E. P. RUSSELL.

LIGHTING AND EXTINGUISHING GAS.

No. 66,044. Patented June 25, 1867.

Fig: 1.

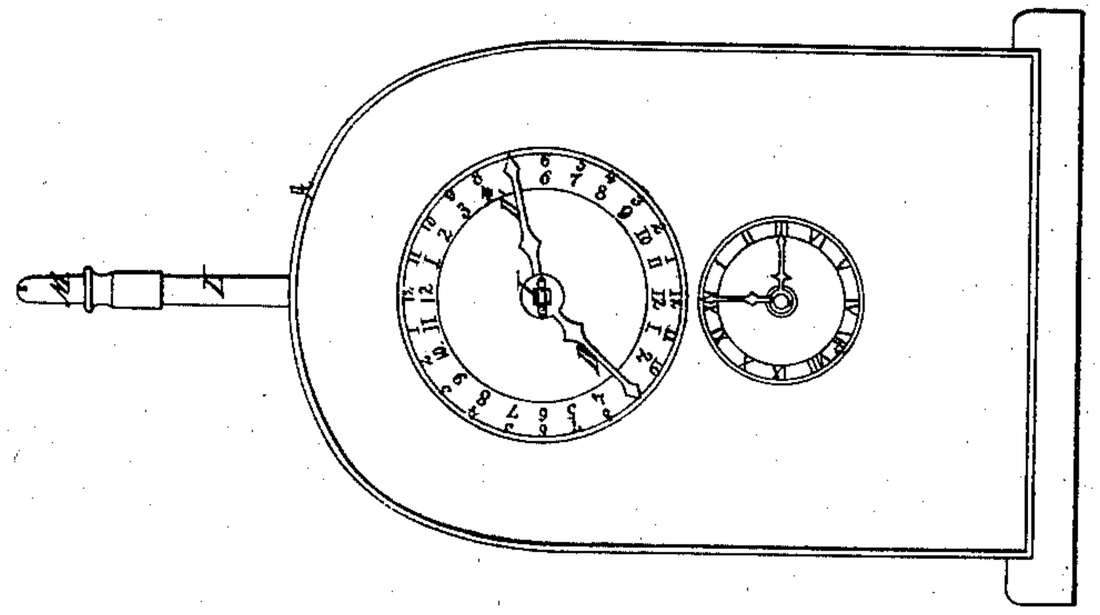


Fig: 2.

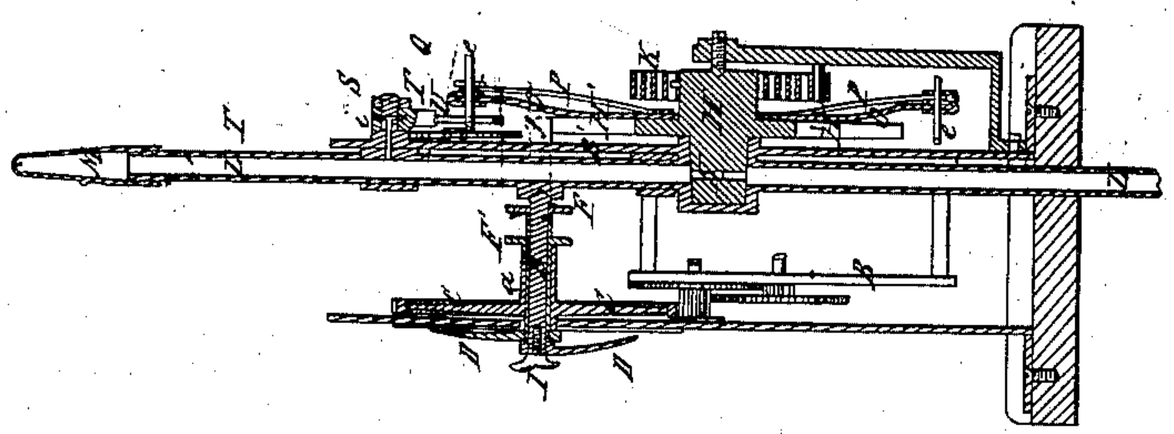


Fig: 5.

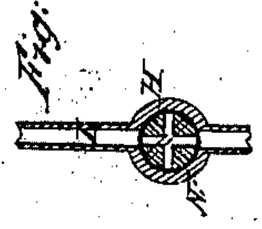


Fig: 3.

