

(No Model.)

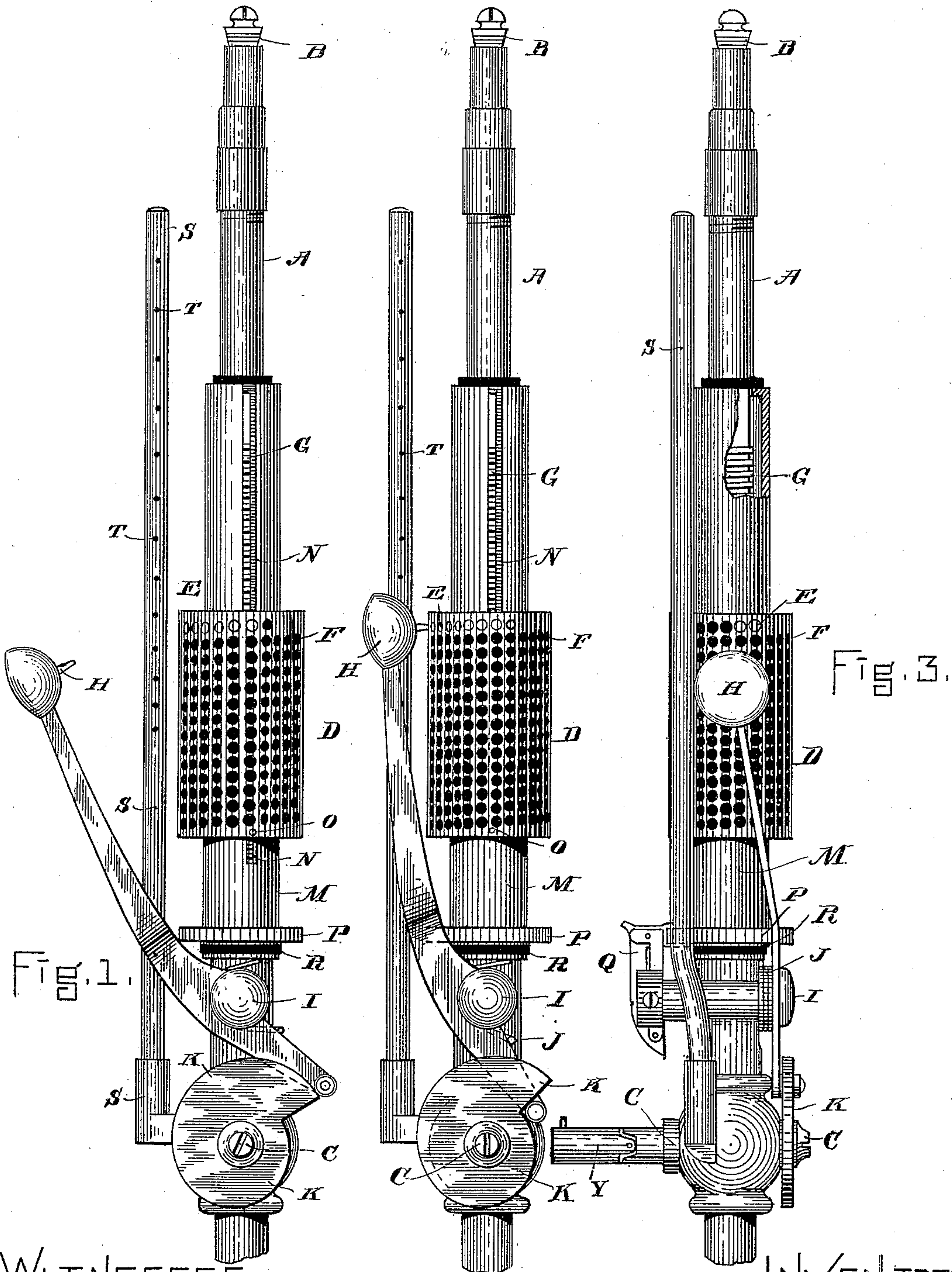
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N. H. & A. B. SHAW.

AUTOMATIC GAS LIGHTING AND EXTINGUISHING APPARATUS.

No. 405,435.

Patented June 18, 1889.



WITNESSES,  
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FIG. 2

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by A. H. Pencer  
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(No Model.)

