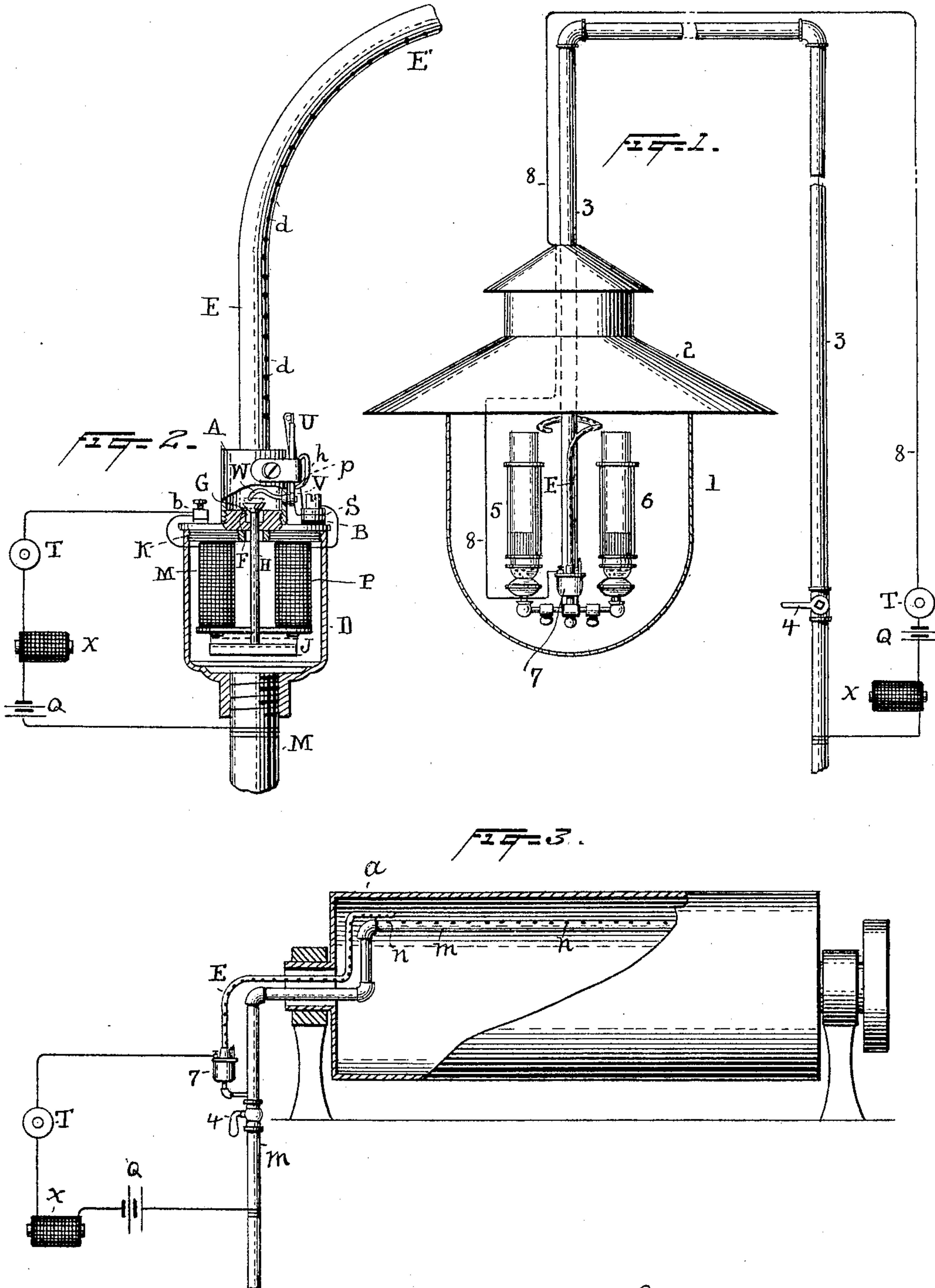


(No Model.)

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ELECTRIC GAS LIGHTING APPARATUS.

No. 591,071.

Patented Oct. 5, 1897.



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ELECTRIC GAS-LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 591,071, dated October 5, 1897.

