2 Sheets—Sheet 1.

T. POWERS & J. B. HULBERT.

Time Gas-Lighting and Extinguishing Apparatus.

No. 197,403. **Patented Nov. 20, 1877.**

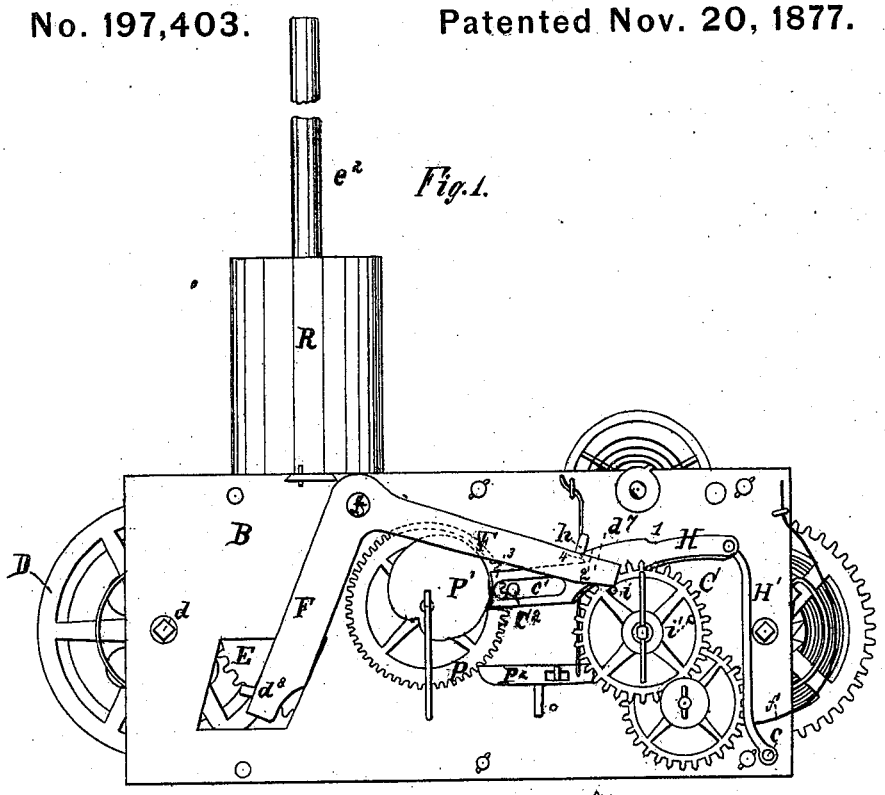

Fig. 1.

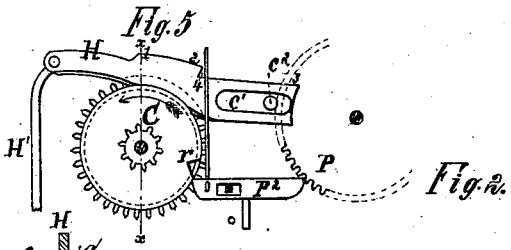

Fig. 5.

Fig. 2.

Fig. 6.

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2 Sheets—Sheet. 2.

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Fig. 3.