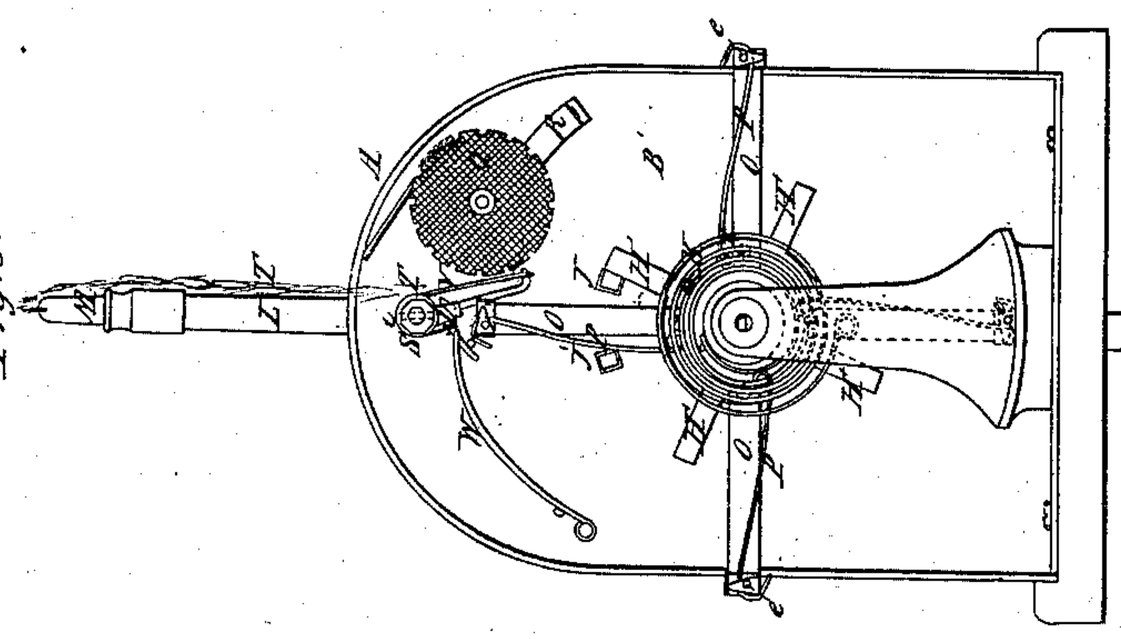
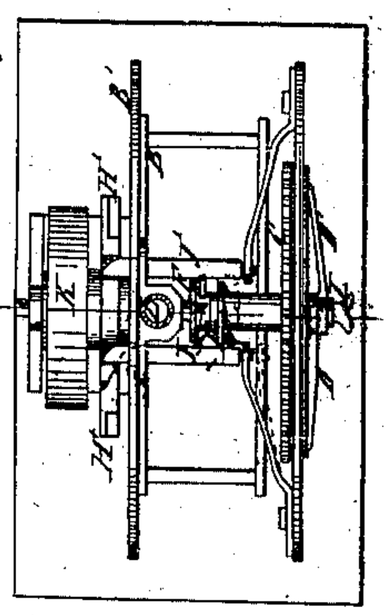


Fig: 4.



Witnesses.

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Letters Patent No. 66,044, *dated June* 25, 1867.

IMPROVEMENT IN AUTOMATIC APPARATUS FOR LIGHTING AND EXTINGUISHING GAS.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, E. P. RUSSELL, of Manlius, in the county of Onondaga, and in the State of New York, have invented certain new and useful Improvements in Automatic Apparatus for Lighting and Extinguishing G Lights; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification. In the drawings—

Figure 1 is a front elevation showing the time and "setting" dials.

Figure 2 is a vertical section through the machine.

Figure 3 is a rear view showing the devices used for operating the fuses and gas-cocks.

Figure 4 is a plan view of the same.

Figure 5 is a section through the main gas-cock.

My invention relates to certain improvements in automatic machinery for lighting and extinguishing gas, and principally consists in using a supplemental jet of gas drawn from the pipe a few inches below the main burner for the purpose of more certainly lighting the gas at the burner, and consuming the match or fuse; also in the mode of operating the gas-cock which regulates this supplemental jet; also in arranging the fuses so that they shall move horizontally instead of vertically; also in the construction and operation of the devices for holding the matches, and giving them a yielding motion in passing over the friction-plate so as to prevent breaking; also in the devices for turning the gas on or off; also in the mode of setting the hands, and in other minor points, all of which will more fully hereinafter appear.

The drawing shows the machine set so as to turn the gas on at 9 p. m., and off at 7 a. m.