Application filed February 24, 1897. Serial No. 624,852. (No model.)

To all whom it may concern:

Be it known that I, ADRIAN LIVINGSTON BOGART, a citizen of the United States, residing at Jamaica, in the county of Queens, State of New York, have invented a certain new and useful Improvement in Electric Gas-Lighting Apparatus, of which the following is a specification.

Great difficulty has heretofore been experienced in connection with the ignition of gas in certain situations—as, for instance, in connection with the Welsbach incandescent lamps, with such lamps as are usually employed in the Pintsch system of illumination, and in connection with other gas-burning apparatus, whether for lighting or heating purposes. The difficulty in connection with such burners as the Welsbach arose from the fact that it was desirable, particularly for outdoor illumination, to inclose the burners, whether one or a group, in a suitable chamber, so as to protect the same. Where the globes were within reach, the operator was obliged to remove the same in order to ignite the gas, or where out of reach the usual method was to keep the gas burning continuously, turned down when not required for illuminating purposes. The latter mode of course involved a useless expense, and variations in the gas-pressure or a sudden gust of wind would be apt to extinguish the gas when turned down low, leading to considerable trouble. With such burners as are employed in the Pintsch system the globes had to be removed, and owing to the amount of heat evolved while burning it was impossible to locate within the inclosing globe the igniting apparatus.

The object of my improvement is to avoid these many difficulties in providing for the ignition of inclosed gas-burners, as well as to provide a system for igniting gas-burners which are not inclosed.

I accomplish the principal object of my invention by providing what I term a “flash-ladder”—that is, a length of pipe perforated with numerous fine holes and connected through a by-pass with the main supply of gas, controlling this by-pass by an automatic spark-producing device, whereby by the op-

eration of the spark-producer the gas which is automatically turned on to the flash-ladder ignites the same, and whereby the flash-ladder will be extinguished when it has performed its work of igniting the main gas-flame.

By employing a flash-ladder of the description above referred to and a by-pass therefor controlled independently of the main gas-supply I am enabled to locate the spark-producing mechanism at a sufficient distance from the gas-consuming apparatus, where considerable heat is generated, to avoid the dangers incident to the heat thereof.

In the accompanying drawings, forming part of this specification, Figure 1 is an elevation of an inclosed street-lamp embodying my invention. Fig. 2 is a view, partly in section, of the spark-producing device, the flash-ladder, and by-pass for controlling the supply of gas thereto, with the electrical connections shown diagrammatically. Fig. 3 shows diagrammatically my invention applied to the ignition of a heating apparatus located within cylinder-rolls.

I will first describe the apparatus shown in detail, as in Fig. 2. In this figure, E E' represents a gas-pipe forming the flash-ladder, which is provided with small holes *d d d d d*, placed in such juxtaposition to one another and drilled in such direction through the surface of the tube E E' that if the gas be turned on to such tube and that issuing from the lowest aperture be ignited by any means the flames will flash or communicate from one to the other. This tube may be of any required length and bent into any desired shape, providing that there be not too much descent from the horizontal at any point along its line. The upper extremity of this flash-ladder E' is placed in close proximity to the main gas-jet to be ignited. The lower end of this flash-ladder is attached to a spark-generating and valve-controlling mechanism, the preferred form of which is shown in the drawings, Fig. 2, and which I will now describe.

A is a metal valve-cylinder having a valve-seat F, into which fits, gas-tight, a conical valve G, to which is attached a metal stem H, having at its lower end an iron armature J.

Below the valve-cylinder A, but attached to the same, is an iron plate K, which serves as the yoke for the two magnet-spools M P, M, P, and K consequently forming a horse-shoe electromagnet. This latter is inclosed in a gas-tight metal case D, the lower end of which is provided with a screw-thread and attached to the gas-supply *m*. When the valve G is in its normal position, as shown in the drawings, the gas is prevented from entering the flash-ladder E on account of the weight of the stem H and armature J. If now the electromagnet M P be energized, the armature J will be attracted and lifted as far as the dotted lines, and at the same time, through the agency of the stem H, the valve will be opened to the position shown in the dotted lines and the gas then will pass, as indicated by the arrows, through the valve-opening into the flash-ladder E, whence it will issue from the various perforations *d d d d*.

