No. 704,391. Patented July 8, 1902.

A. B. SHAW.

AUTOMATIC GAS LIGHTING MECHANISM.

(Application filed Sept. 30, 1901.)

(No Model.) 3 Sheets—Sheet 1.

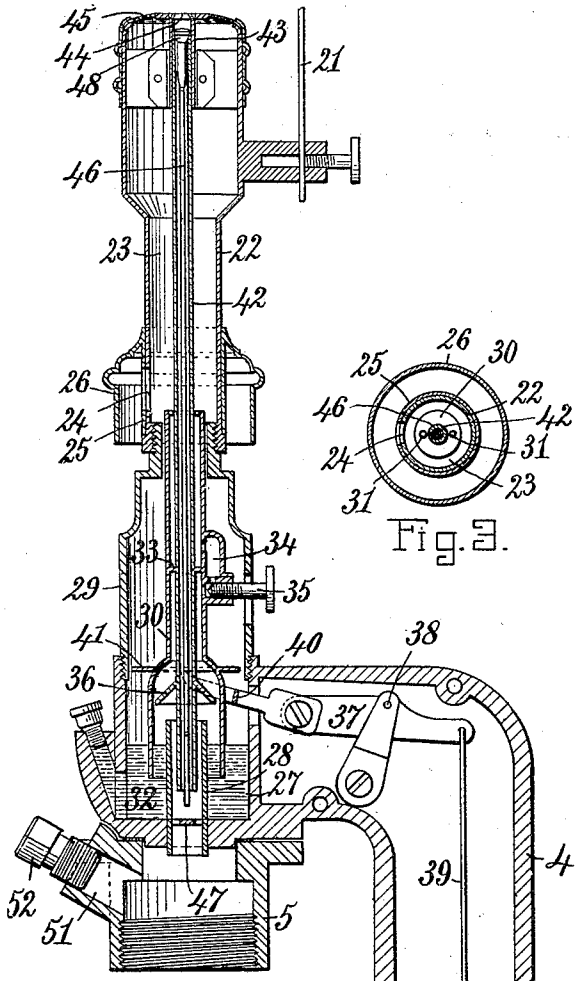


Fig. 1.

Fig. 3.

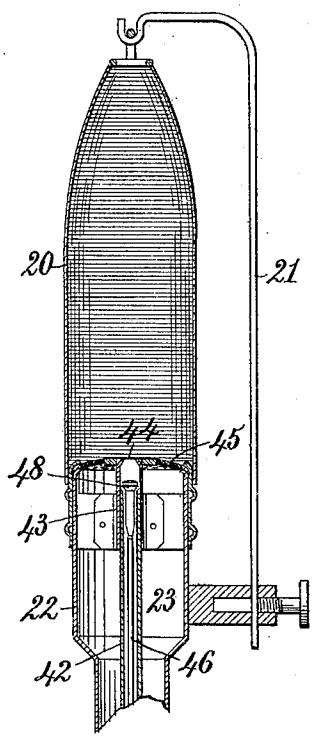


Fig. 2

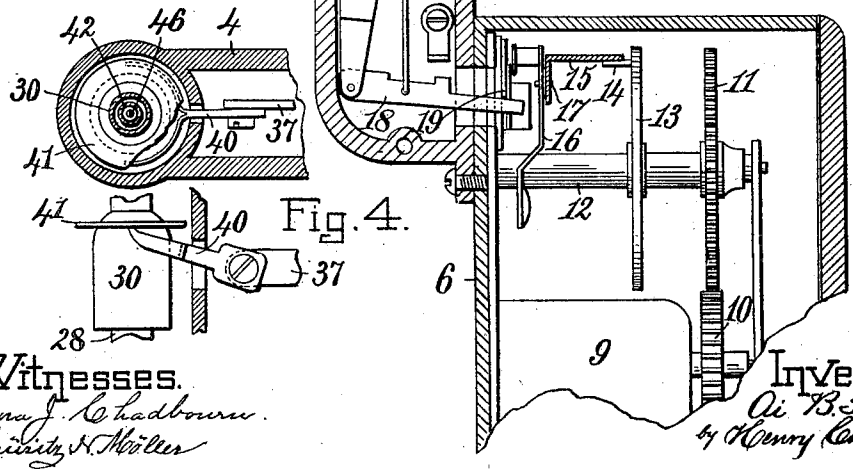


Fig. 4.