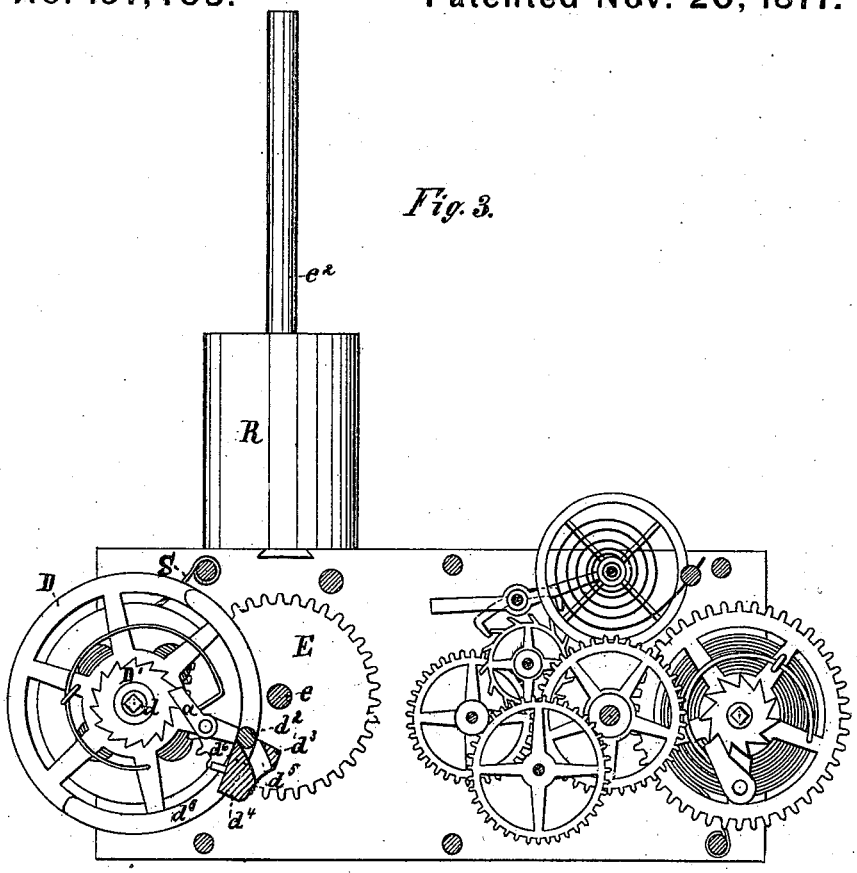
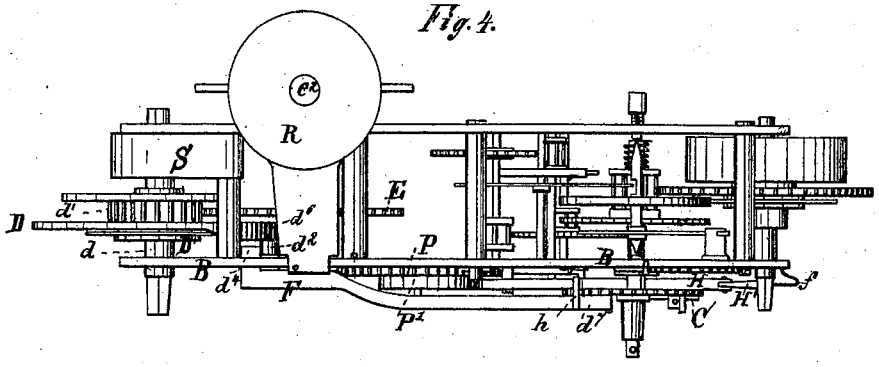


Fig. 4.



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UNITED STATES PATENT OFFICE.

TITUS POWERS AND JEROME B. HULBERT, OF NEW YORK, N. Y., ASSIGNORS TO THEMSELVES AND ISABELLA M. GAZZAM, OF JERSEY CITY, N. J.

IMPROVEMENT IN TIME GAS LIGHTING AND EXTINGUISHING APPARATUS.

Specification forming part of Letters Patent No. **197,403**, dated November 20, 1877; application filed January 4, 1877.

To all whom it may concern:

Be it known that we, TITUS POWERS and JEROME B. HULBERT, of the city, county, and State of New York, have invented an Improvement in Time Gas Lighting and Extinguishing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 is a side elevation of an apparatus containing my improvements. Fig. 2 is an elevation of the opposite side of the same. Fig. 3 is a side view of the interior movements of the apparatus, the side plate seen in Fig. 1, with the works on the exterior face of the said plate, being removed. Fig. 4 is a plan of the same. Figs. 5 and 6 are detailed views of some of the working parts hereinafter particularly described.

The object of this apparatus is to automatically turn on and off the gas, especially of the burners of street-lamps; and consists in the devices and combinations of devices herein described and claimed.

