G. P. GANSTER.
Raising and Lowering Gas.

No. 197,772. Patented Dec. 4, 1877.

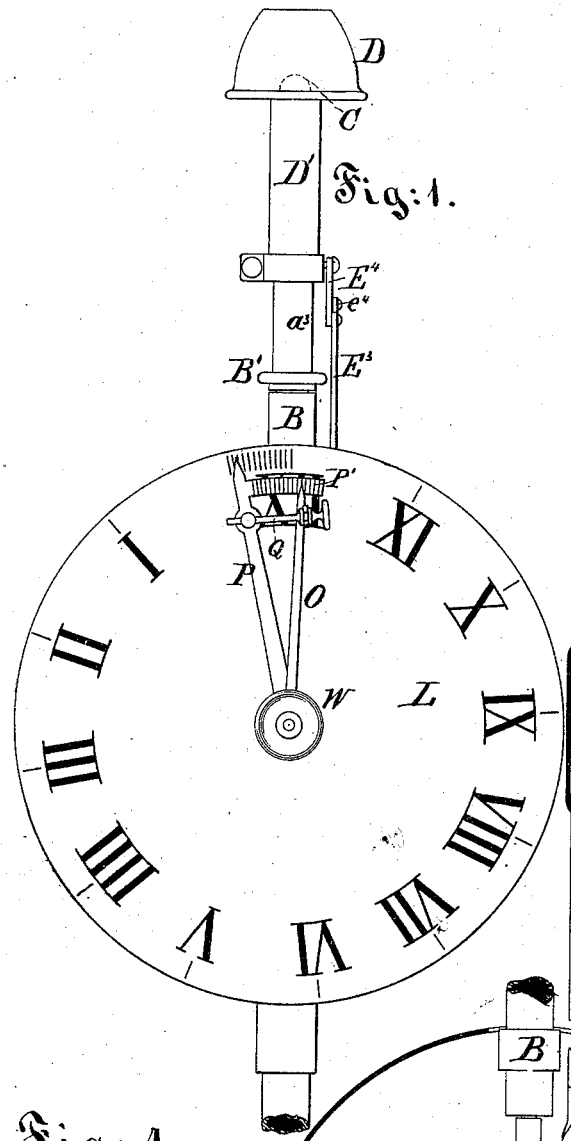

Fig: 1.

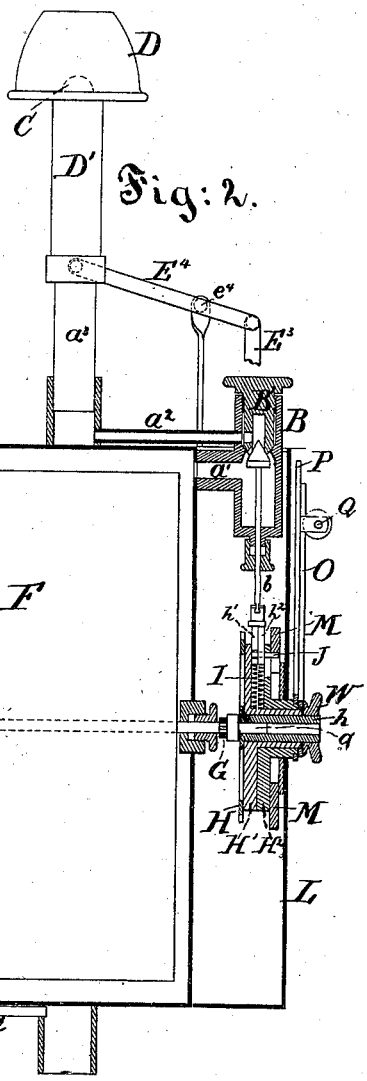

Fig: 2.

