T. POWERS.

Gas-Lighting Apparatus.

No. 197,404. Patented Nov. 20, 1877.

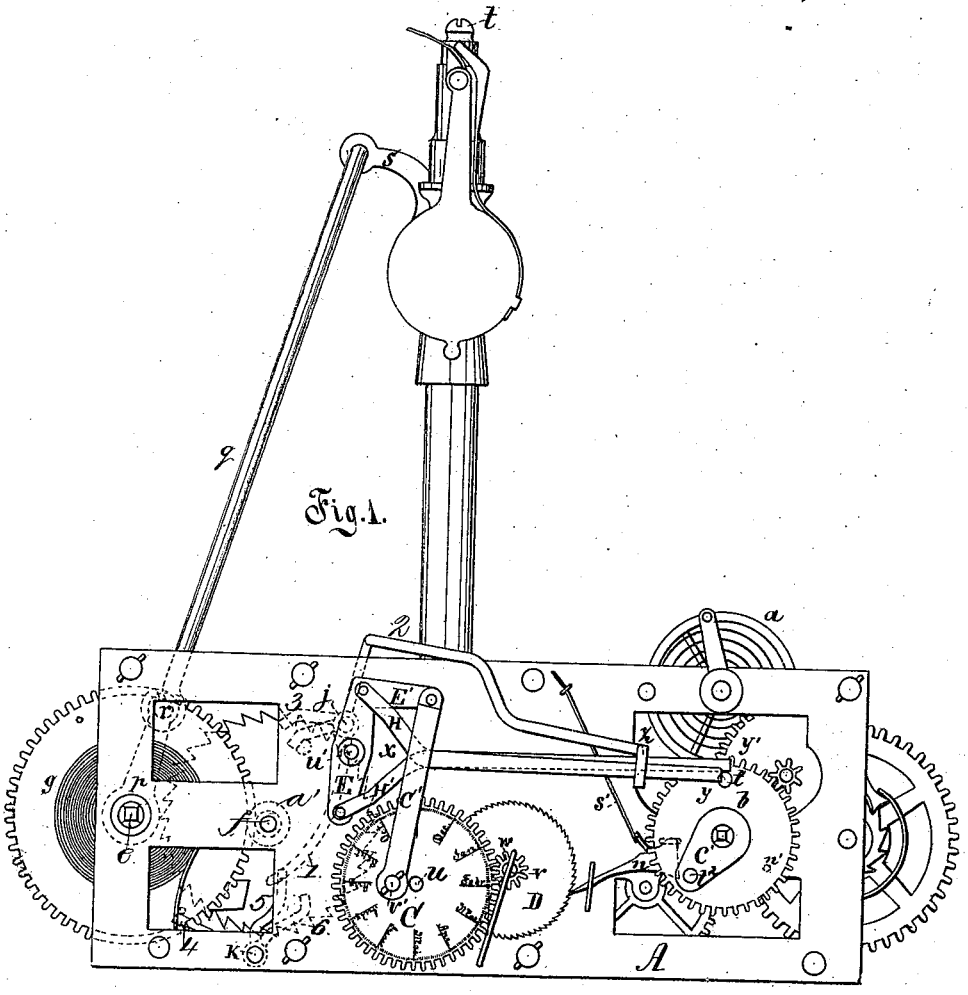

Fig. 1.

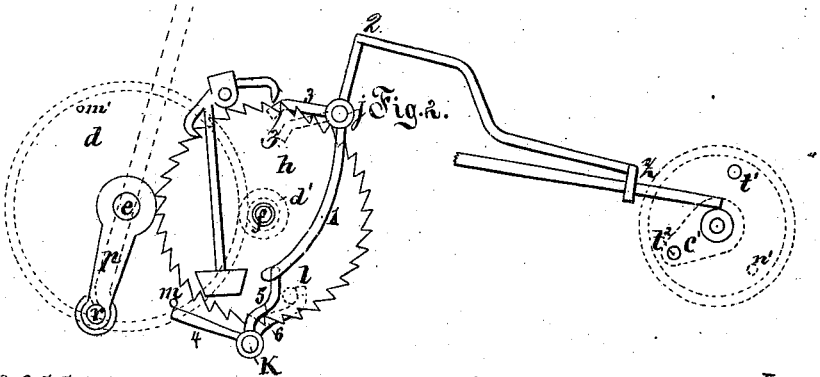

Fig. 2.

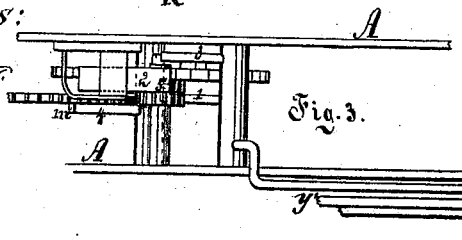

Fig. 3.