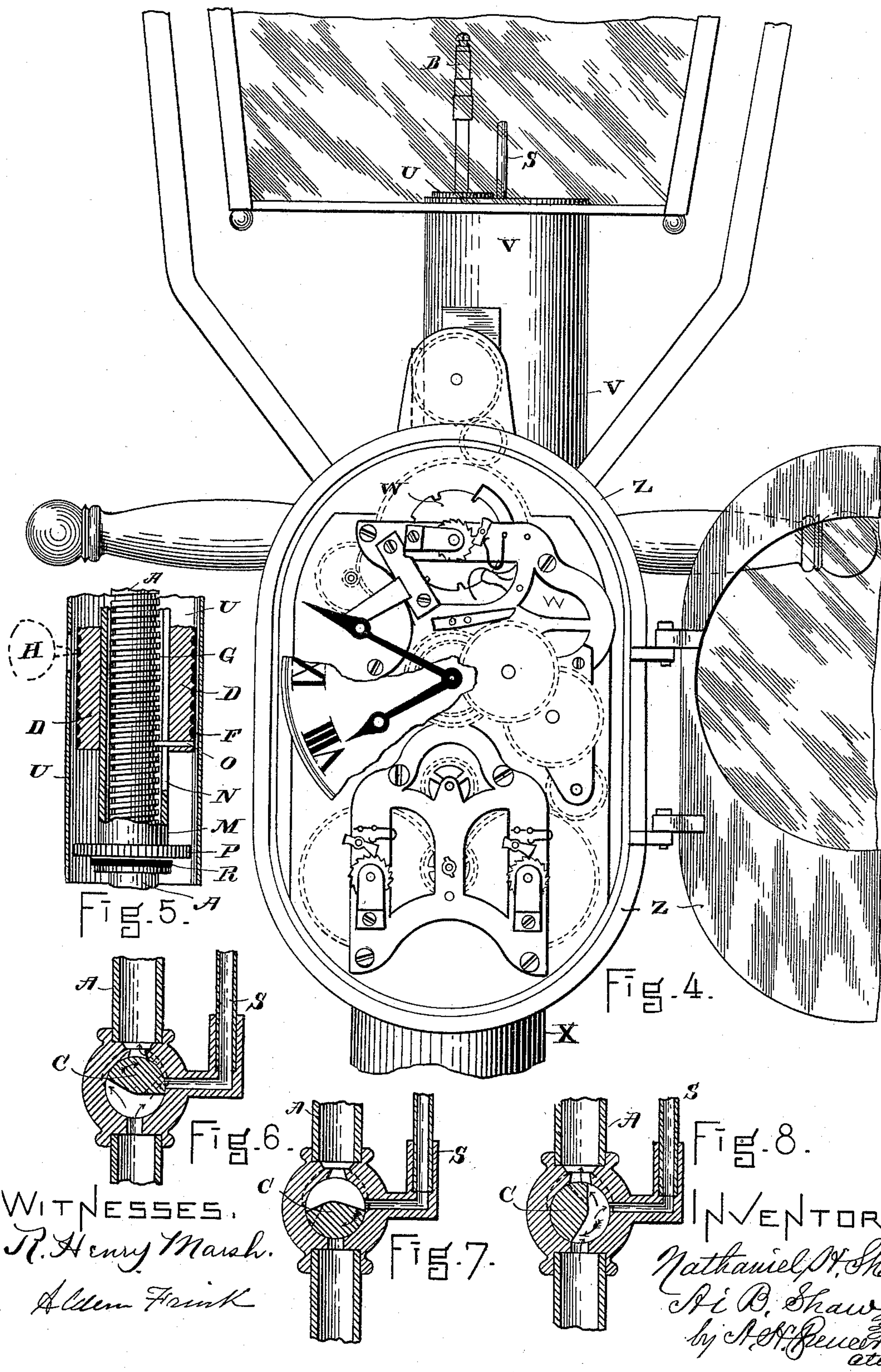
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# UNITED STATES PATENT OFFICE.

NATHANIEL H. SHAW, OF SOMERVILLE, AND AI B. SHAW, OF MEDFORD, MASSACHUSETTS; SAID NATHANIEL H. SHAW ASSIGNOR TO THE AMERICAN AUTOMATIC GAS LIGHTING COMPANY, OF PORTLAND, MAINE.

## AUTOMATIC GAS LIGHTING AND EXTINGUISHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 405,435, dated June 18, 1889.

Application filed August 31, 1888. Serial No. 284,249. (No model.)

