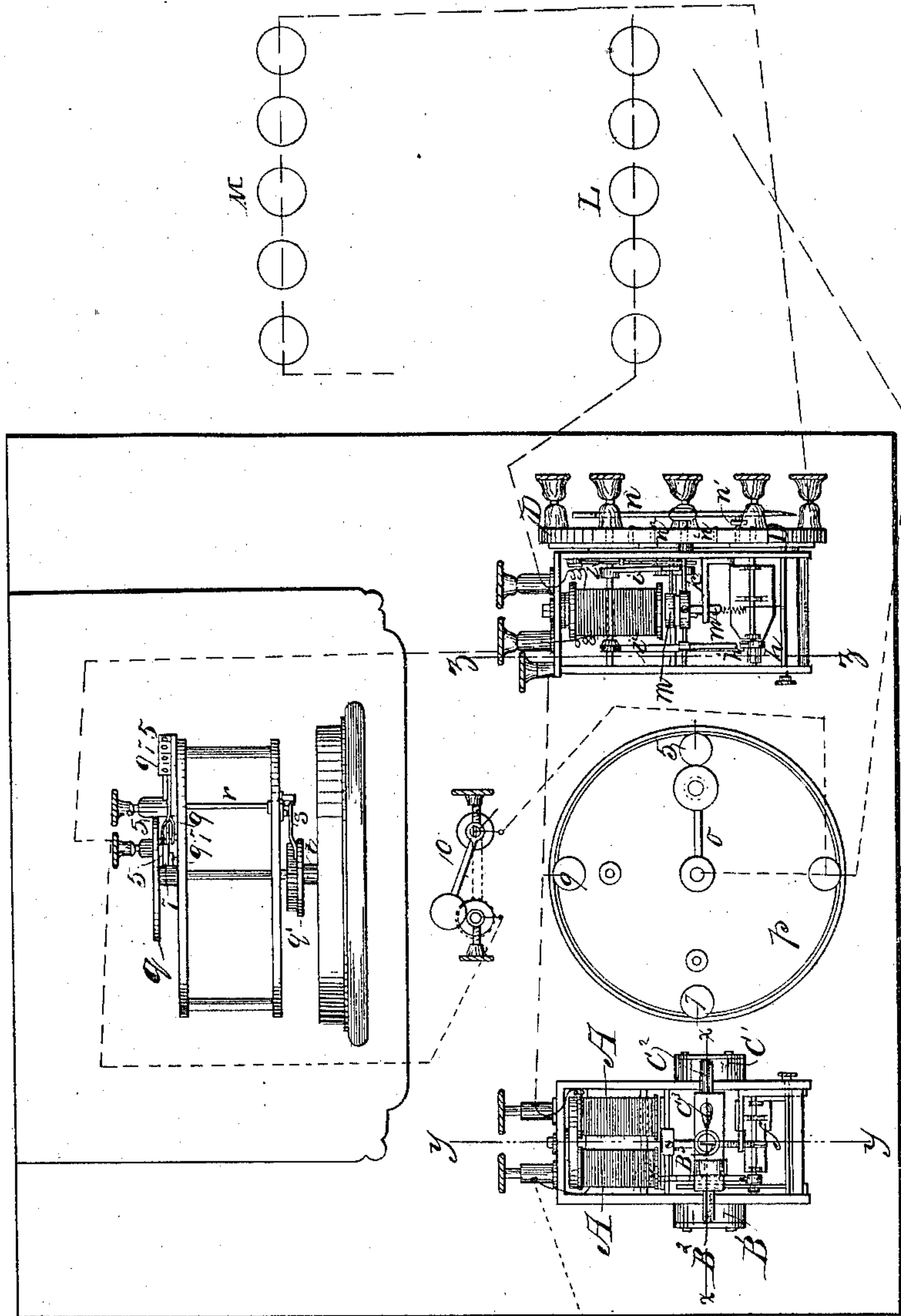


A. BARBARIN.
APPARATUS FOR LIGHTING GAS.

No. 81,735.

Patented Sept. 1, 1868.

Fig. 1.