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UNITED STATES PATENT OFFICE.

TITUS POWERS, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, JEROME R. HULBERT AND ISABELLA M. GAZZAM, OF SAME PLACE.

IMPROVEMENT IN GAS-LIGHTING APPARATUS.

Specification forming part of Letters Patent No. **197,404**, dated November 20, 1877; application filed February 16, 1877.

To all whom it may concern:

Be it known that I, TITUS POWERS, of the city of New York, county and State of New York, have invented certain new and useful improvements in apparatus for turning on and off and lighting the gas at the gas-burners in streets and elsewhere, reference being had to the accompanying drawings, forming part of the same.

Figure 1 is a side elevation of a machine containing my invention. Fig. 2 is a detailed view of certain of the devices contained in said machine. Fig. 3 is a plan or top view of the said machine.

My invention relates to apparatus for automatically turning on and off and lighting the gas at gas-burners, particularly those in the open streets of cities and towns; and consists of the devices and combination of devices hereinafter described and claimed, whereby the times of turning on, and lighting, and turning off the gas is automatically varied daily, to adjust them to the varying hours of daylight throughout the year.

A is a frame, upon which the working parts are mounted. At the right-hand end of this frame is a common clock or watch movement, driven by a mainspring, which need not be particularly described. This movement gives motion to a wheel, *b*, so as to cause its rotation once in every twenty-four hours. Upon the same shaft of this wheel *b* is fixed an arm or segment, *c'*. Both the wheel and arm, being fixed on the same shaft, move together.

At the opposite end of the frame is another movement, made up of the spur-gear wheel *d*, on the shaft *e*, a pinion, *d'*, on the shaft *f*, into which the wheel *d* meshes, and a toothed wheel, *h*, on said shaft. Motion is given to the shaft by a coiled spring, *g'*, and an escapement-pallet regulates and diminishes the movement of said toothed wheel.

j is a shaft, carrying the three arms or levers 1 2 3, and K is another shaft, which carries the three levers 4 5 6. Fixed in the side face of the wheel *h*, the face opposite that seen in Fig. 2, and shown by dotted lines in said figure, is a stop-pin, *l*, and in the side face of the wheel *d*, as seen in said figure, are two stop-pins, *m m'*, near the periphery, on opposite sides of the wheel.

The pin *l* is so placed that it will engage with the bent end of the lever 6 when that lever is thrown up, as seen in Fig. 2. This pin also engages with the lever 3 when that lever is thrown down, as seen by dotted lines indicating that lever in said figure. The pins *m m'* are so placed that they severally strike against the lever 4, as the wheel *d* revolves from left to right, and depress it, thus rocking the shaft K over from right to left. A pin or short arm on the lower end of the lever 1 engages with the lever 5, so that when the lower end of 1 is swung to the right it carries the upper end of the lever 5 with it, and thus rocks the shaft K over from left to right.

It is evident that if these parts are in the position shown in Fig. 2, and the lever 2 be raised, the lever 6 will be thrown out of engagement with the stop-pin *l*, and the lever 3 will be thrown down into the position shown by dotted lines 3'. Then, the wheel *h* being revolved from right to left, the pin *l* would be stopped against said lever 3, and the motion of said wheel arrested. Then, if the lever 2 be permitted to drop down to its first position, the pin *l* will be released from its engagement with the lever 3, and the wheel *h* will be free to revolve unobstructed by either of the levers 3 and 6, and that the wheel *d*, driven by the stress of the spring *g*, will be put in motion, and revolve the wheel *h* by engagement with the pinion *d'*, and that such motion will continue until one of the pins *m m'* shall carry down lever 4, thereby bringing lever 6 up in the way of pin *l*, when the said pin will again engage with the said lever, and the movement will be stopped. Thus it is evident that each time the lever 2 is raised and lowered, the wheel *d* is permitted to make half a revolution. Upon the shaft of said wheel *d* is an arm, *p*, (shown in dotted lines in Fig. 1 and in full lines in Fig. 2,) and *q* is a connecting-rod, pivoted at the lower end to

the crank-pin r of the arm p, and at the upper end to the arm s, which is attached to the stem of the gas-cock which turns on and off the gas to and from the burner t, and by which is also operated the mechanism for lighting the gas. This may be a percussion fuse or primer, ignited by a blow from a hammer brought into action by the motion of the arm s. As this firing apparatus is not new, a particular description of it is not deemed important. Any suitable apparatus for the purpose may be employed.