Witnesses.
Ena J. Chadbourn.
Laisitz N. Möller

Inventor.
Al. B. Shaw
by Henry Chadbourne
his atty.

No. 704,391. Patented July 8, 1902.

A. B. SHAW.

AUTOMATIC GAS LIGHTING MECHANISM.

(Application filed Sept. 30, 1901.)

(No Model.) 3 Sheets—Sheet 2.

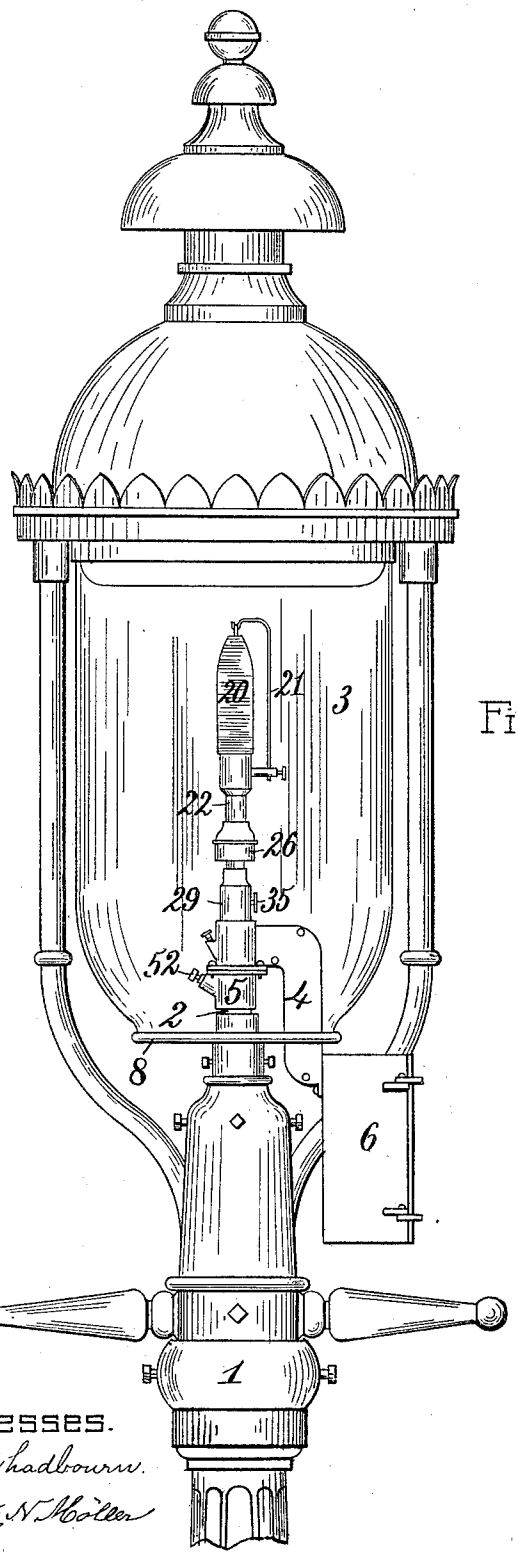


Fig. 5.

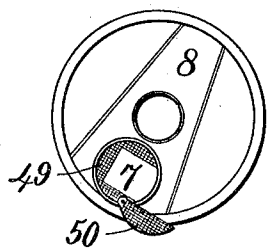


Fig. 6.

Witnesses.
Edw. J. Chadbourn.
Lauritz N. Moller

Inventor.
Ai B. Shaw
by Henry Chadbourn
his atty.

No. 704,391. Patented July 8, 1902.

A. B. SHAW.

AUTOMATIC GAS LIGHTING MECHANISM.

(Application filed Sept. 30, 1901.)

(No Model.) 3 Sheets—Sheet 3.

FIG. 7.