Witnesses:

W. Bailey
S. Adairman

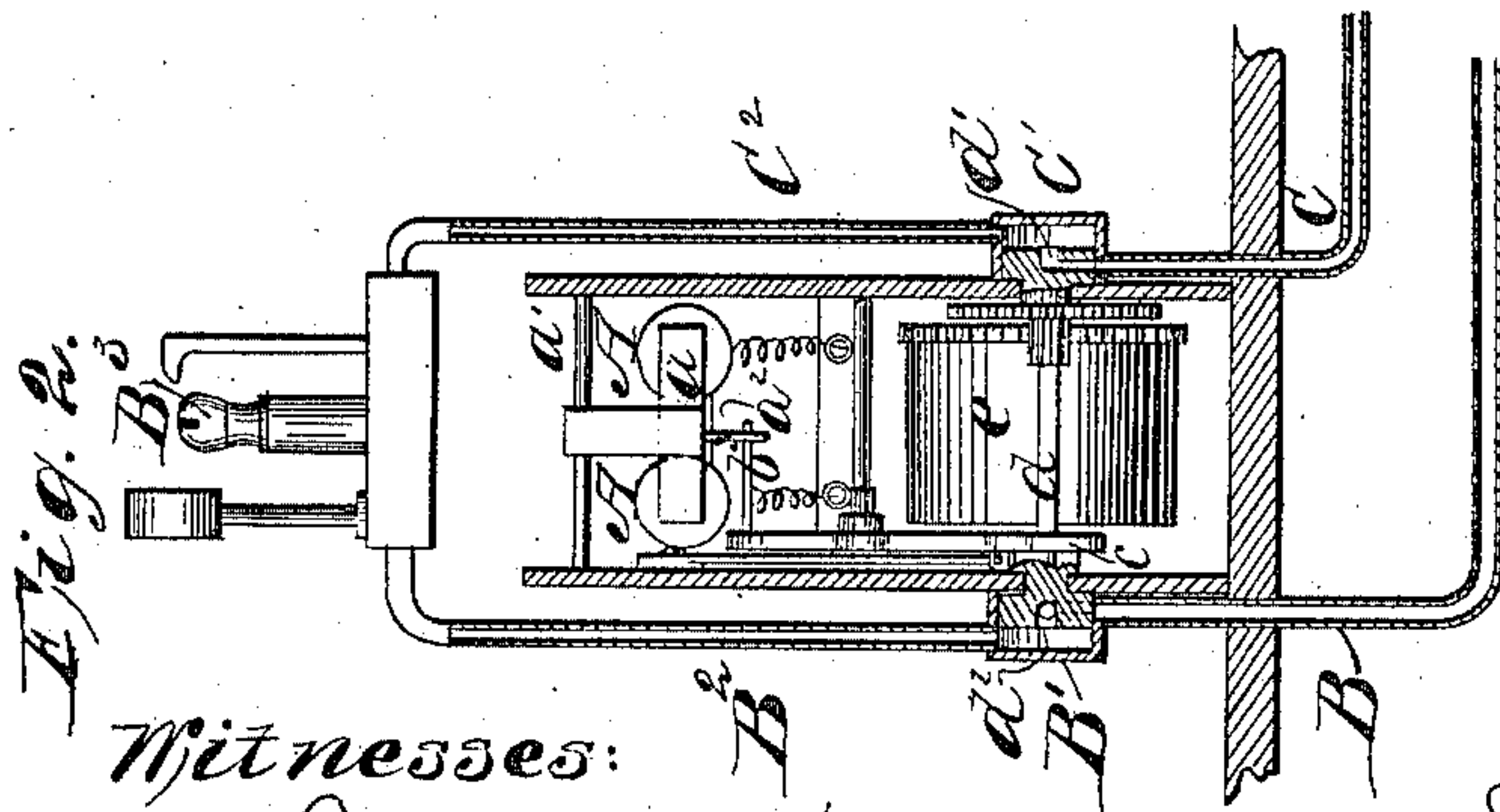
