G. P. GANSTER.

Automatic Device for Raising and Lowering Illuminating Flames.

No. 201,237. Patented March 12, 1878.

Fig: 1.

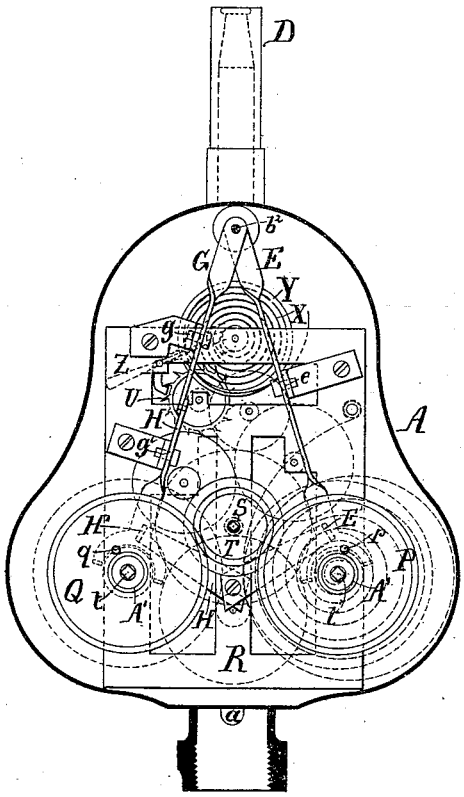


Fig: 2.

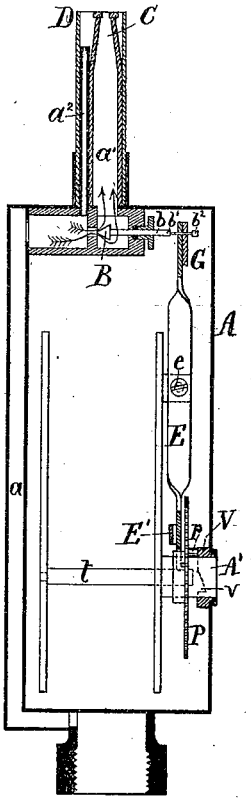


Fig: 3.

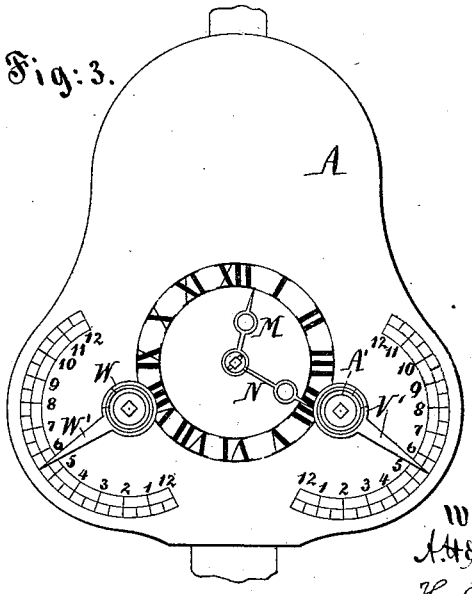


Fig: 4.

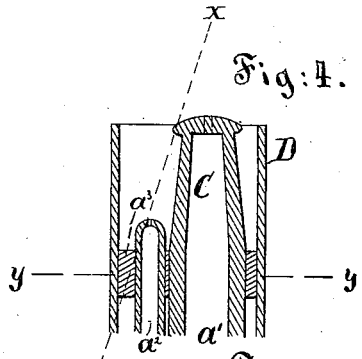
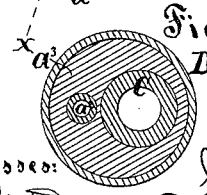


Fig: 5.



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UNITED STATES PATENT OFFICE.

GEORGE P. GANSTER, OF READING, PENNSYLVANIA.

IMPROVEMENT IN AUTOMATIC DEVICES FOR RAISING AND LOWERING ILLUMINATING-FLAMES.

Specification forming part of Letters Patent No. **201,237**, dated March 12, 1878; application filed August 20, 1877.

