2 Sheets—Sheet 1.

G. P GANSTER.

Combined Clock and Gas-Regulating Mechanism.

No. 197,771. Patented Dec. 4, 1877.

Fig: 1.

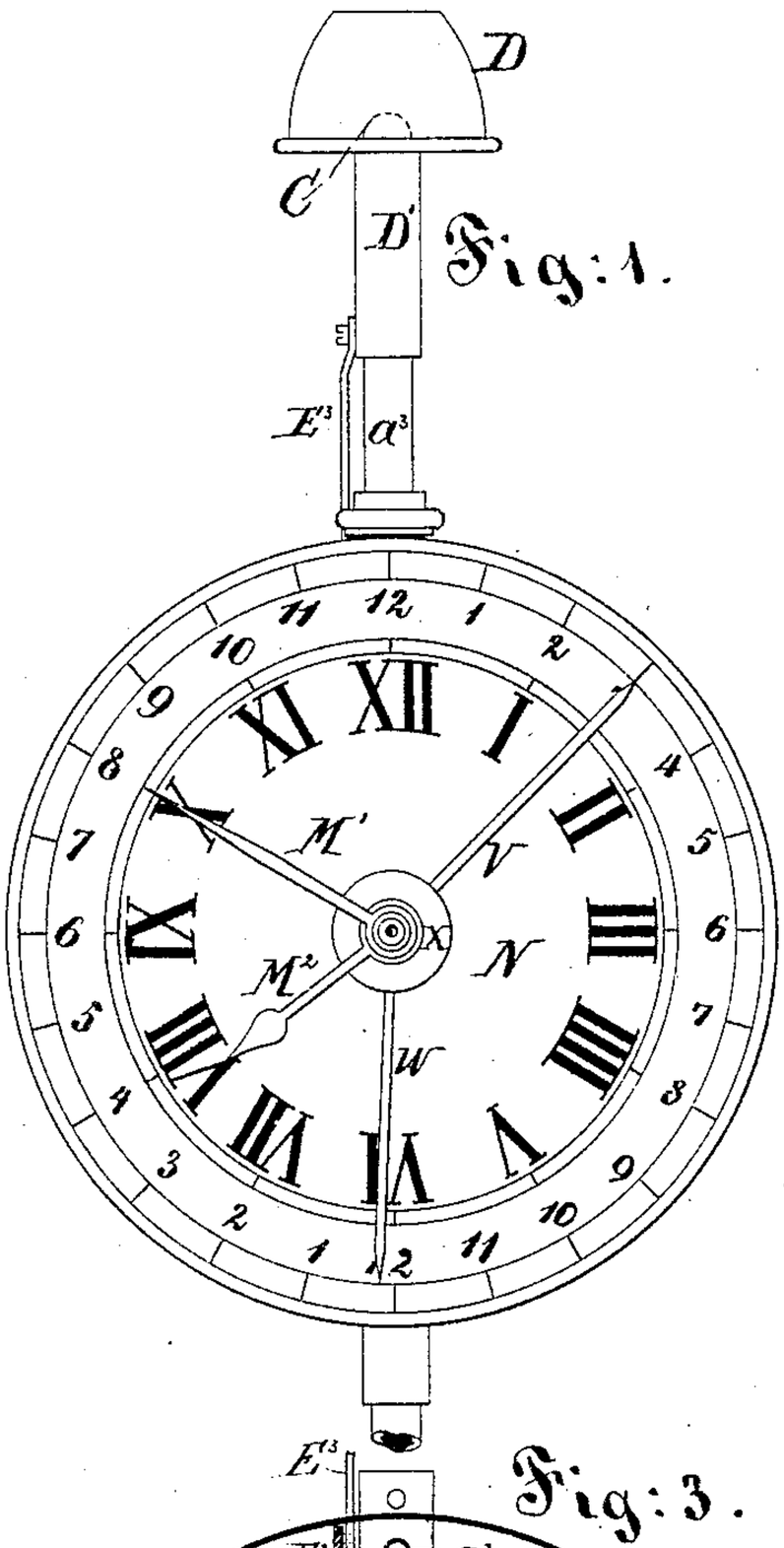


Fig: 2.