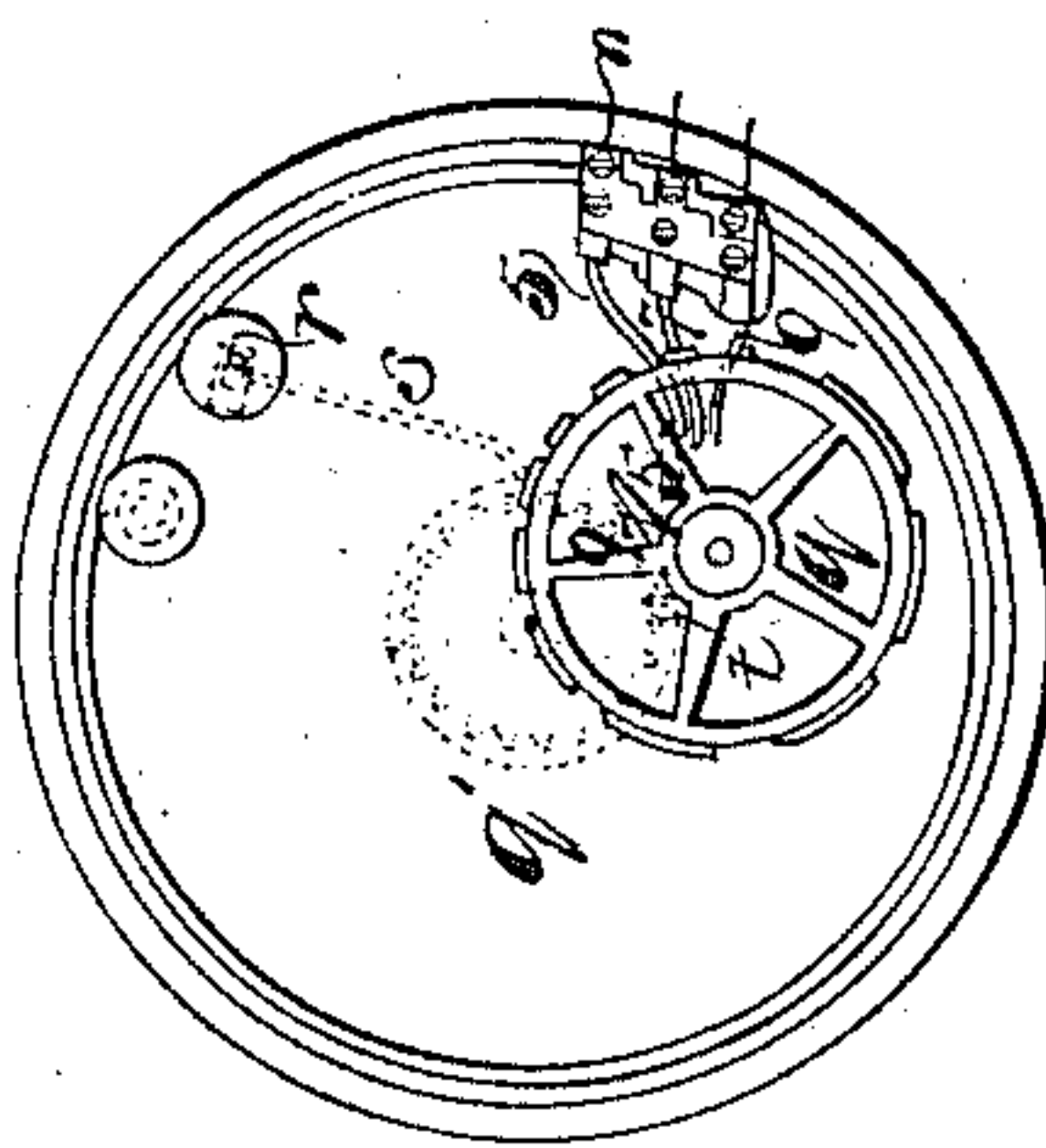
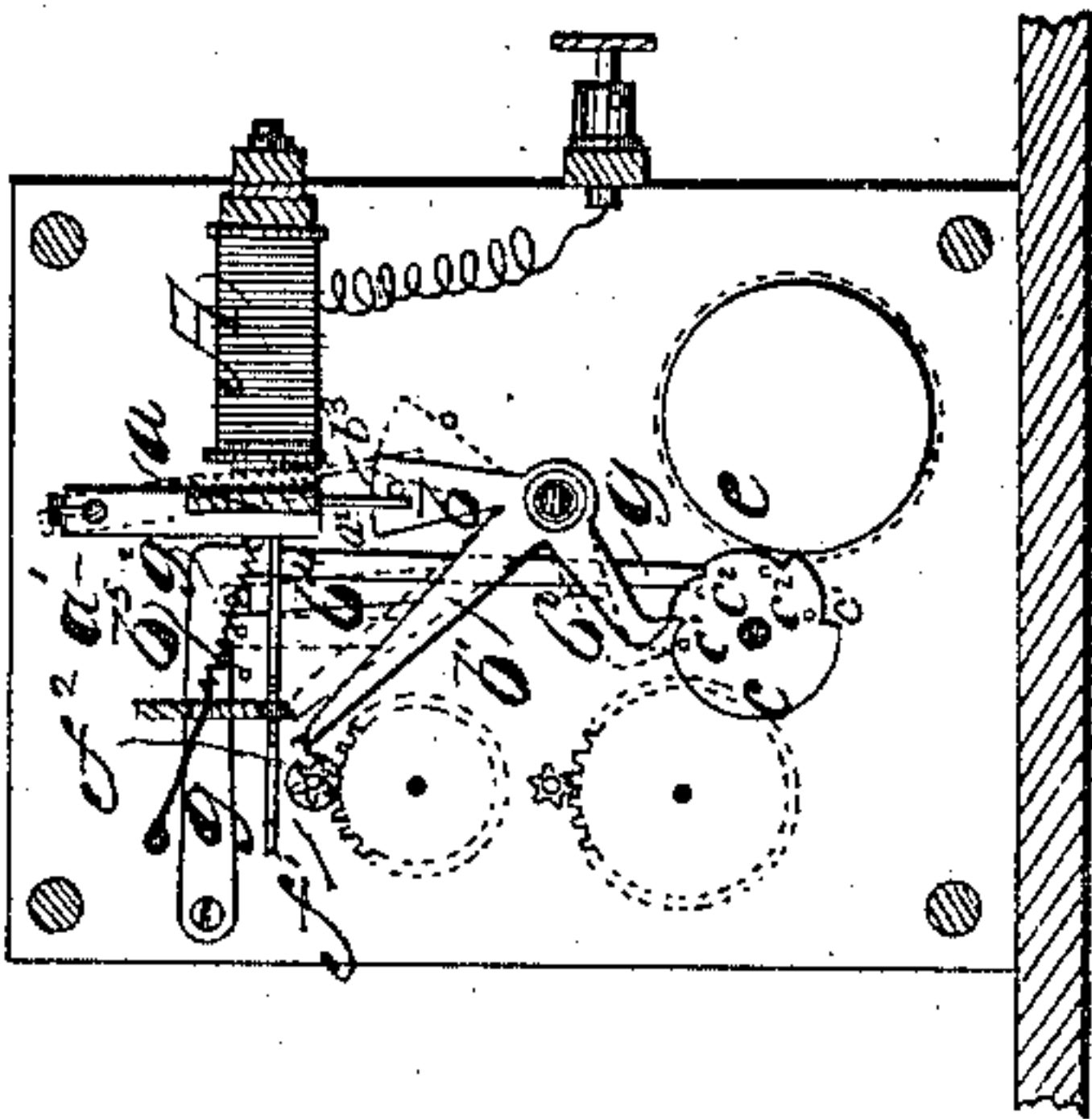