To all whom it may concern:

Be it known that I, GEORGE P. GANSTER, of Reading, Berks county, in the State of Pennsylvania, have invented certain new and useful Improvements relating to Raising and Lowering Illuminating-Flames, of which the following is a specification:

I have, in a patent issued to me in August, 1872, described the means for operating a valve so as to nearly close the passage of gas in the morning, and to open it wide at night, by the ordinary variation of the pressure in the street-main. I provided a shield to protect the flame from currents of air when it was burning very low.

I employ the same general system in the present invention, but with means for varying the volumes of the flame by clock-work. I employ a clock to control the means for producing a large flame at one period and a small one at another. I provide a separate burner and pipe for the small flame, so situated as to instantly ignite the gas for the large flame when it is let on. I provide adjustable cams for determining the periods of letting on and shutting off the strong jet of gas for the large flame, and I mount them on separate centers, with the levers or adjusting-handles traversing on separate dials or parts of dials entirely independent of each other, and also separate from the shafts or hands of the clock. I provide connections independently from each cam to the valve, causing the mechanism which opens the valve to act simply to open it and then return, leaving the valve open, but free to be closed whenever the closing mechanism shall act; and I similarly cause the closing mechanism to act for only a brief period, moving the valve into the closed condition, and rapidly returning, leaving the valve closed, but ready to be opened.

I have devised and applied means for excluding dust from the works of the clock, while allowing free access for the key to wind it.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a vertical section. Fig. 2 is a vertical section in a plane at right angles to Fig. 1. This view shows only a part of the work. Fig. 3 is a face view. Fig. 4 is a vertical section, showing a tip or burner and the immediately adjacent parts on a larger scale. The dotted line x x shows the direction of the small jet. Fig. 5 is a horizontal section of the same on the line y y in Fig. 4.

Similar letters of reference indicate like parts in all the figures.

A is a substantial casing, of sheet metal or other suitable material, having a pipe, a, through which the gas enters from the street-main, (not represented,) and a pipe, a^1, through which it flows out when permitted to pass to the burner C in sufficient quantities to form a strong illuminating-frame. An additional pipe, a^2, alongside may be of smaller diameter, and carries a small but continuous stream of gas under all conditions. The small flow of gas through the pipe a^2 maintains a constant small flame at its upper end, in sufficiently close proximity to the jet which flows at certain times from the large pipe a^1 to ignite it.

D is a shield, which encompasses both pipes a^1 a^2, and extends up a little above the top of the smallest and shortest pipe a^2. Its function is to shield the small flame which burns constantly on the top of the pipe a^2, and prevent it from being extinguished by slight currents of air.

B is a valve, opening and closing by a horizontal motion, and adapted to let on and shut off the flow of gas to the main burner C, according as it is moved backward or forward. Its horizontal movement allows it to remain at either end of its motion. A backward movement closes it, and, by entirely suppressing the supply of gas to the burner C, reduces the flame to the small amount due to the constant flow through the pipe a^2. Its forward movement lets on a strong current of gas to the burner C, which is instantly ignited by the small flame from the pipe a^2, and a strong illuminating-flame is produced until the valve B is again moved backward and closed.

The small pipe a^2 is connected to the gas beyond the valve B, and receives gas constantly without any reference to the open or closed condition of this valve.

The changes of position of the valve B are induced by levers acting on the knobs or col-

lars b^1 and b^2 on the valve-stem *b*. The lever E induces the closing motion. It turns on the center *e*, and at the upper end loosely embraces the valve-stem *b*. Its lower end is pressed forward by a spring, E′; but its motion in obedience thereto is resisted by contact with a wheel, P, which is turned with a uniform motion, making a complete revolution in twenty-four hours.

The wheel P is mounted loosely on a fixed sleeve, and is free to move endwise or axially thereon. Its front face carries a bevel-ended pin or projection, *p*, which projection, as the wheel turns, traverses around in contact with an adjustable face-cam, V, which is mounted in the face-plate of the casing A, and is held with sufficient force, by friction or otherwise, in any position in which it may be left.