In the drawings, A represents the outer case; B the clock-work, which may consist of a common eight-day clock. C is the power-wheel for conveying the power from the "clock" to the mechanism for operating the cocks and fuses. This wheel is so geared as to make one revolution in twenty-four hours. It is fast to a short hollow shaft, *a*, which has one end turning in the frame plate. D is the "on" setting hand, and D′ is the "off" setting hand. The hand D is fast to the step-shaft E; the other hand is fast to the hollow shaft of the screw F. E is a step-shaft passing through shaft *a* and the shafts of the worms F F′, and is "stepped" in a "step" on the gas pipe, (see fig. 2.) F F′ are worms or cam-faced wheels, which operate the sliding stop-bolts J J′, against which the arms H¹ of the disk H strike. The worm F is fast to the step-shaft E, a part of its hollow shaft turning in worm F′. Worm F′ passes through shaft *a* and has the "off" hand D fastened to it. By means of a thumb-screw, I, are tightened and made to work together the hands D D′, power-wheel C, and worms F F′. H is a metallic disk provided with (in this drawing) four arms H¹, radiating about two inches from the centre. These arms, in connection with slide-bolts J J′ and main-spring K, constitute the active part of the device for "tripping" and "stopping." J J′ are two bevelled slide-bolts passing through the frame-plate B′, and kept active by the springs *j j′*. These bolts are supplied with pins *c c′*, against which the cam faces of worms F F′ operate so as to draw in the bolts J J′, and allow the escape of the arms H¹. L is the gas pipe, having the burner M at the top, and its lower end connected to the supply pipe. About six or eight inches from the burner, and at the centre of the machine, there is fitted to the pipe L a gas-cock, N. The four-way valve of this cock is formed out of the axle of the disk H. The one end of the main-spring K is fastened to the other end of the axle of said disk, so that the disk and its arms and the gas-cock are all at once operated by the direct action of the spring K. O are the four match-bearing arms, made of thin spring steel, and radiating from disk H, as shown. A suitable hole for the insertion of a match or fuse *e* is provided at the outer end of the arms. P are light wire springs arranged so as to keep the fuses in place in their holes. The object in making the arms O out of springs, is to allow a yielding motion to the match as it passes over the friction-plate Q, so that it may not be broken. The friction-plate Q is made of a circular piece of roughened metal, placed at a slight incline to the match, and pro ded with a pivot and detent so as to be capable of presenting new surfaces for the action of the match. R auge-plate, against which the matches are placed to determine the degree of inward projection through holders. S is a supplemental gas-cock in the side of gas pipe, about two or three inches below the burner. opening *i* through the cock allows the gas to escape in two directions, both up and down, so as to form a jet T, d lines,) which is thrown downwards so as to be lighted by the match, and aid in its consumption, and at the same time is thrown upward so as to carry the flame to the main burner. Extending downward from this

cock S is a lever, U, bent and having a wire, V, like the cord of a bow. The fuse is made to strike against this wire so as to open the cock S. The lower end of the jet assists in burning off the match. As soon as this is done the spring W closes the cock. By the use of a fine wire the flame of the match is checked less than if the match were in contact with a larger substance.

The operation of my invention is obvious from the foregoing description. My machine is more particularly intended for application to the street gas lights, one machine for each post. The machine being duly wound, and the matches placed in their holders, the hands are turned to their respective hours, and set fast by means of thumb-screw I. For instance, (see drawing,) if it be wished to "light up" the gas at 9 p. m., the hand D is turned to the figure 9 of the left-hand dial, and to turn off the gas at 7 a. m. the hand D′ is set to the figure 7 of the right-hand dial. The "clock-work" simply operates the "tripping device," and is independent of the spring K, which operates the device for opening and closing the cocks and striking the matches. The hands being set as desired, and the clock properly started, the wheel C slowly revolves, carrying with it the worm F and hand D. As soon as this hand reaches the upper figure 12, the worm will strike against pin *j* of bolt J, thus drawing back that bolt and permitting the escape of the arm H^2, which is stopped by it. As soon as this bolt is thus drawn the arm H^2 rapidly flies past it, carrying with it the match-arm O′. The farther revolution of the arms is then stopped by the striking of the arm H^3 against bolt J′. As the arm O′ passes the friction-plate Q, the match is struck against it with a gradual yielding motion so as to ignite it certainly and without danger of breaking it. As the revolution continues, the match itself strikes against the wire V, thus opening the cock S, whence issues the jet T, which is lighted by the match. This jet when lighted flames up and lights the gas that flows from the main burner. The lower part of the jet also serves to assist in burning off the match. As soon as the end of the match is burnt off the spring W closes the cock S. At the same time that this is taking place, the turning of the disk H opens the main gas-cock N, letting on the gas. The gas is thus lighted and continues to burn until the "off" hand D′ reaches the figure 12 on the right-hand dial. As soon as this occurs, the worm F′ draws back the bolt J′ and allows the arm H^2 to escape until it is stopped by bolt J. This part revolution of the cock cuts off the gas and extinguishes the light. The machine thus continues to operate until run down, or until all the matches are used up.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The supplemental gas-cock S attached to the main pipe L, when opened and closed by clock-work substantially as described, for the purpose of lighting the main burner M.

2. Also the jet T for burning off the match, substantially as and for the purposes set forth.

3. Also the lever U in combination with gas-cock S, substantially as and for the purposes set forth.

4. Also the wire V, substantially as and for the purposes set forth.

5. Also the spring-arms O, substantially as and for the purposes set forth.

6. Also the revolving inclined friction-plate Q, constructed and operating substantially as and for the purposes set forth.

7. The springs P in combination with the perforated arms O, for the purpose of holding the matches in the position described.

8. Also the screws F F′ in combination with the bolts J J′ and arms H^1, substantially as and for the purposes set forth.

9. The combination and arrangement, substantially as described, of the main-spring K, gas-cock N, and arms H^1 and O, for the purposes set forth.

10. The hands D D′, arranged and operating as described in combination with step-shaft E, hollow shaft of worm F, and thumb-screw I.

11. Also operating the jet-cock S by means of the fuse itself, substantially as and for the purposes set forth.

12. Also placing the matches so as to revolve horizontally, substantially as and for the purposes set forth.

In testimony that I claim the above-described invention, I have hereunto signed my name this seventh day of January, 1867.

E. P. RUSSELL.

Witnesses:

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T. G. CLAYTON.