Above the valve G is located an arm W, which passes through the side of the valve-cylinder at V and extends upward to the point U, where it terminates in a piece of platinum or other electrical conducting material. This forms one of the electrodes and rests against a second electrode which extends downward to the point S, where it is rigidly attached to but insulated from the valve-cylinder at B. The spring *h* is fixed to the side of the valve-cylinder, the bent end *p* of which presses against the vertical portion of the arm W, causing the two electrodes at U to impinge and the part V to press firmly against the opening in the side of the cylinder-valve. These two latter parts are ground together, so as to act as a valve and valve-seat, permitting no gas to issue from the point V.

Q is an ordinary galvanic battery; X, a primary spark-coil, such as is used in electric gas-lighting, and T a common press-button or circuit-closer.

T, X, and Q are connected as is customary in the electric gas-lighting art, one pole of the battery being usually in connection with the gas-pipe, and from T a wire runs to an insulated binding-post at *b*, from thence to one of the helices M, then to the other P, and thence to the insulated electrode at S, whence the current would descend through the two electrodes at U to the vertical arm, cylinder-casing, and back to the gas-pipe along the metallic parts of the case.

The operation of the parts is as follows: The valve being closed in its normal position, as shown, if the circuit is closed at T the current will pass by the route just given through the two helices M P, energizing them. This would cause the armature J to be attracted, and by means of the valve-stem H the valve G would be raised from its seat, permitting the gas to flow upward through the valve, filling the flash-ladder and issuing outward through the holes therein. The valve G in its upward course strikes against the curved

arm W, raising it, and as, on account of the spring *p*, V acts as a pivot or fulcrum the upper end of the arm W will at U be separated from the fixed electrode, causing the circuit to be broken and a spark to be produced at such break. The armature falls again a slight distance, permitting the end of the arm W to descend and bring the two electrodes at U again into contact to be again immediately separated by the reenergizing of the electromagnet M P. As a consequence a vibratory movement continues at U as long as the circuit is kept closed at the press-button T in the well-known manner of electric bells. The valve G remaining open and the spark continuing to be produced at the point U, the gas which issues from the flash-ladder at the lowest opening *d* becomes ignited and the flame climbs from one opening *d* to the next until it has reached the termination of the tube E'. As soon as the pressure is removed from the push-button T, breaking the circuit, the valve falls back into its place, extinguishing all of the flames from the flash-ladder. It can thus be seen that there is no gas consumed or passing through the flash-ladder until the circuit is closed, that the valve remains open not only for the length of time required to fill the tube of the flash-ladder E' and ignite all of the flames, but that the flash-ladder flames themselves can be kept burning for a sufficient length of time to insure the ignition of the main gas-flame of a burner or heating apparatus that it is desired to light, after which, by the removal of the finger from the push-button, all gas and flame is cut off from the flash-ladder itself.

In Fig. 1 I have shown the application of my invention to the ignition of Welsbach lights in a hanging lantern. In this figure, 1 represents a closed glass globe; 2, a metallic hood or canopy; 3, a gas-pipe, and 4 a valve controlling the gas-supply. 5 and 6 are two Welsbach incandescent gas-lights or Argand burners. 7 is an automatic spark-producer and valve-controller, as shown in Fig. 2, with the flash-ladder E rising vertically from 7 and bent in proper form above the top of the chimneys of the two gas-lights 5 and 6. This flash-ladder is drilled with numerous small holes, as has been before described. 8 8 8 is a circuit-wire properly insulated and connected to a binding-post upon the automatic device 7. From thence it is run along the gas-pipe, insulated and attached by any of the usual methods to the press-button T, battery Q, spark-coil X, and gas-pipe. If the gas now be turned on by the main stop-cock 4, it will fill the pipe 3, descend into the lantern, and emerge from the burners 5 6, but will be cut off from the flash-ladder E by means of the automatic valve-controller 7. By closing the circuit at the button T the gasway is open to the flash-ladder by means of the automatic device 7, ignited, and after ignition climbs to the top of the flash-ladder, the jets there igniting the main flames of the burners 5 6,

after which, the circuit being broken at T, the flame is extinguished from the flash-ladder E and all useless waste of gas terminated there.