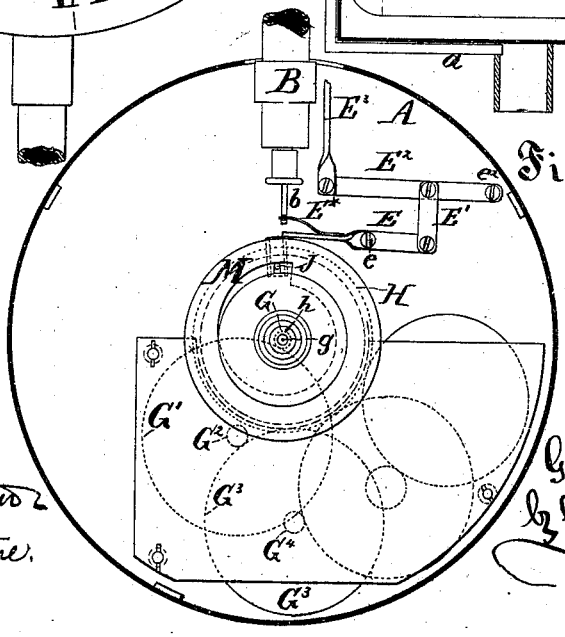

Fig: 3.

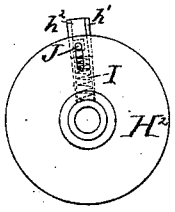

Fig: 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE P. GANSTER, OF READING, PENNSYLVANIA.

IMPROVEMENT IN RAISING AND LOWERING GAS.

Specification forming part of Letters Patent No. **197,772**, dated December 4, 1877; application filed March 14, 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 Gas-Flames, of which the following is a specification:

I have, in a patent issued to me in August, 1872, described a valve for nearly closing the passage of gas, to be closed in the morning and opened at night by a variation in the pressure in the street-main. I provided a shield which encompassed the burner simultaneously with the reduction of the volume of the gas, and have found by trial that an almost inappreciable supply of gas will maintain thus conditioned a sufficient flame ready for immediate enlargement when the volume of gas is again increased.

I employ the same general system in the present invention, but with means for varying the volumes of the flame, and operating the shield independently of any variations in the street pressure.

My present apparatus is automatic and self-controlling. The flame, it will be understood, burns constantly, being contracted to very small dimensions during the day, when the light is not wanted.

The invention is adapted to apply in street-lamps and in all analogous situations. The power is derived from the rotation of a meter-wheel. Provision is made for varying the parts to allow for the increased length of the night in winter, and to adapt the apparatus to changes of burners, and to variations due to wear or other causes which may vary the quantity of gas used per hour.

I will proceed to describe what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a front view. Fig. 2 is a side elevation, partly in section. Fig. 3 is a face view with the hands and dial removed. Fig. 4 represents some of the details detached.

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

A is the casing of a gas-meter. It incloses a quantity of water or of diluted glycerine and a wheel, which may be the ordinary wet-meter wheel, which is revolved by the action of the gas entering through the passage *a* and flowing out through the pipe a^1. B is a casing containing a valve operated by a stem, *b*. B′ is a removable seat, which is formed with a niche on one side, which, when the valve is closed, allows the passage of the small quantity of gas which is required to maintain a minute flame during the day.

The gas having passed the valve B in large quantities during the night when the valve is open, and in small quantities during the day, is conducted by the pipe a^2 to the burner C, where it meets the air and burns. D is the movable shield described in my aforesaid patent of 1872. It is formed with a sleeve, D′, which plays on the upright portion a^3 of the gas-pipe, and is worked by a lever, E^4, which turns on a fixed center, e^4, and is controlled by a link, E^3, from a lever, E^2, which, turning on a fixed center, e^2, is connected by a link, E^1, with the primary lever E, which turns on the center *e*.