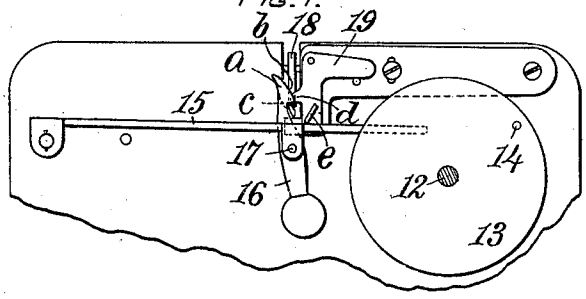


FIG. 8.

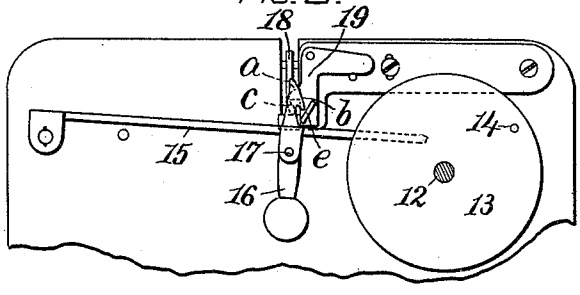
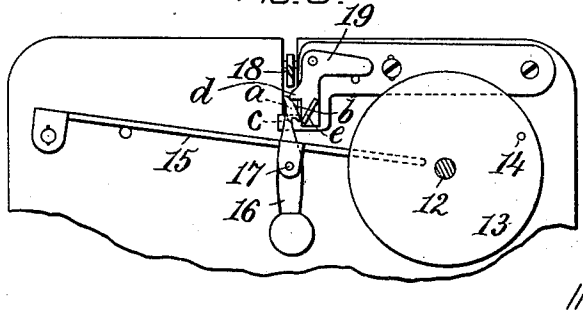


FIG. 9.



WITNESSES

Ena J. Chadbourn

Laurits N. Møller

INVENTOR

Ai B. Shaw

by Henry Chadbourn,

his Atty.

UNITED STATES PATENT OFFICE.

AI B. SHAW, OF WEST MEDFORD, MASSACHUSETTS.

AUTOMATIC GAS-LIGHTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 704,391, dated July 8, 1902.

Application filed September 30, 1901. Serial No. 77,018. (No model.)

To all whom it may concern:

Be it known that I, AI B. SHAW, of West Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Gas Lighting and Extinguishing Devices, of which the following is a specification.

This invention relates to improvements in automatic gas lighting and extinguishing devices in which the gas-supply to a gas burner or burners is controlled by a suitable time mechanism and will be lighted and extinguished at predetermined times by the operation of such time mechanism and a connecting mechanism between the time mechanism, the burners, and a valve or valves controlling the gas-supply pipe.

The invention relates more particularly to the means employed to connect the time mechanism and its inclosing casing to the riser or gas-supply pipe of a street-lamp, whereby the device can be easily applied to the existing forms of street-lamps without making any material change in the lamps.

The invention has for its objects to adapt the device to the existing forms of lanterns used on street-lamps without having to materially change the lantern and to otherwise improve the device, as will be clearly described hereinafter and claimed.

The invention consists in the novel constructions, arrangements, and combinations of parts fully described hereinafter; and it is carried out substantially as illustrated on the accompanying drawings, which form an essential part of this specification, and whereon—

Figure 1 represents a central longitudinal section of the upper part of my improved device, showing the main burner, the pilot-burner used to ignite the gas at the main burner, the valves controlling the flow of gas to said burners, the connecting mechanism between the time mechanism and said valves, whereby said valves are controlled, and the casing which incloses and protects said parts. Fig. 2 represents a detail central longitudinal section of the preferred form of burners used in my device and the mantle used upon the main burner. Fig. 3 represents a detail longitudinal section of the device through the mixing-chamber in the burner and showing the gas and air inlets thereto and the means employed to regulate the amount of air admitted to said chamber. Fig. 4 represents two detail views of the main valve and a portion of its operating mechanism. Fig. 5 represents a side elevation of the lantern and upper portion of a street-lamp provided with my improved automatic gas lighting and extinguishing device. Fig. 6 represents a plan view of the lower plate of the lantern of a street-lamp. Figs. 7, 8, and 9 represent detail views of a portion of the mechanism between the time mechanism and the valve controlled by said time mechanism, showing the same in the positions, respectively, when the main gas-burner is lighted, when in the act of allowing the gas-controlling valve to close, and when said valve is closed.