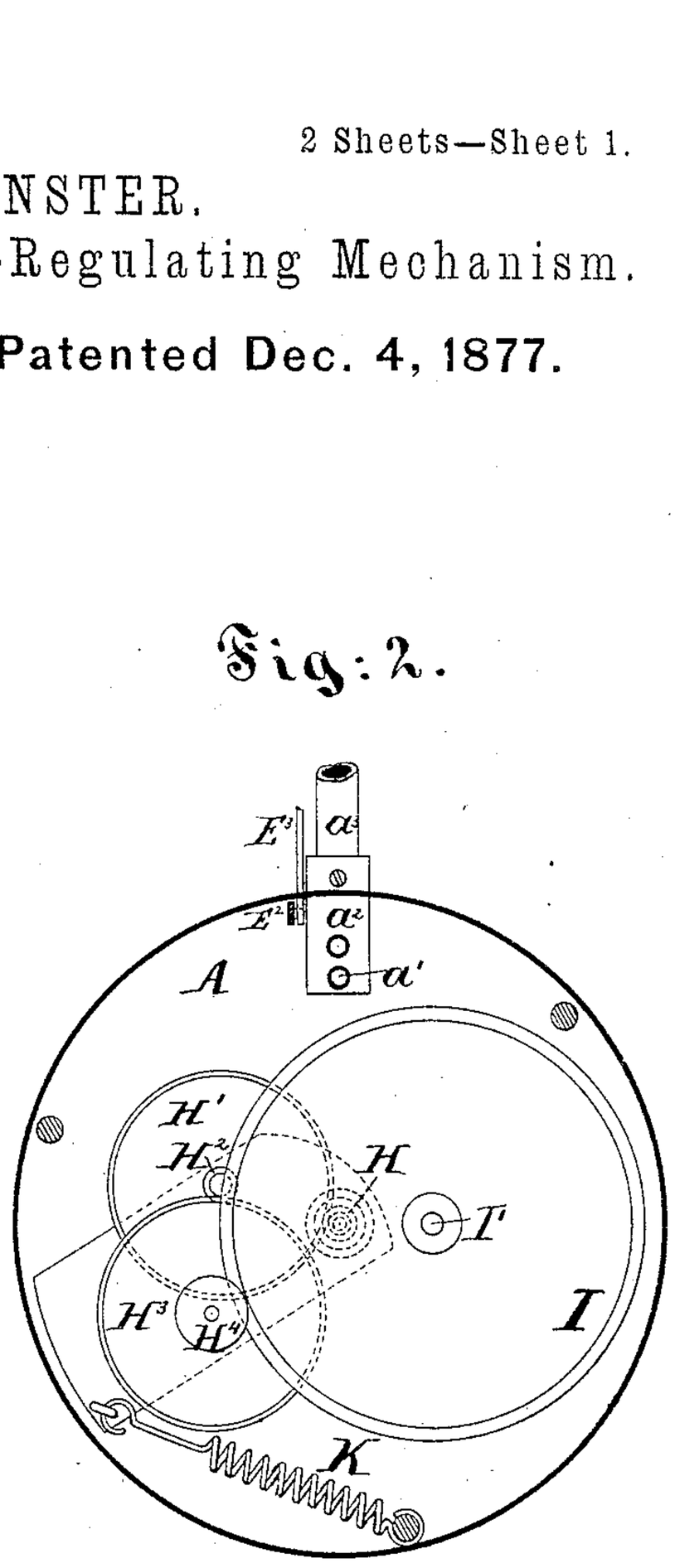


Fig: 3.