*To all whom it may concern:*

Be it known that we, NATHANIEL H. SHAW, of Somerville, and AI B. SHAW, of Medford, both in the county of Middlesex and State of Massachusetts, have jointly invented certain new and useful Improvements in Automatic Gas Lighting and Extinguishing Apparatus, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of this invention is to provide mechanical means for automatically lighting and extinguishing gas-lamps at suitable hours, such means being applied to each lamp independently and requiring simply a periodical winding of the driving mechanism.

Our invention is in the nature of an improvement upon the apparatus set forth in the applications of Nathaniel H. Shaw, No. 261,641, filed January 23, 1888, and No. 273,785, filed May 14, 1888, for patents on "automatic gas lighting and extinguishing apparatus." In each of said applications a time mechanism served to turn on the gas at a predetermined time each evening, light it by an electric spark, and turn it off or extinguish the light at a proper hour in the morning.

By our improvements the battery, electrodes, and conducting-wires are wholly dispensed with, and the apparatus, while entirely automatic, is purely mechanical in its action.

The characteristic feature of our invention is the combination, with the gas pipe and burner and with time mechanism for turning the gas on and off, of a spaced fulminate-carrier and a hammer or other exploder actuated by the time mechanism to produce a spark when the gas is turned on. In connection with these essential parts we employ certain additional devices to adapt the apparatus for the most convenient use, as shown and described.

The several features of our invention herein set forth are particularly referred to in the appended claims.

In the drawings, Figures 1, 2, and 3 represent in various positions the gas-pipe, burner, fulminate-carrier, and hammer, Figs. 1 and 3

showing the hammer retracted ready to strike, 50 and Fig. 2 the position of the parts after the blow is struck. Fig. 4 represents a lamp to which our apparatus is applied with time mechanism for actuating it. Fig. 5 is a sectional detail of the feed movement for the fulminate-carrier, and Figs. 6, 7, and 8 like views of the gas-cock. 55

A is the gas-pipe, B the burner, and C the cock, adapted to be partially rotated at proper times by suitable time mechanism connected to its axis, so as to turn on the gas at dusk and shut it off at dawn. Means may be provided for automatically varying the times of these actions; but such means are not of our present invention. 65

We employ a fulminate-carrier having a succession of detonating charges spaced at regular intervals, so as to be independent of each other. The best form of carrier, the best feed movement therefor, and the best arrangement of these independent charges (clearly shown in the drawings, and original with us) is a metallic cylinder D, having a succession of peripheral pits E, each containing a small detonating or inflammable charge of fulminate F, and arranged spirally around said cylinder, which is gradually fed upwardly by a screw G, so as to bring the several charges F successively into position to be exploded by a blow from the hammer H. The fulminate is readily rubbed into all the pits. Then the cylinder is coated with a water-proof composition, and when each charge is exploded the diverging walls of the pit throw the sparks outwardly without affecting adjacent charges. The hammer is pivoted at I and actuated by a spring J and a cam K, such cam being fixed to the rotating shaft of the gas-cock C and made to throw back the hammer against the pressure of the spring and suddenly release it. 90

As represented in Figs. 1, 2, 3, and 5, the fulminate-cylinder is carried upwardly by the screw G on the gas-pipe A, a slotted sleeve M surrounding said screw and a pin O fixed in said cylinder and extending through the vertical slot N of the sleeve into engagement with the inclosed screw. The sleeve has at its base a ratchet-collar P, having a number 95



of teeth equal to the number of pits E in a single coil around the cylinder, and it is moved to the extent of one tooth by a spring-pressed pawl Q, actuated by the oscillation of the pivot I every time the hammer is retracted, said pawl being held in a slot in the opposite end of said pivot. (See Fig. 3.) Leather or other frictional washers R are placed at the end of the sleeve M.

Figs. 6, 7, and 8 represent the interior of the gas-cock and show as a feature of this invention a supplementary lighting-tube S, to which gas is admitted simultaneously with its admission to the pipe A, leading to the burner. Figs. 1, 2, and 3 represent the tube S laterally perforated, as at T, in the part along which the cylinder D travels. Gas escaping from these perforations, or from the tube S, shortened and without perforation, rises, mixes with the air, and ignites with a flash when the hammer, striking a fulminate charge, produces a spark. The rising flame thus caused ignites the gas issuing from the burner, the cock being so constructed and so moved by the time mechanism as to first open a passage for gas to both burner and lighting-tube S, as in Fig. 8, then to turn further, shut off the supply to the tube S while supplying the burner for the night, as in Fig. 6, and at dawn to be turned by the driving mechanism, so as to shut off the gas altogether, as in Fig. 7. In these figures the curved dotted line above the circle of the cock C denotes a gasway formed in the building and connecting with the burner in a different plane from that of the tube S.