Like characters of reference refer to like parts wherever they occur on the different parts of the drawings.

In applying automatic gas lighting and extinguishing devices to street-lamps now in common use it is desirable and less expensive to utilize the present form of lamp without alteration in the same, if possible, and therefore without having to supply a lantern of a special construction to accommodate the peculiar construction of the automatic device, its connecting mechanism, or its inclosing casing. It is also desirable that the device should be located in such relation to the burner and lantern that the casing containing the time mechanism should be outside the lantern, so as to be easy of access, and sufficiently below the burner to reduce as much as possible the size of the shadow cast upon the ground below the lamp by said casing. In street-lamps now in common use the pipe which forms the gas-riser and conveys the gas to the burner projects through the bottom of the lantern, the burners being attached thereto within the lantern, and as it is desirable that the valves in an automatic device controlling the flow of gas to the burners should be as near the burners as possible it is preferable to attach the automatic device to the riser within the lantern by means of some suitable connecting mechanism between the casing for the time mechanism and said riser.

It is the principal object of my present invention to provide a connecting mechanism

between the casing and riser which shall be in such form as to allow of the use of the present forms of lanterns and also to necessitate the least amount of changing of the parts of the lantern.

With this object in view my improved connection is made as follows: The lamp-post 1, its gas-supply pipe or riser 2, and its cylindrical glass globe or lantern 3 are of any of the common and well-known forms, and any form may be substituted for the one shown, if so desired. To the riser 2 is secured a bracket 4, which is attached to said riser preferably by means of a flanged coupling 5, as shown, or it may be attached in any other suitable and well-known manner, if so desired. This bracket at the end which is within the lantern carries the burner and its gas-controlling valves, which will be fully described hereinafter, while at the opposite end of said bracket, which is outside the lantern, is attached the casing 6 for the time mechanism and the automatic valve-operating mechanism controlled by the time mechanism, which will also be fully described hereinafter. This bracket is made hollow and contains the connecting means between the valve-operating mechanism and the valves, and it is so shaped that it extends downward from its connection with the riser through a perforation 7 in the bottom plate 8 of the lantern to the casing 6, located outside the lantern and below the bottom plate thereof. This bracket is therefore preferably made gooseneck in form, as shown.