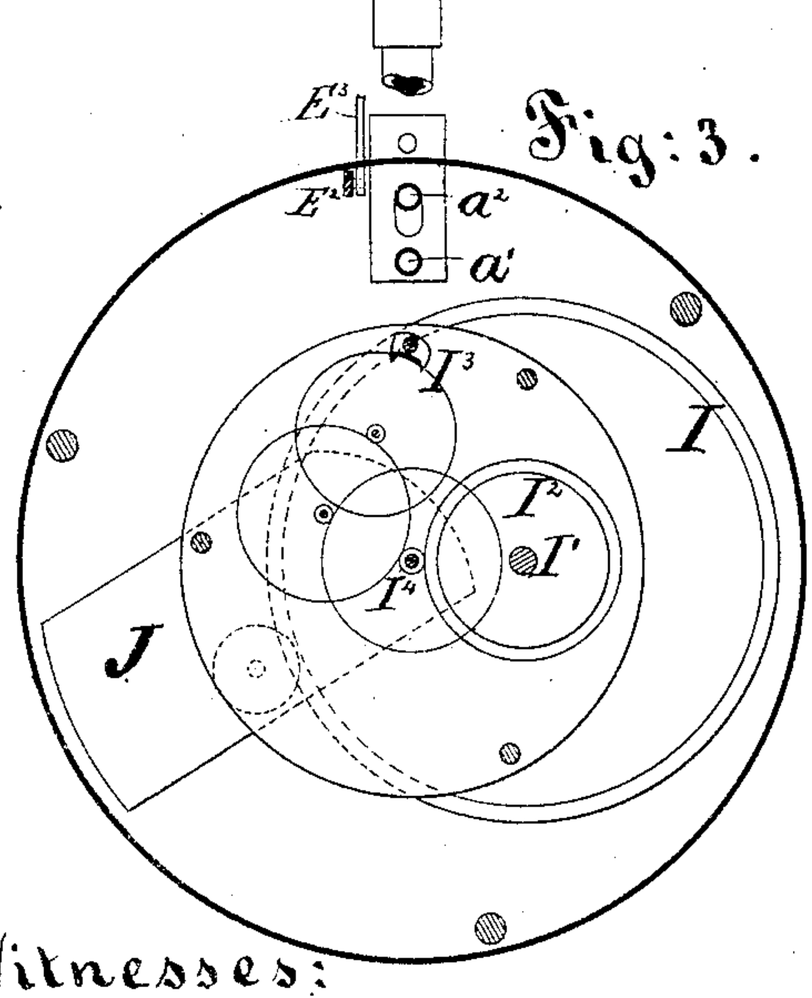
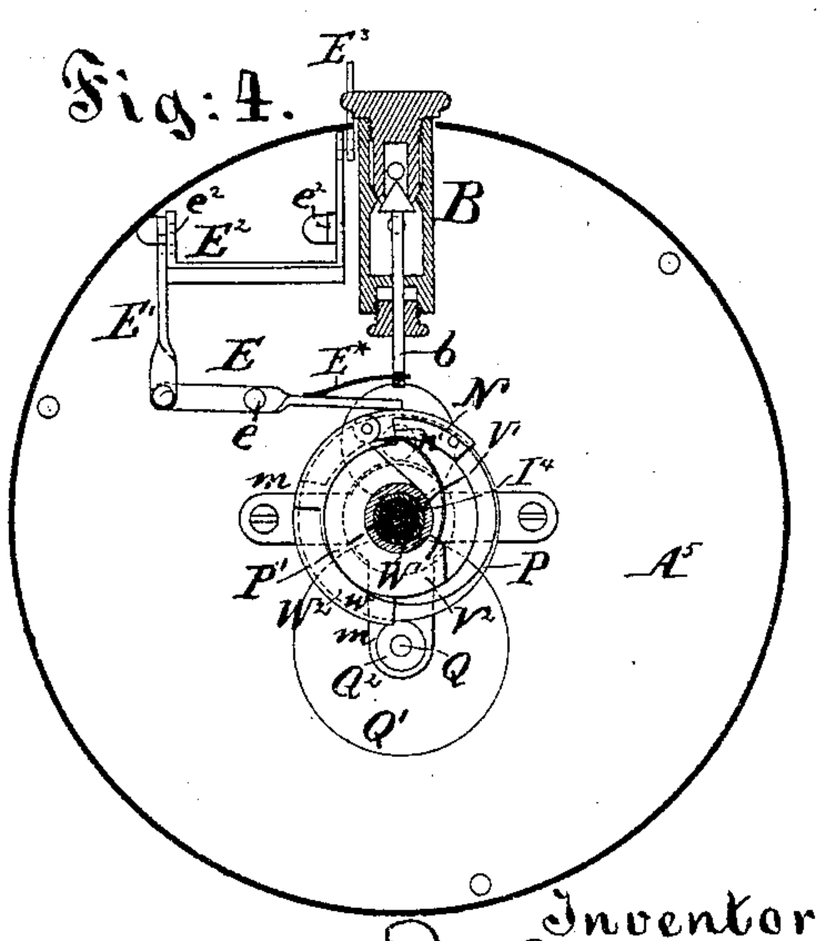


Fig: 4.