The fulminate-cylinder is by preference inclosed by a tube U, (shown in section in Fig. 5) serving to protect the parts from the weather. A narrow slot or other aperture through such tube gives the hammer access to the fulminate-pits in the cylinder D, and another opening is required for the pawl Q to work in if the tube U is close-fitting.

V, Fig. 4, represents a shell in the form of a somewhat flattened tube of such dimensions as to surround the pipe A, the cylinder D, the lighting-tube S, and the hammer. This shell, being open at top and bottom, affords an upward passage or flue for the flame rising to the burner from the point of ignition at the hammer, and serves to prevent it from being extinguished by the wind. The shell, if employed, may rest on some projection from the lamp-frame.

It is obvious that by carrying the fulminate-cylinder well up within the lantern and near to the burner these projecting tubes or shells may be dispensed with, and that a jet of gas from the tip of the tube S would suffice as a lighter.

The clock-work or time mechanism W is inclosed in a suitable case Z, mounted on the lamp-post X, and the shaft of the upper gear-wheel will be connected to the rotary cock C by a suitable coupling Y, about as indicated

in the drawings accompanying the application No. 261,641 of N. H. Shaw aforesaid.

We claim as our joint invention—

1. The combination of the gas-burner and rotary cock with a spaced fulminate-carrier of rigid material having a succession of fulminate charges permanently attached thereto, an igniting device, and a time mechanism for automatically actuating them, substantially as set forth.

2. The combination of the gas-burner, rotary cock, and time mechanism, with a solidly-filled fulminate-carrier having spaced pits, and the explosive compound permanently fixed therein, and an igniting device, substantially as and for the purpose set forth.

3. The combination of the gas-burner, rotary cock, time mechanism, and hammer, with a rotary carrier having in its face a series of accurately-spaced pits or depressions containing fulminate, substantially as and for the purpose set forth.

4. The combination of the gas-burner, rotary cock, time mechanism, and hammer, with a cylindrical rotary fulminate-carrier provided in its periphery with a succession of pits or depressions to localize the explosive material, substantially as set forth.

5. The combination of the gas-burner, rotary cock, time mechanism, and hammer, with a rotary and longitudinally-movable cylinder having at regular intervals peripheral pits containing fulminate, and with a suitable feed mechanism to bring such pits beneath the hammer, substantially as and for the purpose set forth.

6. The combination of gas-burner, rotary cock, hammer, and time mechanism, with a cylindrical fulminate-carrier having peripheral fulminate charges arranged in succession spirally, and with an automatic feed mechanism having a shaft screw-threaded to correspond in pitch with the spirally-arranged fulminate deposits on said cylinder, substantially as set forth.

7. In an automatic gas-lighting apparatus, the gas-burner and rotary cock, the spark-forming device consisting of a hammer and rotary cylinder having spirally-arranged peripheral pits containing fulminate, a screw-threaded central shaft of corresponding pitch, a slotted tube interposed between said shaft and cylinder, a ratchet and pawl to actuate said tube, and a pin from said cylinder traversing the tube-slot and engaging with said screw-thread, substantially as set forth.

8. In an automatic gas-lighting apparatus, the combination of a suitable spark-forming device with the burner, a secondary gas-jet arranged to discharge a limited amount of gas beside the burner when the spark is formed, and with a rotary cock having double gas-passages, as described and shown, adapted to supply gas to said secondary jet momentarily and to the burner permanently, for the purpose set forth.



9. In an automatic gas-lighting apparatus, substantially as described, the spark-forming devices, the burner, and the rotary cock having double gas-passages, as described and  
5 shown, in combination with a secondary gas-pipe having lateral perforations arranged one above another from the spark-point toward the burner, for the purpose set forth.

10. In an automatic gas-lighting apparatus,  
10 substantially as described, the spark-forming devices, the burner, and rotary cock, in combination with a secondary lighting-tube and

an inclosing-shell adapted to carry the flame upwardly from such tube, substantially as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 29th day of August, A. D. 1888.

NATHANIEL H. SHAW.

AL B. SHAW.

Witnesses:

A. H. SPENCER,

ELIHU E. LOOMIS.

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