The time mechanism 9 may be of any suitable construction to impart a constant and regular rotary motion to the center gear-wheel 10 thereof, from which the moving parts of the device derive their motion. The intermediate mechanism between the center gear and the valves which control the gas, as shown on the drawings, is made as follows: The center gear-wheel 10 meshes into a gear-wheel 11, firmly mounted upon the shaft 12, upon which is also firmly mounted the disk 13, having a pin or projection 14 thereon, forming substantially a crank-pin which rotates around the shaft 12 with the disk 13 when said shaft is rotated, as hereinafter described. A piece 15, which may be in the form of a pivoted lever or a slide, but which I shall designate in this description and have illustrated on the drawings as a lever, is free to move up and down at the side of the disk 13 and within the path of the rotation of the pin 14 on said disk, so that said pin will act upon the lever 15 and cause it to vibrate up and down, said lever preferably being released from the pin when at its upper position and making its downward movement by the action of gravity in order to accelerate said movement. The lever 15 carries a hooked pawl 16, which is fulcrumed at 17 thereto, and at each complete upward and downward movement of said lever and hooked pawl said pawl engages the projecting end of the lever 18, depressing said end of the lever until it is locked by a locking-pawl 19, or said hooked pawl by engaging the locking-pawl releases said lever from said locking-pawl and allows the end of the lever 18 to be moved upward. This mechanism, which causes or allows the lever 18 to move upon its fulcrum alternately in opposite directions at each complete upward and downward movement of the lever 15 and attached pawl 16, can be more clearly understood by reference to the detail views of said mechanism shown in Figs. 7, 8, and 9 of the drawings, whereon the parts of said mechanism have been shown in different positions to more clearly illustrate the operation of the same. The hook portion *a* of the hooked pawl 16 is offset or at one side of the main portion of said pawl, substantially as shown by the side elevation of said pawl shown in Fig. 1, and so that said hooked portion will move in a plane parallel to the plane of the movement of the main portion of the pawl when the pawl turns upon its fulcrum. By this means the hook portion of the pawl will engage the end of the lever 18 when the pawl is moved upward or downward with the lever 15, and at the same time the main portion of the pawl will be free to move across the end of the lever 18 when said pawl is turned upon its fulcrum. The hook portion of the pawl 16 is made with inclined surfaces *b* and *c* on its opposite edges, substantially as shown, partly in dotted lines and partly in full lines, in Fig. 7. If the end of the lever 18 is within the path of the upward movement of the hook portion of the pawl 16, the inclined surface *b* on said hook portion will engage the end of said lever, and a continuation of said movement will cause the pawl to move on its fulcrum sufficiently to allow the hook portion to pass the end of the lever; but when the end of the lever 18 is at its upper position, as shown in Fig. 9, and the pawl 16 commences to make its downward movement from the position shown in Fig. 1 the hook or pawl will engage the end of the lever 18 and will turn said lever on its fulcrum, thereby raising the valve through the connecting mechanism between said lever and valve and admitting the flow of gas to the main burner, as hereinafter fully described. When the end of the lever 18 is moved downward by the hooked pawl and reaches the position shown in Fig. 7, the locking-pawl 19 will automatically turn on its fulcrum and cause the locking projection *d* on the locking-pawl to lock the end of the lever 18 in this position. If the pawl 16 is again raised by the action of the pin 14 on the lever 15, it will leave the end of the lever 18 at its lowest position and locked by the locking-pawl; but when the pawl 16 next moves downward the opposite inclined surfaces *b* and *c* on the hook portion of the pawl 16 will enter the space between the end of the lever 18 and an inclined projection *e* on the locking-pawl, substantially as shown in Fig. 8. The continued down-

ward movement of the pawl 16 will cause the inclined surfaces on the hook portion of the pawl 16 to act as a wedge between the end of the lever 18 and said inclined projection on the locking-pawl, thereby forcing the locking projection *d* of the locking-pawl from contact with the end of the lever 18, releasing said lever and allowing the end thereof to move upward to the position shown in Fig. 9, leaving the pawl 16 at its lowest position, ready to be again moved upward and to hook upon the end of the lever preparatory to repeating the above-described operation.

The particular contruction of the hooked pawl and locking-pawl, as well as the construction of the lever carrying the hooked pawl, have not been fully shown on the drawings, as the same form no essential parts of my present invention and can be changed for others, if desired.

The preferred form of burner used on my improved device is what is known as a "mantle" or "Welsbach" burner, and the same has been illustrated on the drawings; but other common and well-known burners may be substituted therefor, if so desired.

The mantle 20, its supporting-rod 21, the shell 22, containing the mixing-chamber 23, the air-inlet 24 to the mixing-chamber through the shell 22, the air-regulator 25, and the protecting-hood 26 are substantially the same as those now in common use on mantle-burners.

At the end of the hollow bracket 4, which is attached to the gas-inlet pipe 2 within the lantern, is formed a reservoir 27, which surrounds an upwardly-projecting tube 28, attached at its lower end to the bracket within the same and forms an open passage for the gas through the bracket from the gas-inlet pipe. To the end of the bracket within the lantern and in line with the gas-inlet pipe is also attached a shell or casing 29, forming an upward extension from the bracket, and to the upper end of which is secured the shell 22 of the burner. Within the reservoir 27 and the shell 29 is located a vertically-movable tube 30, the upper end of which is closed with the exception of one or more small perforations 31 and is guided within a perforation in the shell 29. The lower end of the tube 30 enters a body of mercury 32 or other liquid within the reservoir 27, which forms a liquid seal, preventing gas escaping from the inside of the tube at this place. The tube 30 constitutes a passage for the gas between the gas-inlet pipe 2 and the shell 22 of the burner, into which shell the gas escapes from the tube 30 by means of the perforation 31. In order to regulate the flow of gas through the tube 30, I provide the tube with a dividing-partition 33 and have a by-pass or passage 34 around said partition connecting the tube on both sides of the partition, said passage being controlled by a regulating-valve 35, which can be adjusted so as to close said passage more or less and for convenience of operation projects through a slotted perforation in the wall of the casing 29. Within the tube 30 is arranged a hood 36, which forms a valve and engages the open top of the tube 28 when the tube 30 is moved downward and prevents gas from escaping from the gas-inlet pipe and tube 28 into the tube 30; but said hood is withdrawn from the top of the tube 28 when the tube 30 is moved upward, and thereby allows a free flow of gas into the tube 30 and its connections to the burner.