The lever E is connected by a spring, E*, with the valve-stem *b*. The valve B is opened by lowering. When the lever E turns in the proper direction to open the valve on the approach of night, the same movement is communicated through the connections E^1 E^2, &c., to the shield D, lowering said shield and exposing the burner in condition for full illumination. The reverse movement of the parts in the morning closes the valve except for the very slight quantity allowed to pass through the notch or niche, and raises the shield D to protect the slight flame until another movement in the opposite direction takes place on the succeeding night.

The mechanism for operating the lever E is adjusted in various conditions by hand at will, but is operated by the rotation of the gas-meter; and, when properly adjusted, the desired contraction and expansion of the flame will occur at the right intervals for a long period.

I provide for operating in both directions, by a reasonably rapid movement, by the following means: The rotation of the meter-wheel F turns the small wheel G in the night rapidly, and in the day-time very slowly, but nevertheless continuously. This wheel G

gears into the larger wheel G^1, which carries a small wheel, G^2, gearing into a large wheel, G^3, which in turn carries a small wheel, G^4, and so on till it results in so slow a rotation of the gear-wheel H that only one complete rotation of the latter is performed in twenty-four hours. This wheel H performs important functions. It carries on its front face two adjustable cams, H^1 H^2, both held by friction or otherwise to the wheel H, and capable of being set forward or backward by means of hands or indexes on the dial. Each of the adjustable wheels H^1 H^2 is provided with a slide, h^1 h^2, moving radially within certain limits, and forced outward by a single spring, I.

The slow rotation of the wheel H with its attachments might be made effective with some success to increase and diminish the volume of the gas and to shield and expose the flame by the simple action of the wheels H^1 H^2 having fixed cams instead of slides, as shown. In other words, if the slides h^1 h^2 were fixed in their extreme outer positions they would act camwise on the lever E at a certain portion of their revolution, and might work the lever E, and produce the desired effect at the proper intervals. But the closing off or contraction of the light would be by degrees as the foremost projection h^1 commenced to act upon the lever E by the slow rotation; but I prefer to contract the light by a more prompt movement.

A radial slot in the front wheel H^2 receives a pin, J, extending forward from the slide h^2, and, as the wheels slowly revolve, is acted on by what I term a "spiral cam," M, mounted in a fixed position in the front. As the wheel H and its connections revolve, the spiral cam M draws inward the pin J, and, when the cams h^1 h^2 approach their contact with the lever E, they are held inward against the force of the spring I by the spiral cam M. Just at the right period the pin J passes the contracted part of the cam M, and is promptly forced upward by the spring I. This movement works the lever E by a prompt motion.

The pin J is extended through both the slides h^1 h^2, but its engagement with the respective slides differs. In the front slide h^2 it is in a small hole, and may be firmly soldered or otherwise secured. In the rear slide h^1 it stands in a slot, as shown in Fig. 2, and in dotted lines in Fig. 4. It compels the slide h^2 to move inward and outward with it, but allows it to be set forward and backward, as required, for adjustment.

The adjustment is effected by turning the wheel H^1 forward or backward, as required, through the medium of the index or hand, which is fast on the proper sleeve. The effect of setting the wheel H^1 backward is to hold up by the slide h^1 the adjacent end of the lever E for a longer period, and thus to maintain the nearly closed or suppressed condition of the flame for a correspondingly increased period. It will be understood that the slides h^1 h^2 move upward simultaneously when the pin J reaches the offset in the spiral cam M. That movement suppresses the light and induces so slow a consumption of gas that the movement of the train of wheels is immediately retarded; but, as the gas continues to burn with a small flame, the wheel H and its connections turn slowly forward. So soon as the rear edge of the slide h^2 passes the end of the lever E, it would allow the valve to open and the light to burst forth in full volume, except for the other slide, h^1, which is set to continue its hold on the lever E for a longer period. As the index is set more or less backward, the connected wheel H^1, and consequently the slide h^1, is set more or less backward. A slight change in the position of the index suffices to make a considerable change in the time of letting on the flame. In the longest days in summer, and especially in high latitudes, as Edinburgh or Christiana, the wheel H^1 should be thus set an eighth of an inch, more or less, behind the adjacent wheel H^2. Thus conditioned the slide h^1 will retain its contact with, and control of, the lever E many hours after the slide h^2 has let go. The gravity of the shield D induces a prompt movement of the lever E and its connections, and light is immediately full on.