Witnesses:

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by his attorney

C. C. Stetson

2 Sheets—Sheet 2.

G. P. GANSTER.

Combined Clock and Gas-Regulating Mechanism.

No. 197,771. **Patented Dec. 4, 1877.**

Fig: 5.

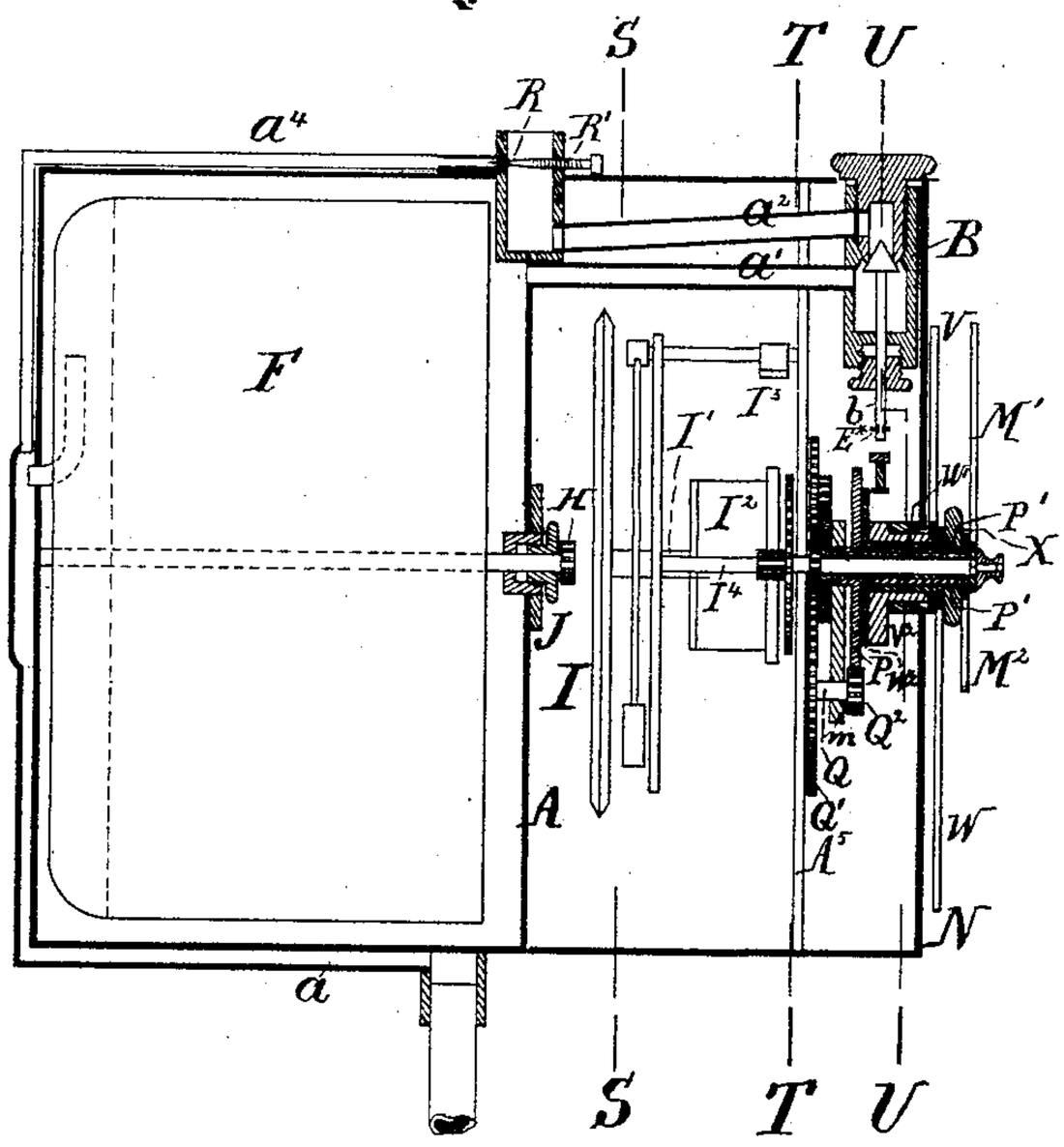
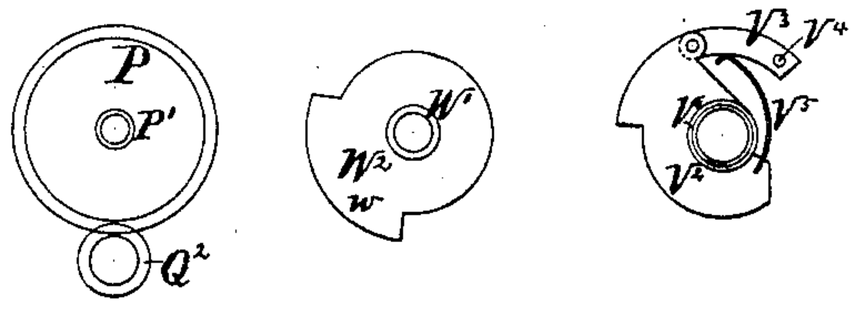