In order to control the movements of the tube 30 by the time mechanism 9 or by the operation of the lever 18, operated by the time mechanism, I employ a suitable connecting mechanism between said parts, which mechanism is preferably located within the hollow bracket 4, and on the drawings this mechanism has been illustrated as consisting of a lever 37 fulcrumed at 38 within the bracket 4, a connecting-rod 39 between the levers 18 and 37, connecting them together, so that they will act in unison, and a forked extension 40, adjustably but securely attached to the end of the lever 37, which extension engages the under side of an annular flange 41 on the tube 30. It will thus be seen that when the end of the lever 18 is depressed the forked end of the lever 37 will be raised and by raising the tube 30 will open the valve 36 and allow gas to pass through the tube 30, the mixing-chamber 23, and into the mantle of the burner, where it will be burned; but when the end of the lever 18 is released from the locking-pawl 19 the weight of the tube 30 and its connected parts will act upon the forked end of the lever 37 and through the connecting-rod 39 will raise the end of the lever 18. The tube 30 will continue its downward movement until the valve 36 engages the top of the tube 28 and shuts off the supply of gas to the burner through the tube 30.

Although I have illustrated the above connecting mechanism between the lever 18 and the tube 30, it being the most convenient form to be used, I do not wish to confine myself to that construction alone, as other and suitable mechanisms might be substituted therefor, if so desired.

In order to provide means whereby the gas admitted to the mantle of the burner by the upward movement of the tube 30 and its attached valve 36 will be ignited as soon as it reaches the combustion-chamber within the mantle, I provide the device with a pilot-burner located within the mantle, and I supply and cut off the supply of gas to said pilot-burner in such a manner that the pilot-burner will be lighted when the gas, which passes through the tube 30 and chamber 23, reaches the combustion-chamber in the mantle, so that the pilot-burner will be extinguished during the time the main burner is lighted and will be lighted by the main burner just before the downward movement of the tube 30 cuts off the supply of gas from the main

burner. This pilot-burner and its operating mechanism are constructed and arranged substantially as follows: A tube 42 is attached to and moves with the tube 30, being arranged within and projecting through the top of the tube 30 to a point near the upper end of the mixing-chamber 23. The lower end of the tube 42 projects through the valve 36 and is in open communication with the gas-inlet pipe 2, so that gas will freely enter the tube 42 from said gas-inlet pipe at all times. To the interior of the upper end of the shell 22 of the burner and centrally within the mixing-chamber contained therein is secured a tube 43, and the upper end of the tube 42 is telescoped within the lower end of the tube 43 when the tube 30 and the attached tube 43 are moved by the time mechanism. The top of the tube 43 is located just below or so that it enters a perforation 44, made in the center of the gauze top 45 of the mixing-chamber. It will thus be seen that gas escaping from the top of the tube 42 will pass up through the tube 43 and through the perforation 44 into the combustion-chamber in the mantle, where it will burn and constitute a pilot-burner.

In order to control the supply of gas to the pilot-burner through the tubes 42 and 43, I introduce a rod 46 of less diameter than the tube 42 into the tube 42, which rod extends from both ends of the tube, the lower end of the rod engaging a cross-plate or other stationary stop 47 in the tube 28 and limiting its movement when the tube 30 and attachments are moved downward, while the upper projecting end of the rod is provided with a head 48, which projects over the sides of the rod and by engaging the upper end of the tube 42 forms a valve closing the end of the tube against the escape of gas therefrom when the tube 30 and attachments are raised by the action of the time mechanism. It will thus be seen that the rod, with its projecting head, in connection with the tube 42, forms a valve for controlling the supply of gas to the pilot-burner, that the action of the valve for the pilot-burner is directly opposite to the action of the valve controlling the supply of gas to the main burner, and that when one is open the other is closed by the action of the time mechanism upon the tube 30 and attachments to said tube.