The cam V may be turned by any sufficient force applied by the hand of the attendant, or otherwise, through the lever or arm V′, which is presented on the front of the casing, and, as it is set or moved in one direction or the other, traverses over a graduated arc provided with figures, and corresponding with the hour at which the gas is to be shut off. A notch in the face-cam V allows the pin or projection *p*, and consequently the entire wheel P, to move forward when it is turned into the position corresponding thereto; but as the wheel continues slowly revolving, the bevel of the notch *v* soon returns the wheel back to its original position. When the wheel P is thus moved forward by the spring E′, the other end of the lever E, by striking the collar b^1, moves the valve B into the closed position. After the wheel P, and consequently the lever E, has assumed its original position again, the valve B remains closed. It continues closed, and consequently the flame remains entirely suppressed, except a small flame from the pipe a^2, until the valve B is thrown in the opposite direction, and opened by the action of the lever G. This lever G loosely embraces the valve-stem *b*, in the same manner as the other lever, E, but in front thereof. It turns on a fixed center, *g*, and receives motion from another lever, H, which turns on a fixed center, *g*′. The lower end of this latter is pressed outward by a spring, H′, and is resisted by another wheel, Q. This wheel Q is provided in front with a beveled pin, *q*, and travels around in contact with an adjustable face-cam, W, in the same manner as has been already described for the wheel P; but the two wheels are entirely separate and distinct from each other. Each is free to move outward and inward without affecting the motion of the other.

The wheel Q moves forward when its pin *q* comes opposite the notch in the adjustable cam W, and this movement, in obedience to the force of the spring H′, acts, through the levers G and H, to strike the collar b^2 and move the valve B into the open position, in the same manner as already described in treating of the wheel P. The beveled side of the notch in the cam W causes the wheel Q, and consequently the levers H and G, to return to their original positions very soon after the valve has been opened. This leaves the valve open, but free to be shut whenever the other lever, E, shall impress the force.

The cam W is set by the arm W′, which, like the corresponding arm V′, is presented prominently in front of the face of the casing A. The separate arc over which each travels is graduated and provided with figures corresponding to the hours at which their respective functions shall be performed. The function of the parts connected with the arm V′ in suppressing the light has been already described. The parts connected with the arm W′ cause the gas to be let on.

The cams V and W, being entirely distinct from each other, may be made strong and simple, and the arcs traversed by their respective arms being entirely distinct, no danger of confusion can arise in the adjusting.

Each of the wheels P and Q is revolved by a constant slow motion once in twenty-four hours. They receive motion from a single wheel, T, which is fast on the hour-sleeve S, which will be the ordinary hour-hand sleeve of a train of clock mechanism. This clock mechanism may be in all respects of the ordinary and long-approved character, and need not be minutely described. U is the escapement-wheel, and Y the balance-wheel, actuated by an ordinary lever, Z, and hair-spring X. M is the ordinary hour-hand, and N the minute-hand, turning on a suitable dial separate from the other mechanism, and serving their usual functions. The hands M and N are shown entirely distinct from V′ and W′.

Although the tubes a^1 a^2 may, under some conditions, be worked successfully if the upper ends are entirely distinct and unconnected, but simply lie parallel and close to each other, I prefer for general purposes to bind them strongly together with a thick mass of metal, a^3, applied either as a tight-fitting collar or formed in one with one of the tubes. It is important that it shall be of brass or analogous material, so as to conduct heat from one tube to the other.

Various modifications may be made in many of the details by any good mechanic. The single lever E and the train of levers G H may be reversed in position, and the wheels P and Q actuated by a brief movement backward instead of forward at the periods when they are to act. I can realize some of the advantages while dispensing with any precise equivalent for these levers, so long as the motion due to the cams V and W results in the proper movement of the valve B, leaving it soon after free, ready to be moved in the opposite direction. This allows the independence of the adjustments, and allows the mechanism to be set for the shortest nights, or for even a shorter period, as during hours of evening work or the like, if desired, without necessitating any change other than the simple turning of one or both the arms V′ W′ and their correspond-

ing separate and distinct cams and connected mechanisms. The positions of the centers of the wheels P and Q may be changed within wide limits.