C is a gear-wheel, which revolves freely on or with its shaft u. D is a wheel on another shaft, v, on which is a gear-pinion, w, which meshes into the wheel C. E is a rocking lever, pivoted on the shaft u', having on its upper end an arm, E′. v' is a crank-pin in the wheel C, and C′ a rod, pivoted at the lower end on the pin v' and at the upper end to the arm E′.

It is evident that as the wheel C is revolved the lever E will be rocked on its shaft. H and H′ are two arms of equal length, one, H, pivoted at the upper end of the lever E, and the other, H′, at the lower end of said lever. They are bent at x, so that from that point they may lie parallel with each other to their ends y y'. The lever 2 has, at its outer end, a loop, z, through which the levers H H′ pass, so that as their ends y y' are raised and lowered, they will carry with them the said lever 2. n is a dog, which engages with the notches in the wheel D. Upon the inner face of the wheel b is a pin or lug, n', which, at each revolution of the wheel b, engages with the said dog and gives it a slight motion to the left, so as to cause it to move the wheel D one notch, the spring s' forcing the dog back again after said pin has passed it. It is intended that there shall be on this wheel D just the requisite number of notches required to give three hundred and sixty-five revolutions of b to one revolution of c—that is, that c shall make one complete revolution in a year.

In the wheel b, and projecting from its outer face, is fixed a pin or lug, t^1, so placed that it will engage with the lever y', but not with the lever y; and projecting from the inner face of the arm or segment c' is also a pin or lug, t^2, so placed as to engage with the lever y, but not with y', there being some space between the said wheel and arm, so that said levers may lie between them.

Now, it is evident that at each revolution of the wheel b, or once every twenty-four hours, the lever y' will be raised, and allowed to fall again; and that a similar motion will, once in twenty-four hours, be given to the lever y by the revolution of the arm C; and that each lever will, when raised and lowered, carry with it lever 2; also, that the interval of time that will elapse after pin t^1 has raised and lowered the lever y' before the pin t^2 will raise and lower the lever y will, if the said levers were to remain invariable, depend upon the relative positions of these pins t^1 and t^2. It is intended that the relative positions of these pins t^1 t^2 be such that it will require about nine hours for pin t^2, as in the position seen in the drawings, to move into the position of t^1, and, of course, about fifteen hours to move over the remaining portion of the circle back to its first position.

It will be understood that the design of my improvement is to automatically vary and adjust the time of turning on and off gas to the varying lengths of day and night, so that street-lamps will be always lighted at or about dark, and turned off at or about daylight throughout the year.

The gas is turned on and off and lighted by the revolution of the arm p operating a pitman or connecting rod, that actuates the apparatus at the gas-burner, each half-revolution of said arm p acting to turn on and light the gas, and the other half-revolution turning it off. It is necessary, therefore, to determine and vary the time when this crank-arm shall be permitted to start to make its revolution morning and night. The moment when this will take place, as is evident, is that at which the lever 2, after having been raised so as to release the pin l from lever 6, shall be permitted to fall again, so as to release said pin from the lever 3, as before described, and that is when the pins t^1 and t^2, respectively, pass the ends of the levers or arms H H′. The time when these pins will thus pass the ends of the said levers will be varied with the position of the levers. Suppose t^1 is the pin which acts to turn on the gas at night by raising and permitting to fall lever H. Then, as said lever is carried to the right, as it will be a small distance daily by the rocking of the upper end E′ of the lever E toward the right while the crank-pin v' is moving down in its revolution, the moment of turning on the gas will be later each day than the preceding until the lever H shall have reached the limit of its movement to the right. At the same time that the above movement is going on the lever H′ is being drawn each day one step back to the left, so that it will drop off the pin t^2 a little earlier each successive morning until that lever shall have reached the limit of its movement to the left. While the pin v' is then moving from below upward through the other half of its revolution, the above-described motions will be reversed—the time of turning on and lighting the gas will be each day a little earlier, and the time of turning it off later.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the crank-pin v', rock-lever E, connecting-rod C′, and levers H H′, constructed and arranged to operate as and for the purpose described.

2. The combination of the wheel b, carrying the pins t^1 and n', the arm C′, carrying a pin, t^2, the wheels C D, pinion w, dog n, and levers

E H H′, and connecting-rod C′, all constructed and combined to operate as and for the purpose described.

3. The combinations of the levers H H′ 1 2 3 4 5 6, the wheel *d* and *h*, the pinion *d′*, and stop-pins *l* and *m*, all constructed and arranged to operate as and for the purpose described.

4. The wheels and pinions *d h d′*, spring *g*, levers 1 2 3 4 5 6, pins *l* and *m*, arm *p*, connecting-rod *q*, and arm *s*, all combined and arranged to operate as and for the purpose described.

Witness my hand this 13th day of February, 1877.

TITUS POWERS.

Witnesses:
B. S. CLARK,
J. B. HULBERT.