On account of the fragile nature of the mantle of the burner it is essential that insects should be excluded from the lantern of a street-lamp, and consequently the perforation 7 in the bottom plate 8 of the lantern through which the bracket passes should be closed after the automatic device is put in position. In order to accomplish this, I provide the perforation with a cover which is made in two pieces 49 and 50, hinged together so as to surround the bracket and to completely fill the space between the walls of the bracket and the wall of the perforation. This cover is made of netting in order to admit the necessary amount of air to the interior of the lantern required to insure proper combustion.

It sometimes happens that the gas-inlet pipe becomes stopped either by frost during the winter months or by some other cause and requires the introduction of a liquid or a wire in order to remove such obstructions. In order to introduce this liquid or rod, it has been customary to provide a side opening into the gas-inlet pipe through a coupling located below the bottom plate of the lantern or to remove the burner; but in either case it necessitates labor and is rather inconvenient to get at the side opening when located below the bottom plate of the lantern, making such constructions objectionable. In order to remove such objections and to provide means which are convenient and of easy access for the introduction of liquid or a wire to the gas-inlet pipe, I provide the flanged coupling 5, which is located within the lantern, above the bottom plate 8 thereof, with a side opening 51, having a cap or plug 52 for the prevention of the escape of gas from said opening. By this means I am able to simply remove the metal top of the lantern, when the plug 52 and side opening 51 will be within easy access for the introduction of liquid or a wire, as desired.

From the above description of my device it will be seen that it can easily be applied to lanterns now in common use on street-lamps without materially changing the construction of the same, the only change, if any, necessary to be made being to provide a perforation for the bracket to pass through, which perforation is often found in the present forms of lanterns, it being used for the purpose of inserting a torch when lighting the lamp by hand. It will also be seen that the valve controlling the supply of gas to the burners is very simple in construction, easy to operate, and not liable to get out of order, and also that the casing containing the bulky part of the device, such as the time mechanism, is located outside and below the lantern, where it will be easy of access and will not cast a large shadow on the ground surrounding the lamp.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. A gas-supply pipe, a gas-burner attached thereto, a valve controlling the supply of gas to said burner, a time mechanism, and connecting mechanism between the time mechanism and said valve, whereby the valve is controlled by said time mechanism, combined with a protecting-lantern having its base portion located intermediate the time mechanism and said valve, for the purpose set forth.

2. A gas-supply pipe, a gas-burner attached thereto, a valve controlling the supply of gas to said burner, a time mechanism, a casing for said time mechanism, connecting mechanism between the time mechanism and said

valve, whereby the valve is controlled by the time mechanism, combined with a protecting-lantern having its base portion located intermediate the time mechanism and said valve, and an inclosing casing for said connecting mechanism passing through the base portion of the lantern and forming a means by which the time mechanism and its inclosing casing are suspended from said gas-supply pipe, for the purpose set forth.

3. In an automatic gas lighting and extinguishing device for a street-lamp, a lantern, a gas-supply pipe entering the lantern, a burner in the lantern, a valve controlling the supply of gas to said burner, a time mechanism, and connecting mechanism between said time mechanism and valve including two levers and a connecting-rod between said levers, one lever engaging the valves within the lantern and the other lever engaged and acted upon by the time mechanism outside the lantern, whereby the bottom of the lantern will be located intermediate the time mechanism and the valve, for the purpose set forth.

4. In an automatic gas lighting and extinguishing device, a burner, a valve controlling the supply of gas to the burner, a time mechanism, a casing for the time mechanism and a connecting mechanism between the time mechanism and the gas-controlling valve engaging the valve at a plane above the casing for the time mechanism, adapted to receive a protecting-lantern having its base portion located intermediate the time mechanism and the gas-controlling valve, for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

AI B. SHAW.

Witnesses:
HENRY CHADBOURN,
CORA J. CHADBOURN.