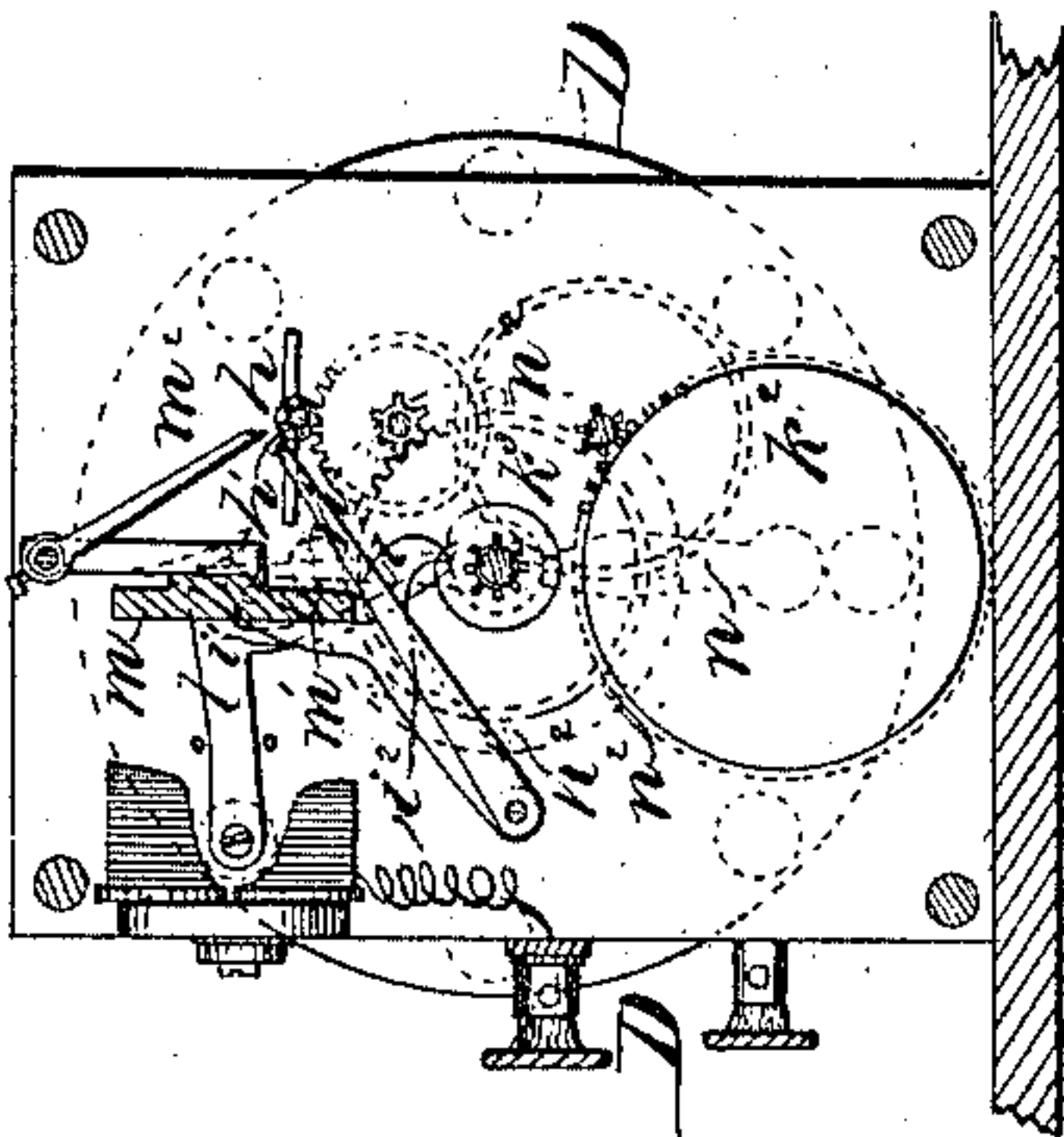
Inventor.