Fig: 6. Fig: 7. Fig: 8.



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UNITED STATES PATENT OFFICE.

GEORGE P. GANSTER, OF READING, PENNSYLVANIA.

IMPROVEMENT IN COMBINED CLOCK AND GAS-REGULATING MECHANISM.

Specification forming part of Letters Patent No. **197,771**, 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 Time-Keepers, and to Lighting and Extinguishing Gas, of which the following is a specification:

I connect a clock with a revolving wheel or analogous mechanism operated by the motion of gas, analogous to the action of a meter. The clock may serve only its ordinary functions of indicating time, giving alarm to awaken persons, and the like; or it may, in the fullest form of my invention, control the development and suppression of the light at certain desired periods.

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. I use the terms "igniting" and "extinguishing" for want of better; but 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 of the whole. Fig. 2 represents a portion of the same, the burner and front parts being removed. It is a section on the line S S in Fig. 5. Fig. 3 is a corresponding vertical section on the line T T in Fig. 5. Fig. 4 is a corresponding section on the line U U in Fig. 5. Fig. 5 is a side elevation, partly in section. The section is in the plane of the shaft. Figs. 6, 7, and 8 represent details detached.

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

I will describe the invention as fully carried out, the gas being caused to operate the clock, and being, in turn, developed and suppressed by the action of the clock.

A is the casing of a gas-meter, and F is an ordinary wet-meter wheel therein. The casing A contains diluted glycerine or other non-freezing and non-evaporating fluid, and the gas enters through the passage *a* and flows out through the passage a^1. B is a valve-casing, containing a valve operated by the stem *b* and closing by a forward movement. This valve closes tightly when lifted, the small quantity of gas required to maintain a minute flame during the suppressed period being supplied by other means.

The gas having passed the valve in the valve-casing B, flows to the burner C through the pipe a^2. D is a movable shield, described in my patent of 1872. It is formed with a sleeve, D^1, which plays on the upright portion a^3 of the gas-pipe, and is of sufficient weight to operate the attached train of levers and links E^1 E^2, &c., in one direction, these parts being operated in the other direction by the clock.

The first lever, marked E, turns on the center *e*, and is connected by a link, E^1, with the lever E^2 turning on the fixed centers or pivots e^2, mounted at such a distance apart as to afford a wide bearing, as will be obvious. This lever E^2 is connected to the arm or extension E^3 from the sleeve D^1.