I prefer that the clock shall be provided with sufficient mainspring and suitable gear-wheels to run eight days. I have provided two mainsprings, the one on the right side being indicated in dotted lines in Fig. 1. The corresponding position of the other will be readily understood, and their joint force transmits motion to the clock-work through a single connecting-wheel, R. (Shown in dotted lines in Fig. 1.) The clock receives its motion from this intermediate wheel, and thus is impelled by both the springs; but one spring alone, of sufficient power, may be made to serve.

I have mounted the wheels P and Q so that they turn freely on fixed sleeves A′ A′, surrounding the winding-shafts *t t*, the interior of each sleeve being sufficiently large to allow the introduction of an ordinary box-key for winding.

This part of the invention involves an advantage of considerable importance in regard to the success and durability of the clock mechanism, in the fact that the sleeves A′ A′ exclude dust from the clock-work. The sleeves A′ are not only mounted firmly on the clock-framing, but are thereby closed tightly around the respective winding-shafts *t*. The square end of each winding-shaft is freely exposed to receive the key, and there is a liberal hole in the clock-front for the same purpose; but no dust can enter through such holes in the clock-front and lodge among the works of the clock. I esteem this an important point, which will be of value in clocks generally. The exteriors of these sleeves form convenient seats for the two twenty-four-hour wheels P Q; but I am not compelled to use those sleeves as centers. I can mount the wheels on other centers, so long as I mount them entirely separate and distinct from each other.

I believe that my invention will succeed, not only with all the ordinary and extraordinary kinds of "illuminating-gas," properly so called, and with atmospheric air saturated with hydrocarbon vapor, as commonly used in many of the forms of what are known as "gas-machines," but also, with slight and obvious modifications, or without any modifications at all, for the use of various petroleum products in their ordinary liquid forms. A reservoir is introduced at a proper level and kept supplied with the fluid kerosene, naphtha, or the like, which may be caused to flow constantly through the small passage, and at intervals, when a strong light is required, to be allowed to flow through the large pipe, and let on and shut off the illuminating material in the same manner and with a substantially equivalent effect as when used with gas. With such modification it will be well to introduce a short length of wicking between the valve-chamber and the immediate vicinity of the burner. I prefer that the wicking shall not go to the extreme upper end of the burner, but only to a sufficient height to reach that part of the tube where the heat is sufficient to vaporize naphtha, gasoline, or whatever may be the fluid employed.

When the illuminating material is supplied as a dense liquid to be evaporated, the small flame from the small burner a^2 should not only be in position to ignite the vapor when it issues, but also to heat the metal of the burner C, so as to induce a liberal discharge of vapor as soon as the gasoline or equivalent illuminating fluid has risen to that part of the pipe.

The metallic union a^3, by conducting heat freely from the constant flame on the tube a^2 to the tube a^1, is of great importance when thus using a volatile fluid instead of a permanent gas.

It will, of course, be understood that the wheels P and Q, or the gear-wheel R, which connects them, must be of such width as to allow them to remain in gear, notwithstanding their considerable changes of position axially.

I claim as my invention—

1. The separate adjustable cams V W, with their respective arms V′ W′ traversed over separate arcs, in combination with a clock mechanism, and with means for actuating a valve by the latter to let on and suppress the flow of illuminating material to the burner C, as herein specified.

2. The valve B, formed with collars or stops b^1 b^2, in combination with two independently-operated levers, E G, and their controlling means V W, arranged to let on and cut off the supply of illuminating material to a burner, C, as and for the purposes herein specified.

3. A clock mechanism in combination with means for admitting a strong flow of gas or oil to the burner during a predetermined period, and suppressing it for another period, in combination with provisions for maintaining a constant flame in connection therewith for its ready ignition, as herein specified.

In testimony whereof I have hereunto set my hand this 16th day of August, 1877, in the presence of two subscribing witnesses.

GEO. P. GANSTER.

Witnesses:
A. HENRY GENTNER,
CHAS. C. STETSON.