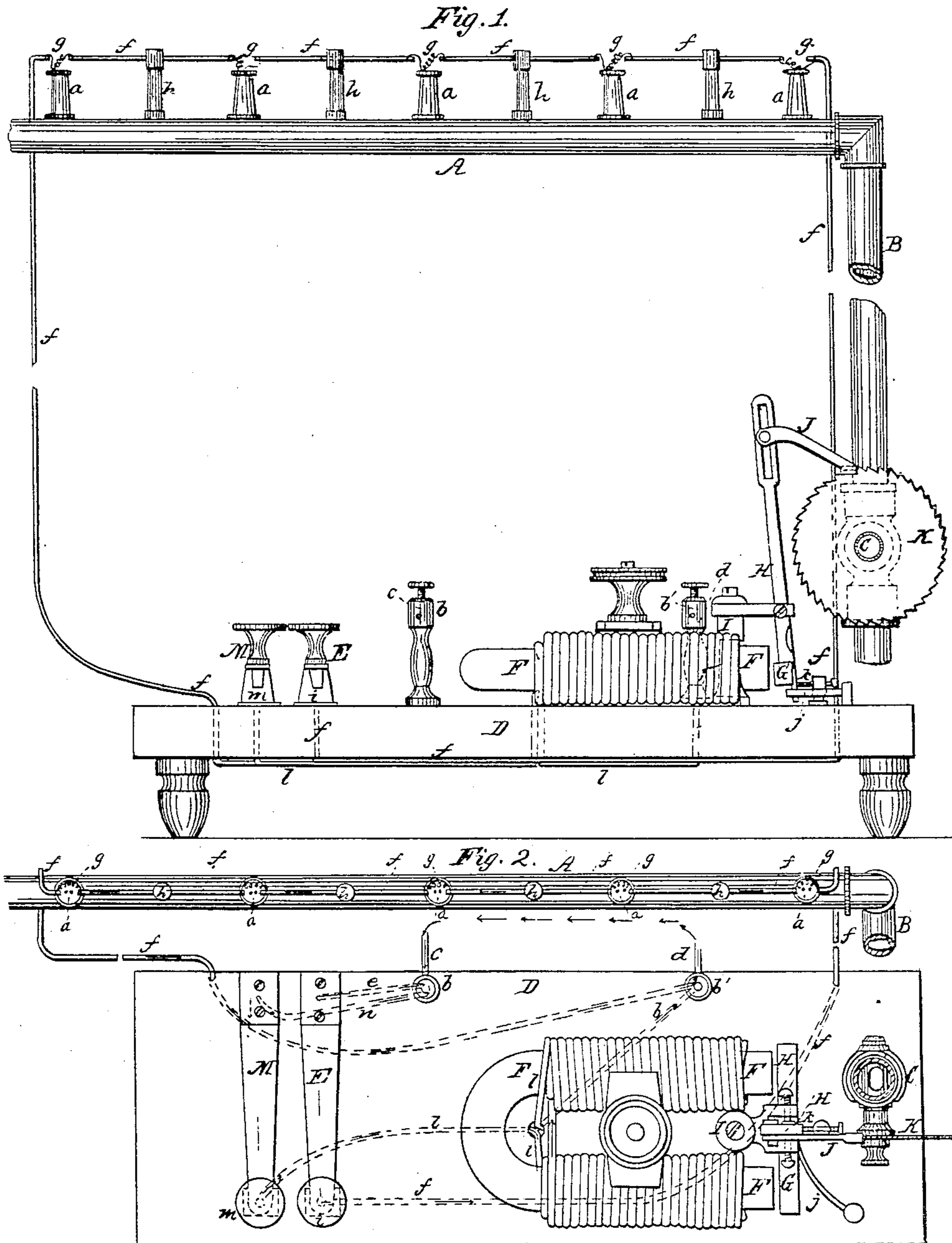


S. GARDINER, Jr.
Electric Gas Lighter.

No. 18,945.

Patented Dec. 22, 1857.