The lever E is connected by a spring, E*, with the valve-stem *b*. When the lever E turns in the proper direction to lower the

valve-stem *b*, and thus to open the valve, the same movement is communicated through the connections E^1 E^2, &c., to the shield D, lowering said shield, and properly exposing the burner C for full illumination. Simultaneously with this movement the gas-light bursts up into full flame. The reverse movement of the parts at the proper time closes the valve and raises the shield D, to protect the slight flame from any current of air which might extinguish it until another movement of the mechanism in the opposite direction.

a^4 is a small pipe leading from the main pipe *a*, and intended only to convey the small quantity to support the flame during the daytime or the unilluminated portion of the time. Through it the gas flows constantly, and contributes its quota to the magnitude of the flame when in full illumination; but at that period its influence is inappreciable. When, however, the flow of gas through the valve B, and consequently through the pipes a^1 a^2, is entirely stopped, the small quantity flowing through the pipe a^4 is of great importance. The quantity thus admitted is regulated by a long tapering valve, R, operated by a threaded portion, R^1. The valve R, being forced inward or drawn outward by turning it in one direction or the other, enlarges or contracts the aperture, which is thus capable of very delicate adjustment.

During the period while the gas is full on, the meter-wheel F turns in the ordinary manner, and I find it is capable of exerting a sufficient power to operate a clock mechanism. Even if the gas is only used for one or two hours each day, the motion of the meter-wheel during that period is sufficient to wind up a clock-spring, which will cause a clock to run something more than one day. I work a clock mechanism through the medium of a spring thus wound up by the gas.

The rotation of the meter-wheel F turns a small gear-wheel, H, on the exterior of the case. This turns a large wheel, H^1, having fixed to its side a small wheel, H^2, and the latter turns a large wheel, H^3. On the side of the wheel H^3 is a small grooved wheel, H^4, which transmits motion by friction to a large wheel, I, connected with the clock mechanism. The series of wheels from H to H^4 are mounted on a movable frame or plate, J, turning on the stuffing-box of the meter-shaft as a center, and actuated by a spring, K, having sufficient force to hold the small friction-wheel H^4 always firmly in contact with the large friction-wheel I. The contact of these wheels H^4 and I winds up the clock mechanism until the spring is fully wound. Then any further rotation of the gas-meter is allowed by the slipping.

The clock mechanism may be of any ordinary character. I prefer, for obvious reasons, the simplest and most durable construction. The large friction-wheel I may transmit its force to the clock-spring through multiplying-gear, if desired; but my experiments indicate that a direct connection may be allowed, and I have represented it as firmly fixed to the spring-shaft I^1. Each rotation of the wheel I gives one complete rotation to the spring-shaft I^1. The spring is marked I^2.

The clock mechanism I I^1 I^2, &c., up to the escapement I^3 need not be particularly described. The result is a mathematically-uniform rotation of the shaft I^4, which extends out beyond the fixed bearing A^5 farther than usual. It carries two hands, M^1 M^2, in the ordinary manner, the minute-hand, M^1, being mounted directly on the shaft I^4, and the hour-hand, M^2, being geared in the usual manner. They perform their usual functions, and the apparatus may be used with good effect in dwellings to perform simply the ordinary functions of indicating time.

Thus used, my invention performs the functions simply of making the clock self-winding.

The gas may be let on and suppressed by hand, through the aid of any convenient attachment (not represented) to the lever E or its connections.

When my invention is thus worked the passage *a* may be omitted, as also the shield D and its connected levers. The gas may be ignited by ordinary means by hand, and on being suppressed may be turned off altogether.

In the fullest form of my invention all these parts are available. The mechanism for operating the lever E and its connections may be adjusted to run the light all night, turning it down low in the morning, and turning it full on at the approach of evening, as will be ordinarily desired for street-lamps; or it may be adjusted to be turned on at the same or any other hour, and be suppressed at eleven o'clock, or any other desired period.

On the front of the main fixed plate A^5 is a similar fixed framing, *m*, attached as represented, which forms a bearing for a large gear-wheel, P, carrying the sleeve P′. It also forms the bearing for a side shaft, Q, having two gear-wheels, Q^1 Q^2, of greatly differing sizes.

The large wheel Q^1 receives motion from a small wheel on the quick-shaft I^4, and communicates it back again through the small gear-wheel Q^2. The result is a uniform rotation of the wheel P and its sleeve P′ once in twenty-four hours. Any cams mounted on the wheel P or its attached sleeve may be made to operate at any desired hour in the twenty-four by adjusting them forward and backward.