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ARTHUR BARBARIN, OF NEW ORLEANS, LOUISIANA.

Letters Patent No. 81,735, dated September 1, 1868.

IMPROVEMENT IN APPARATUS FOR LIGHTING GAS.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that I, ARTHUR BARBARIN, of New Orleans, in the parish of Orleans, and State of Louisiana, have invented a certain new and improved Method of Gas-Lighting; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

In an application now before the United States Patent Office, I have described a method whereby the property of hydrogen-gas to become inflamed, when brought in contact with spongy platinum, is utilized, in order to effect the ignition of illuminating-gas. In connection with that invention, I have devised a method by which the supply of the hydrogen and hydrocarbon-gases to the burners may be regulated by the action of a current of electricity upon apparatus constructed substantially as hereinafter described, and it is in this application of electricity, to cause the opening or closing of the valves or passages through which the gas is conducted to the burners, that my invention principally consists; and it will be understood, that, although I represent my invention as applied to special apparatus, in which hydrogen-gas and spongy platinum are employed to cause the ignition of the carburetted hydrogen, it may also be used with ordinary gas, or other apparatus of a like nature, the object in all cases being the same, *i. e.*, to regulate the flow of the gas to those points where it is consumed.

My invention further consists in the arrangement of apparatus, by means of which any number of jets of gas may be lighted simultaneously.

Let it be supposed, for instance, that all the street-lights of a town or city are to be lighted in accordance with my invention. With every hundred or more lights, whose burners are arranged as described in the application above mentioned, I connect an apparatus, called a "gas-lighter," provided with valves for regulating the supply of the hydrogen and illuminating-gases to its group of lights. The valves are located in a cylinder or shaft, which is revolved by suitable mechanism, actuated by means of a coiled spring, weights, or other suitable means.

This mechanism is locked or held stationary by a system of levers, which are connected with the armature of an electro-magnet secured in the frame of the gas-lighter. When it is desired to revolve the valve-shaft, the circuit of the battery which connects with the magnet is closed. The magnet is thus caused to attract its armature, which draws back with it the locking-mechanism, and leaves the valve-gear free to revolve. In this manner, the valves may be opened or closed, as desired.

These gas-lighters, each representing one hundred burners, more or less, are connected, by insulated wires, with an apparatus located in some central or convenient place, the function of which is to transmit the electric current from a main battery to each of the gas-lighters. This apparatus, which I call a "circuit-closer," is provided with an electro-magnet, which, when its connection with a local battery is complete, draws back its armature, and unlocks a system of gears, which cause the revolution of a needle or arrow. This needle, in its course, comes in contact with a series of pins or wires, each of which connects with the insulated wire of one of the gas-lighters. By this means, the circuit is for a moment closed between the gas-lighters and the main battery attached to the circuit-closer, and an electric current is transmitted which causes the armature of each gas-lighter to unlock the operative-mechanism, and so effect the opening or closing of the valve, as above explained.

By connecting the local battery for exciting the magnet of the "circuit-closer" with the hour and minute-wheels of a clock, as hereinafter explained, I am enabled to cause the simultaneous ignition of the gas-jets at any desired hour during the day or night.

In the accompanying drawings, I have represented in detail the construction of the apparatus above mentioned.