We employ a train of clock-work, which is shown in the right-hand part of Fig. 3, and which, being common and well known, need not be particularly described. The object of this train of clock-work is to give a uniform rotation, once in twenty-four hours, to the wheel C, and it is constructed and arranged to accomplish that result.

At the opposite end of the frame is another train of wheels, D E d^1, the motive power being the recoil of a coiled spring acting upon the shaft d of wheel D. The object of this train of wheels is to give to the crank-arm e^1, on the shaft e of the wheel E, an intermittent movement, a half-revolution twice every twenty-four hours. The wheel D and pinion d^1, made fast to it, are both loose on the shaft d, and motion is given to them by means of a ratchet-wheel, D′, fixed to said shaft, and a dog, a, pivoted to the wheel D, and engaging with the said ratchet-wheel. This arrangement permits the spring S to be wound up without moving the wheel D. d^2 is a stop-pin on the side face of the wheel D near its periphery.

F is a bell-crank lever, pivoted at f in plate B. On the inner face of the end d^8 of said lever are two projections, sections of which (marked d^3 and d^4) are shown in Fig. 3, which extend through an opening in the plate B, and nearly into contact with side face of wheel D. Between these two projections is an inclined slot or channel, d^5. The pin d^2 stops against these projections.

When the end d^8 of said lever F is thrown upward sufficiently, the said pin rests on d^3. Then, by depressing the end d^8, the pin d^2 will pass off from the said projection, and fall into and pass through slot d^5, over the incline d^6, swinging the end d^8 of the said lever upward and to the left, and, of course, depressing the opposite end d^7; but if the end d^8 of the said lever is prevented from being depressed at the time the pin d^2 falls into the slot d^5, it will be stopped against the incline d^6, and cannot pass through the slot d^5 until the end d^7 of the lever is allowed to fall. As soon as the pin d^2 passes through the said slot, the wheel D is free to make a revolution, when the said pin will be again stopped upon the projection d^3 as the movement given to the lever by the passing of the pin d^2 over the incline d^6 will bring said projection into position to engage said pin.

H is a sliding bar hinged at one end to the arm H′, which is pivoted at its lower end, at c, in the plate B.

c^1 is a slotted opening in the opposite end of this bar, and c^2 is a pin fixed in plate B, which passes loosely through this opening.

On the shaft of the wheel C, and between that wheel and the plate B, is a friction-wheel, a detached view of the same being given in Fig. 6, and there indicated by the letter I. It is indicated, also, by dotted lines seen in the wheel C, Fig. 5. It may be attached to or form a part of the wheel C, its diameter being a little less than said wheel.

The under edge of the bar H rests on the periphery of the said wheel I. A finger or pin, h, projects inward from the end d^7 of lever F, and rests upon the upper edge of the bar H. The action of the pin d^2, pressing against the projections d^3 d^4, is to depress the end d^7 of lever F, and, of course, to force the finger h down upon the bar H. This bar, therefore, operates to hold the said lever in position to cause the projections d^3 d^4 to engage the pin d^2. The surface 1 to 2 of the upper edge of the bar H is elevated above that

from 2 to 3. When the finger *h* rests on the latter the projection d^3 engages with the pin d^2. When it is raised onto the latter—the surface 1 to 2—the said pin passes off from the said projection into the slots d^5. Then, when the said finger is allowed to drop again onto the surface 2 to 3, the pin passes through the said slot, and the wheel D makes a revolution.

i and *i'* are two pins fixed in the wheel C. They are so placed that they engage with the end d^7 of lever F, and elevate it, as the said wheel is revolved from left to right. The normal position of the finger *h* is resting on the lower surface 2 to 3 of the bar H. When the end d^7 of the lever is raised by one of the pins *i* the bar H is slid to the left by the stress of the spring *f* against the arm H', when the finger will rest on the surface 1 to 2 of the bar, pressing the said bar down upon the friction-wheel I, which, as it rotates, will act by friction to slide the bar H back against the stress of the spring *f*, until the finger *h* falls down onto the lower surface 2 to 3 of the bar H. P is a toothed wheel, to which is attached an eccentric or cam, P^1. P^2 is a sliding dog. In the periphery of wheel I is a notch and an incline, *r*, whereby the said dog P^2 is caused to move the wheel P^1 one tooth at each revolution of the wheel I.