I employ two such cams, with means for independent adjustment of each from the front of the face by means of the handles V W. By setting the handle V at any desired hour, the light will be turned down at that hour. By setting the other handle, W, at any desired hour, the gas will be again let on in full illumination at that hour.

The handle W is fixed on the sleeve W^1, turning loosely on the sleeve P′, and carrying a cam, W^2, which, in its rotation, touches the

lever E, and holds it up until the offset *w* arrives at the end of the lever E. Then it drops and lets on the light.

The valve-stem *b* has been previously shut, and the light suppressed by the action of the other adjustable cam V^2, which is fast on the sleeve V^1, and is turned by the handle V. This sleeve V^1 may be set forward and backward by acting on the handle V, to change the hour when the light is suppressed, at will. X is a thumb-nut threaded on the sleeve P′. By tightening this thumb-nut both the cams V^2 W^2 may be firmly set. To change the period of enlarging or contracting the flame, first the thumb-nut X should be slackened, then the hands V and W, or either of them, changed in position, thereby inducing a corresponding change in the attached cam V^2 or W^2, and then the thumb-nut X should be again tightened, holding all firm, and causing the light to be regularly let on, and turn off at the corresponding moment, until the parts are again adjusted.

The apparatus may work with some success with the cam V^2, simply raising the valve *b* by a gradual motion at the proper hour for suppressing the light; but I esteem it far preferable to suppress the light suddenly. To effect this a loose piece, V^3, is hinged to the cam V^2, and subjected to the operation of a spring, V^5, which exerts a constant force, urging the piece V^3 outward or away from the center. There is a pin, V^4, in the front face of the movable piece V^3, which, as the cam revolves, is subjected to the action of a spiral cam, N^1, formed on the interior of the clock-face N. As the wheel P performs its slow and uniform diurnal rotation the pin W^4, and, consequently, the attachment W^3, is drawn inward by the spiral cam N′, until it reaches the offset *n*′. On passing that the pin is liberated, and the attachment W^3 is moved rapidly outward by the action of the spring W^5.

By the compound construction and operation of these parts I obtain a quick instead of a slow lifting motion of the valve-stem *b* at the right moment.

Many modifications of the details may be made by any good mechanic.

Some parts of the invention may be useful without the others; but I prefer the whole used together.

The handles V and W may be made of a different color from the ordinary clock-hands, and the eye soon becoming accustomed to their presence in the desired fixed positions, they interfere but little with the enjoyment of the ordinary use of the clock—that is to say, the hands proper of the clock indicate time on the dial or clock-face N in the ordinary manner.

I can score the figures or marks indicating the hours for the adjustment of the handles V W either outside of the ordinary clock-figures, as represented, or inside of the latter. It may be more convenient in some cases to have the adjusting-handles and their attachments on the back instead of on the face of the apparatus. In such case the clock-face will show only its usual front; but the inconvenience of being required to adjust the handles for changing the illumination at the back will, I believe, more than counterbalance the advantages of that arrangement for ordinary purposes.

My invention may, in some cases, be used with advantage simply to turn off the gas at a specified hour, leaving it to be ignited by ordinary means. The clock may, in such case and in other cases, be made to serve for more than one burner.

One clock may, under some conditions, serve to extinguish the lights for a large room or entire building.

I claim as my invention—

1. The combination of a clock with mechanism for winding the same by the motion of a gas-meter actuated by the flow of gas to a burner or burners, substantially as and for the purpose herein specified.

2. The clock-dial N, clock-hands M^1 M^2, and actuating-spring I^2, in combination with means H^4 I for winding the same by the motion of gas, a provision for slipping to avoid overwinding, one or more gas-burners, C, a provision, a^4, for allowing a continuous small flow of gas, and a shield, D, for protecting the flame when reduced, all combined and operating as and for the purposes herein specified.

3. A motor actuated by the motion of gas, a clock wound up thereby, means for contracting the volume of the flame at a certain period and for enlarging it at another period of time, both determined by the clock, and means for adjusting one or both periods at will, as herein specified.

4. In combination with a clock actuated by the motion of gas, and serving to enlarge and contract the flame at adjustable periods, the dial N, ordinary clock-hands M^1 M^2, adjusting-handles V W, and pinching-nut X, the latter being adapted to hold the adjustable parts rigidly, 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.