UNITED STATES PATENT OFFICE.

SAML. GARDINER, JR., OF NEW YORK, N. Y.

MODE OF LIGHTING GAS BY ELECTRICITY.

Specification forming part of Letters Patent No. 18,945, dated December 22, 1857.

To all whom it may concern:

Be it known that I, SAMUEL GARDINER, JR., of the city, county, and State of New York, have invented certain new and useful Improvements in Lighting Illuminating-Gas by Electricity; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

The object of this invention is to control and regulate the supply of gas to burners by a mechanism operated by electricity.

The object of my invention is to bring the service or supply cock by which the gas is supplied to a number of burners that are to be lighted by electricity to be opened or closed or made to regulate the supply to the said burners under the control of a person at a distant part of a building or other distant place; and to this end my invention consists in furnishing the service or supply cock with a ratchet-wheel or its equivalent, to be engaged by a pawl or dog or the equivalent thereof attached to one end of a lever whose opposite end has attached to it the armature of an electro-magnet which is made to attract the said armature by an electric current, which may be generated by the same battery or generating apparatus employed for the purpose of generating the current by which the lighting is effected, requiring only a change of circuit effected by a proper arrangement of conductors and a key. By closing and opening the circuit in which the magnet is placed by means of the key the armature is alternately attracted toward the magnet by the attraction produced therein by the current and drawn away therefrom by a spring, and by that means motion is given to the pawl to operate the ratchet or other wheel and turn the cock.

The accompanying drawings serve to illustrate the application of the invention.

Figure 1 is an elevation, showing a gas-pipe with several burners attached, the service pipe and cock for supplying the same, the lighting-conductors and the wires connecting the same with the battery, and the electro-magnet and branch of the circuit for operating the same to open and close the service-cock. Fig. 2 is a plan of the same.

Similar letters of reference indicate corresponding parts in both figures.

To enable others skilled in the art to make and use my invention, I will proceed to describe the construction and operation of the same.

a a are the burners attached to the pipe *A*. *B* is the service-pipe, and *C* is the cock.

D is a table, to which are attached the wires which constitute the two branches of the circuit for opening the cock and lighting the gas, the two keys for opening and closing the circuit in either branch at pleasure, and the electro-magnet and its armature and lever for operating the cock.

b b' are two screw-clamps secured to the table *D*, for the purpose of receiving the ends of the two wires *c* and *d*, which constitute the terminal poles of the battery or other generating apparatus. That apparatus is not shown in the drawings, as it may be of any known character, and its nature is supposed to be sufficiently well understood without representation.

From the bottom of the clamp *b* a wire, *e*, runs under the table *D* to the fixed end of the key *E*, and from a plate of metal, *f*, attached to the upper surface of the table *D*, under the knob of the key *E*, is attached one end of the conducting-wire *f*, in which the platina lighting-conductors *g g* are placed, the other end of the said wire being connected with the clamp *b'*.

The direction of that branch of the circuit between the wires *c* and *d*, of which the wire *f* and lighting-conductors *g g* form parts, is indicated in Fig. 2 by red arrows.

The wire *f*, which should be of copper, leads to all the burners to be lighted by the current; but opposite to each burner it has a short piece cut out or omitted to make room for the fine platina-wire conductor *g*, which is soldered or otherwise attached to it, to stand above and nearly close to the burner for the purpose of lighting the gas. It is preferable, in some respects, to make the lighting-conductors *g g* in the form of coils, as shown; but they may be crimped, curled, tangled, or otherwise formed so as to make a small bunch near the orifices of the burners for the gas to pass through as it issues from the burners.

The conductors should be placed a little on one side of the orifices of the burners, as shown in Fig. 2, in preference to immediately over them, for if placed immediately over them the issuing streams of gas blowing upon them are

liable to cool them without being ignited, which is not the case when they are placed so far aside that the gas has an opportunity to expand and become mixed with a certain proportion of atmospheric air before coming in contact with them.

h h are small posts of insulating material attached to the pipe *A* to support the wire *f*. The branch of the circuit through the wire *f* and conductors is closed by depressing the knob of the key *E* to bring its point into contact with the plate *i*; but when the pressure of the hand is removed from the key *E* the said key springs up so as to break the contact between its knob and the plate *i*, and thus open the circuit.