It can be easily understood that my invention is applicable to the ignition not only of two lights, as shown, but of a single one or any number in a group, the only modification being the extension in length of the flash-ladder. By the arrangement shown in Fig. 1 the automatic valve-controlling and igniting device is located at a point entirely below the main flames of the gas-jets and in a position where it is subjected to the lowest temperature.

Fig. 3 shows the application of the same device to the ignition of a gas heating-burner within a roller, *a* being the roller, a portion of which is broken away to show the interior. *m m* is a gas-pipe passing in through one of the trunnions and pierced with holes along the line *n n* for the purpose of doing the heating on the interior of the roll after ignition. 4 is the main stop-cock controlling the gas-supply. 7 is the automatic controller and igniter, with its flash-ladder E provided with proper apertures in its wall to admit of the flame flashing along its surface from the lowest portion at the automatic device 7. T, X, and Q constitute the electric circuit, as in the other figures. The gas being turned on at 4 will fill the main supply-pipe *m m* and issue through the openings of the heating-pipe at *n n*. The circuit being closed at T will cause the gas-supply to be opened by the automatic device 7 to the flash-ladder E and ignited, when its flame will flash along the surface of the flash-ladder to its extreme end, igniting the main heating-flames at *n n*, the flash-ladder being extinguished when the circuit is opened at T.

I do not desire to confine myself to the special construction of the automatic device as shown and described. In the place of performing the operation by means of a single wire and circuit-closer, as shown, two wires may be employed with two sets of magnets within the automatic device, one serving to turn on and ignite the flash-ladder and the other to extinguish the same in the well-known manner shown and described in Letters Patent No. 441,458, dated November 25, 1890, and No. 377,505, dated February 7, 1888, issued to Leroy S. White, or by any of the automatic gas-lighters at present in use, or I may operate the spark-producing device by a pull in the shape of a chain or otherwise, having devised such a mechanism to be shown in an application about to be filed by me, or I may employ instead of a sparking device an incandescent igniter on the plan of the well-known Gardner gas-lighting apparatus,

the main object of my invention being the production of a gas-igniting spark or heating effect at a point where it will be applicable to the lighting of gas passing into or through a flash-ladder and controlling by the operation of the gas-igniter the valve for turning on and off the gas in a flash-ladder.

I claim—

1. The combination in an electric gas-igniting apparatus, of a main gas-supply pipe, a by-pass, valves for independently controlling the main supply and by-pass, a flash-ladder connected to the by-pass, an electric igniter, and means for operating the said igniter and jets to be ignited by the flash-light, substantially as set forth.

2. The combination in an electric gas-igniting apparatus, of a main gas-supply pipe, a by-pass, valves for independently controlling the main supply and by-pass, a flash-ladder connected to the by-pass, an electric igniter, and means for operating the said igniter and by-pass valve together and jets to be ignited by the flash-ladder, substantially as set forth.

3. The combination in an electric gas-igniting apparatus, of a flash-ladder, a gas-supply pipe therefor and a valve for controlling the gas-supply for the flash-ladder independently of the main gas-supply valve, an electrical igniter and valve-controller comprising an electromagnet and valve-carrying armature, said igniter being operated by the movement of the valve-carrying armature, and means for controlling the electrical circuit, substantially as set forth.

4. The combination in an electric gas-igniting apparatus, of a by-pass from the main gas-supply, a flash-ladder connected with said by-pass, and an electrical valve-controller adapted to maintain the valve open while the circuit is closed at the circuit controller or key, and to close the valve when the circuit is open at the circuit controller or key, substantially as set forth.

5. The combination with a closed globe, of a gas burner or burners located therein, a valve or cock controlling the supply of gas thereto, a flash-ladder within said globe, a valve controlling the gas-supply to said flash-ladder independently of the gas-burner supply, an electric igniting apparatus, and means for operating the same and the valve simultaneously, substantially as set forth.

This specification signed and witnessed this 18th day of February, 1897.

A. LIVINGSTON BOGART.

Witnesses:

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JNO. R. TAYLOR.