Figure 1 is a top view of all the different parts of the apparatus, arranged in their proper relations to one another.

Figure 2 is a transverse vertical section on the line *x x* of the gas-lighter, fig. 1.

Figure 3 is a longitudinal vertical section of the same on the line *y y*.

Figure 4 is a like section on the line $z z$ of the circuit-closer, fig. 1; and

Figure 5 is a plan view of the hour and minute-wheels of a clock, arranged and constructed for the purposes above referred to.

The gas-lighter, figs. 1, 2, and 3, consists of a frame, in the upright sides of which are held the rods and shafts which carry the gear and other mechanism. In the upper part of the frame is secured an electro-magnet, A , whose armature, a , is rigidly attached to and hangs from a rod, a^1 , capable of a rocking-motion, so as to allow the armature to be drawn towards its magnet when occasion requires. From the bottom of the armature projects a pin, a^2 , which crosses another pin, b^2 , projecting from the face of the arm b of a lever, which regulates the revolution of the shaft which carries the valves. This lever has three arms radiating from the rock-shaft, upon which they are mounted. The upper arm, b , is provided with the pin, which engages with and transmits motion from the armature a . The functions of the middle arm, b^1 , will be presently described. The lower arm, b^2 , extends downwards, and terminates in a tooth, which engages in notches, c^1 , formed in the periphery of a disk, c , mounted on the rotary valve-rod d . This rod has a pinion, which meshes with the teeth of a barrel, e , within which is the coiled spring or other mechanism for producing the rotation of the valve-rod when the latter is unlocked. The rod also carries a toothed wheel, by means of which its motion is communicated to a series of gears, seen in red lines in fig. 3, the uppermost of which constitutes the fly-wheel. The shaft which carries the fly-wheel f is also provided with another wheel, f^1 , from the periphery of which projects a pin, f^2 , which, when the apparatus is at rest, is caught and held by the end of the lever-arm b^1 , as shown in fig. 3.

This arm has attached to it an auxiliary piece, b^4 , provided with a pin, b^5 , which, when the arm is drawn back by the movement of the armature towards its magnet, catches in a notch, g^2 , formed in the bent lever g , pivoted to the frame at g^1 . The lower end of this lever extends downwards, so as to be lifted by pins, c^2 , projecting from the face of the notched wheel c , fig. 2, which, during the revolution of the valve-rod d , lift the lever g , and allow the regulating-lever arm b^2 to fall in time to engage with the next succeeding notch, thus bringing the middle arm, b^1 , in contact with the pin f^2 , and stopping the revolution of the valve-rod until the armature a is again attracted by its magnet.

The valve-rod d extends through both sides of the frame, and its projecting ends are enclosed by boxes $B^1 C^1$, with which are respectively connected the hydrogen and the illuminating-gas pipes. The ends of the rod are enlarged, and have orifices, $d^1 d^2$, of an angular shape, formed in them. The main hydrogen and illuminating-gas pipes $C B$ are inserted in the boxes $B^1 C^1$, in such position that they shall meet the openings $d^1 d^2$ when the rod revolves, and thus form a connection with the upper pipes $B^2 C^2$.

The arrangement of the openings $d^1 d^2$ relatively to each other is such that the hydrogen-gas valve d^1 shall come in communication with its pipe, C , before communication is established between the upper and lower portions, $B B^2$, of the illuminating-gas pipe. This arrangement is shown in fig. 2, and its object is to supply the hydrogen to the spongy platinum before the flow of the illuminating-gas to its burners commences.

In the drawings, the gas is represented as being supplied to but one burner, B^3 . It will be understood, however, that the number of burners regulated by one gas-lighter may be one hundred, more or less, according to circumstances.

The magnet A of each of the gas-lighters is connected, by an insulated wire, with the "circuit-closer," shown in figs. 1 and 4.

The mechanism of this apparatus resembles, in most respects, that which I have just explained. Like the gas-lighter, it has a series of gears, terminating in a fly-wheel, upon whose shaft is mounted a smaller wheel, k , provided with a projecting pin, k^1 . It also has three regulating-arms, $i^1 i^2$. The arm i^2 engages with the pin k^1 . The arm i is provided with a tooth, which catches in a notch, k^1 , formed in the periphery of the wheel k , which is driven by the gear-mechanism, when actuated by the spring or other suitable mechanism within the barrel k^2 . The arm i^1 is provided with a pin, which catches in a notch formed in the bent lever l , when the arm i^1 is drawn back by the armature.

The armature m , located in the upper part of the frame, is arranged as described in the gas-lighter, and carries a pin, m^1 , which extends out from the armature across the lever-arm i^1 , and, when attracted by its magnet, causes the latter to disengage the arms i and i^2 .