F is the electro-magnet for operating the cock *C* to turn off and on and regulate the flow of the gas. *G* is its armature; *H*, the lever to which the armature is attached; *I*, a standard supporting the lever *H*; *J*, a pawl attached to the lever *H*, and *K* a ratchet-wheel on the cock *C* with which the pawl *J* engages. *j* is a spring to remove the armature from contact with the poles of the electro-magnet when the branch of the circuit in which the magnet is placed is open. *k* is an adjustable stop-screw to regulate the movement of the armature.

The branch of the circuit in which is the magnet *F* consists of a wire, *n*, a key, *M*, a plate, *m*, and a wire, *l*, the wire *n* running from the screw-clamp *b* to the fixed end of the key *M*, and the plate *m* being secured to the surface of the table *D* below the knob of the key, and having attached to it one end of the wire *l*, which forms the coil of the electro-magnet, the other end of the said wire being connected with the screw-clamp *b'*. This branch of the circuit between the wires *c d* (whose direction is indicated by blue arrows in Fig. 2) is closed by depressing the knob of the key *M* into contact with the plate *m*, and opened by the elasticity of the key when the knob of the key has the pressure removed from it.

The operation of turning on the gas is effected by playing with the finger on the key *M* to open and close the branch of the circuit through the magnet *F*. Every time the circuit is closed the armature is attracted by the magnet, and every time the circuit is opened the armature is drawn away by the spring *j*, thus giving motion to the lever *H*, and causing the pawl *J* to operate the ratchet and turn the cock. A very few strokes of the key *M* will be sufficient to turn on the gas full. When the gas is thus turned on, the branch of the circuit through the magnet is allowed to remain open at the key *M*, and the other branch

through the wire *f* and lighting-conductors *g g* is closed by depressing the key *E*. The conductors *g g*, owing to the resistance they offer to the passage of the current, both by reason of their being of a size so very much less than the wire *f* and of the inferior conducting-power of the platina, will almost instantly become of a high red or almost a white heat, and will cause the ignition of the gas. Other metal might be used temporarily in place of platina for the conductors; but there is no other metal of which they could be so easily constructed but that would be soon destroyed by the heat. When the burners are all lighted the key *E* is allowed to rise, and the circuit through the wire *f* and the conductors *g g* may remain open.

When it is desired to turn off the gas the key *M* is played upon as in turning it on, to make the magnet operate the pawl to turn the cock.

The wheel *K* may be marked or graduated in any way to show when the cock is open or closed and how far it is open.

I do not claim to be the discoverer of the fact that illuminating-gas may be ignited by means of electricity; nor do I claim to be the first to suggest the lighting of a street of gas-lamps simultaneously by means of electricity. A method of doing this is described on page 125 of the American Year Book of Facts, 1851, and alleged to be the invention of M. Villatte. In this method a slip of platina is placed close to the orifice of each burner. Nor do I claim the raising and lowering of extinguishers for spirit-lamps by means of electricity, as in the English patent of Mr. Straite, described on page 55, volume 48, of the London Mechanics' Magazine, 1848. In this device the size of the flame is not controlled by the electro-magnet; but in my improvement the supply of gas depends on the movement of the armature, and the latter is perfectly controlled by the finger of the operator. Thus by touching a key the supply-cock may be very gradually turned at the will of the operator, and the supply of gas and consequent size of flame may be regulated with the utmost nicety.

I do not confine myself to the particular method herein described of accomplishing my object; but

I claim, broadly—

Turning on or shutting off inflammable gas by degrees or gradually through the agency of electricity, for such purposes as are hereinbefore alluded to.

SAMUEL GARDINER, JR.

Witnesses:

JAMES F. BUCKLEY,
SELIM FRAS. COHEN.