The dial L is graduated with wide spaces for the hours of illumination, and with much smaller spaces, proportioned to the slower motion of the indexes, during the non-illuminated or suppressed period.

Many modifications may be made in various parts of the apparatus by any good mechanic without departing from the principle of the invention. Some parts of the apparatus may be used successfully without the others. A dry meter, and various modifications of meters, may be used as a motive power in place of the ordinary wet-meter wheel F represented. The dial or face L may be dispensed with altogether, or may be variously modified and ornamented. I have represented the wheel H^1 as formed with a small sleeve, which carries the index O, and the wheel H^2 as formed with a larger sleeve-inclosing the sleeve of H^1 and connected with the index P. I believe this is the most convenient mode of operating, but any other mode of setting the wheels at will may be substituted.

For some situations, as in the tropics, the apparatus may be worked successfully without provision for adjustment. In such cases I would make the gas always increase its light at about half-past six in the evening, and to contract it again at about half-past five in the morning. But it is obviously convenient to have my adjustment not only as a means of adapting the apparatus to variations in the length of the day, but also to compensate for variations in the aperture of the burner. Supposing four thousand revolutions of the meter-wheel to be allowed per day, the person in charge can adapt the apparatus to consume

this amount of gas, with a considerable variation in the size of the aperture, by slightly increasing or diminishing the length of time during which the flame is strong.

For the more convenient setting of the wheel H^1 to the proper extent in rear of or behind the wheel H^2, I have provided the index P with a short graduated arm, P′, and have provided a screw, Q, tapped through a projection from the index P, and engaging by proper collars with a projection from the index O.

The arm P′ being marked with the proper graduations and figures aids to show at a glance the length of the period during which the light will be suppressed. Turning the screw Q in the direction to draw the indexes P and O together shortens the suppressed or day period. Turning the screw in the opposite direction moves the wheel H^1 farther backward, holds on to the lever E longer, and lengthens the day-period. When the right adjustment has been found by trial, I esteem it of advantage to confine the wheels H^1 H^2 rigidly together and to their driving-wheel H.

W is a thumb-nut on the projecting end of the inner sleeve *h*, by tightening which these several parts are engaged firmly together. I esteem it preferable to rely upon this as the only means of compelling the wheels H^1 H^2 to turn. In other words, the friction I have spoken of as holding them may be made merely nominal, so that they are, in fact, loose wheels, to allow of free adjustment, but are tightened by the pinching thumb-nut W into a firm union when the adjustment is satisfactorily made. All the parts thus turning together may revolve on the extended end of the quick-turning shaft *g;* or I can, if preferred, provide a separate fixed pin, on which these parts may turn.

I claim as my invention—

1. The automatic apparatus described, composed of a gas-burner, a controlling-valve, and operating mechanism, worked by a gas-meter as a motive power, as herein specified.

2. The two independently-adjustable cams H^1 H^2, in combination with each other and with a gas-controlling valve and driving means, as herein specified.

3. The construction of the cam or cams described, with the slide h^1, serving as the cam-projection, actuated by the spring I and spiral cam M, so as to be moved rapidly outward, in combination with a gas-controlling valve and burner, as herein specified.

4. The dial L, graduated unequally, as shown, in combination with mechanism for automatically changing the rate of consumption of the gas, and with the changeable indexes O P and means for adjusting them, as herein specified.

In testimony whereof I have hereunto set my hand this 7th day of March, 1877, in the presence of two subscribing witnesses.

GEO. P. GANSTER.

Witnesses:

THOMAS D. STETSON,

CHAS. C. STETSON.