The lower end of the bent lever l comes in contact with a pin or projection, k^2 , on the face of the wheel k , by which, when the wheel revolves, it is raised, so as to release from the notch in its upper part the arm i^1 , which falls back into place, and enables the tooth of the arm i to fall into the notch k^1 , thus depressing the arm i^2 sufficiently to cause it to again catch under the pin k^1 , and to arrest the movement of the wheel k , and other mechanism.

The "circuit-closer," as its name implies, is intended to close the circuit between a main battery and the several gas-lighters with which it is connected.

To accomplish this object, the revolving rod upon which the one-toothed wheel k is mounted extends out through one side of the frame, and upon this projecting end is secured a needle, n , (shown in fig. 1, and in red lines in fig. 3,) which revolves with the rod. A wooden or other suitable plate, D , is placed between the needle and the side of the frame, and in it is secured a series of pins or wires, n^2 , arranged in a circle concentric with that described by the needle, which connect with the various gas-lighters.

When the needle n revolves, its presser-foot or "rubber" n^1 comes in contact with the heads of the wires n^2 , and thus for a moment closes the circuit between the main battery and the particular gas-lighter represented by the wire over which its "rubber" passes.

The armature of the circuit-closer is actuated by a small local battery, and in order to lock the mechanism until the circuit of the latter is broken, an arm, m^2 , extends from the rod on which the armature is secured, which, when the armature is drawn towards its magnet, is depressed, so as to take the place of the arm i^2 , and

to prevent the gear-mechanism from revolving; but as soon as the circuit is broken, the armature falls back from the magnet, and the arm m^2 is lifted, thus releasing the gearing, and allowing the revolution of the rod and needle. At the expiration of one revolution, however, the motion is arrested by the dropping of the arm or ratchet i into the notch in the wheel k , and the consequent depression of the upper arm, i^2 , which again catches against the pin h' .

I am enabled to cause the closing of the local circuit of the "circuit-closer" to take place at any desired hour, by connecting the local battery, or battery for actuating the armature of the "circuit-closer," with the hour or striking and minute-wheels of a clock, so that at a certain hour the wheels shall connect with wires extending from the battery, and thus complete the circuit.

To do this, I proceed as follows: I connect the platina-pole of the local battery L with a crank, o , fig. 1, mounted on a circular plate, p , provided with a number of screw-caps or binding-screws, marked 5, 7, 9, &c.

Each one of these binding-screws is connected with the hour or striking-wheel q of a clock, by a wire that meets a corresponding spur on the hour-wheel. For instance, the wire starting from the binding-screw numbered 5 is attached to the frame of the clock, and its end, 5, fig. 2, is so arranged as to come in contact with a spur, 5, on the hour-wheel, the spur being placed so as to meet the wire at 5 o'clock; and the same arrangement is made with respect to the 7 and 9 o'clock binding-screws and wires, which are connected with corresponding spurs, 7 and 9, on the hour-wheel.

The platina-pole of the battery L is also connected, through another crank, o' , with the minute-wheel q of the clock by means of an insulated rod, r , and spring-wire, s , which touches an ivory disk secured to the minute-wheel, and provided with two platina points, t , about half a minute apart from each other, the first platina point being at the same time placed nearly a half minute after the hour.

Under this arrangement, the circuit of the battery L, after being broken by the separator of the hour-spur 5, 7, or 9, from its wire, may be re-established by the spring s coming in contact successively with the points t as the minute-wheel moves around, and the valves in the gas-lighter may thus be operated in order to regulate the flow of hydrogen and illuminating-gases through the pipes.

The operation of the whole apparatus is shown in fig. 1, and is substantially as follows:

Let it be supposed that the hour to open and light the gas is at 5 o'clock p. m. At any time before that hour the cranks o o' are placed upon their respective buttons so that when the hour arrives, the circuits may be closed. As soon as it is 5 o'clock, the circuit of the local battery L is closed by the contact of spur 5 of the hour-wheel with the wire 5. The course of this current is indicated in blue lines. As soon as the circuit is broken, the needle n of the "circuit-closer" is revolved, as above explained. During this revolution, the presser-foot or rubber n^1 of the needle is brought in contact with the points n^2 , thus completing the circuit between the main battery M and the gas-lighters, with which the points n^2 are connected. The circuit from the main battery to the gas-lighting apparatus is indicated in red lines.