It is evident that the point of time when the finger *h* will fall down upon the surface 2 to 3 of the bar H will depend upon the position occupied by the notch 4 of the bar H with reference to said finger at the moment when the end d^7 of lever F passes off from one of the pins *i* and rests upon the surface 1 to 2 of bar H; and it is also evident that the cam P^1, against which the bar H, when free to move, is forced by the spring *f*, will determine the position of the said notch 4 with reference to the said finger *h*.

The operation of this machine is as follows: The clock-work being timed so that the pin *i* will raise the end d^7 of the lever F at a given hour, supposed to be that at which it is desired to turn on the gas, the bar H, being thereby freed from pressure and relieved from the friction of the wheel I, will be thrown forward into contact with the cam P^1, and the said finger *h* will then rest upon the surface 1 to 2 of said lever, and the pin d^2 will, by said movement, pass off from the projection d^3 into the slot d^4, and, pressing against the incline d^6, will press down the finger *h* upon the bar H into contact with the friction-wheel I. The said friction-wheel, continuing its movements with the wheel C, will slowly force the said bar back against the stress of the spring *f* until it is stopped against the pin c^2, in the course of which movement the finger *h* will pass off from the surface 1 to 2, and drop down upon the surface 2 to 3, thus permitting the pin d^2 to pass through the slot d^5, thereby leaving the wheel D to make one revolution and give one-half of one revolution to the wheel E, whereby the crank e^1 forces the rod e^2 either up or down, as the case may be. The said rod e^2 is intended to be connected to the cock of the gas-burner, so that such movement of the rod shall turn on the gas and set off a friction or percussion match to light the same. The wheel C is provided with another pin, *i'*, placed at such a distance from *i* that there shall be the time required between the turning on and turning off of the gas, and this pin causing a repetition of the movement before described, a reverse movement of the rod e^2 will take place and the gas be turned off. A movement of the wheel P and cam P^1 to the extent of one tooth being produced in each twenty-four hours by the action of the notch *r* in the wheel I upon the dog P^2, it is evident that, by the said cam P^1, the moment when the gas shall be turned on or off will be automatically changed each day later or earlier, as the case may be, so as to make the time of such turning on or off the gas conform to the varying lengths of days in the year.

R is an air-cylinder, through which the rod e^2 runs. There is a piston-head on the rod within the cylinder, working closely therein, and small apertures are made at each end of the cylinder, or through the piston-head, for the passage of air. This device is intended to regulate or moderate the movement of the rod e^2, which might otherwise be too rapid. The rate of such movement may be regulated by enlarging or diminishing the apertures in the ends of the cylinder or that in the piston-head. It is intended that this apparatus, for street purposes, shall be inclosed in a suitable case or box, which is to be attached to a lamp-post, and the rod e^2 extends therefrom to the gas-burner.

What we claim, and desire to secure by Letters Patent, is—

1. The combination of the lever F, provided with the projections d^3 and d^4, the bar H, the wheel D, provided with the pin d^2, and the wheel C, provided with the pins *i i'*, one or both driven by a clock-movement, together with pinion d^1, wheel E, crank e^1, and rod e^2, all constructed to operate as and for the purpose described.

2. The combination of the bar H, spring *f*, cam P^1, toothed wheel P, dog P^2, notched wheel I, all constructed to operate as and for the purpose described.

3. The combination, with the train of wheels D d^1 E, crank e^1, and rod e^2, provided with a piston-head, of the air-cylinder R, the piston-head working within the cylinder, and the cylinder or piston-head being provided with air-apertures, as and for the purpose described.

Witness our hands this 1st day of December, 1876.

TITUS POWERS.
JEROME B. HULBERT.

Witnesses:
B. S. CLARK,
M. F. CLIFTON.