When the circuit is thus completed, the armature a of the gas-lighter is attracted by its magnet, and draws back with it the locking-mechanism, b , b^1 , b^2 , &c., so as to disengage the same from the gears. The valve-rod d consequently revolves, bringing the opening d' opposite the mouth of the hydrogen-gas pipe C. The hydrogen-gas at once passes up through the opening d' and box C^1 and pipe C^2 , and, issuing from its burner C^3 , strikes against the spongy platinum S, which becomes incandescent, and inflames the hydrogen. As soon as the valve-rod d' has turned sufficiently, the tooth of the arm b^2 drops into the first notch, e^2 , of the wheel e , and stops the running of the machine, allowing the hydrogen-gas to flow freely until sufficient time has elapsed to insure its passage through all its different branches and burners. During this time the minute-wheel has been revolving, and the first point t now strikes against the spring-wire s , which again completes the circuit of the local battery L. The course of this circuit from the binding-screw v on the plate p is indicated in brown lines, passing through the crank o' . The needle n is thus caused to make a second revolution, again closing the circuit between the main battery M and the different gas-lighters, and causing the valve-rod d to continue its revolution, so as to open the illuminating-gas valve d^2 , and to partly close the hydrogen-pipe C. The motion of the valve-rod d is stopped, as before, by the tooth of the arm b^2 falling in the next notch, e^2 , in the wheel e , thus depressing the arm b^1 sufficiently to cause it to catch under the pin f^2 .

By this means, the illuminating-gas is enabled to pass freely through its pipe B^2 and burner B^3 , and is ignited by the burning hydrogen issuing from the tip or nozzle C^3 .

The circuit of the local battery is a third time closed by the contact of the second point t with the wire s , and the valve-rod d makes another partial revolution, until the tooth of the arm b^2 drops into the next succeeding notch e^2 , this time fully opening the illuminating-gas valve d^2 , and closing tightly the hydrogen-gas opening. The minute-crank o' is now turned, so as to be disconnected from its button, to prevent any further working of the apparatus through the points t t when the next hour rings, and the illuminating-gas is thus free to flow through its pipes during the whole night.

At 5 o'clock the next morning the hour-wheel will have completed its revolutions, at which time the wire 5 will again come in contact with the spur 5, and close the circuit of the local battery.

As soon as the local circuit is broken, the needle n revolves, closing the circuit between the main battery, M, and the gas-lighter, whose valves are revolved so as to shut off the gas for the day.

The gas may of course be allowed to burn as long as desired, by removing the head of the crank o from the 5 o'clock button, or it may be shut off or turned on at any other hour by placing the crank on the button 7, 9, &c.

Having described my invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The application and use of clock-work, or equivalent mechanism, in combination with the armature of

an electro-magnet, to let on or shut off the gas, and control at the same time the operation of the illuminating agent, substantially as described.

2. The combination of the rotary valves for supplying gas to the burners, and the mechanism for operating and stopping the same, with the armature of an electro-magnet, under such an arrangement that the motion of the said armature towards its magnet shall leave the said valves free to revolve, substantially as set forth.

3. The arrangement relatively to each other of the valves for supplying the hydrogen and illuminating-gases to their respective burners, so that the hydrogen-gas shall be supplied to its burners before the opening of the valve through which the illuminating-gas passes, substantially as shown and described.

4. The method of transmitting a current of electricity from a main battery to the magnets of one or more valve-operating apparatus, by means of an apparatus arranged and operating so as to effect the momentary closing of the circuit between the said battery and magnets, substantially as shown, and for the purposes described.

5. The circuit-closing apparatus herein described, the same consisting of the combination of a revolving needle, and its actuating and stopping-mechanism, with the armature of an electro-magnet, the whole being constructed and arranged so that the momentary passage of a current of electricity through the said magnet shall so move its armature as to effect the revolution of the needle, substantially as set forth.

6. The combination, with the said circuit-closing needle, of a plate or disk, in and to which are secured the insulated wires of one or more apparatus for operating the valves which supply the gas to the burners, substantially as and for the purposes described.

7. The method of closing the circuit of the local battery, by which the circuit-closing apparatus is actuated, by connecting the same with the operative-works of a clock or other time-piece, under the arrangement herein described, so that the said circuit may be closed at any desired hour.

8. The construction and arrangement of the mechanism for closing and breaking the circuit between the operative-works of the clock and the battery connected with the magnet of the circuit-closing apparatus, substantially as shown and described.

9. The combination, with the operative-mechanism of a clock or other time-piece, of the gas-lighting and circuit-closing apparatus herein described, the whole being constructed and arranged so as to cause the simultaneous ignition of any number of gas-jets at any desired hour, substantially as set forth.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

ARTHUR BARBARIN.

Witnesses:

FÉLIX N. TREPAGNIER,

T. A. BARTISSE.