(No Model.)

3 Sheets—Sheet 1.

G. E. THAXTER.

MACHINE FOR LIGHTING AND EXTINGUISHING GAS.

No. 381,440. Patented Apr. 17, 1888.

Fig. 1.

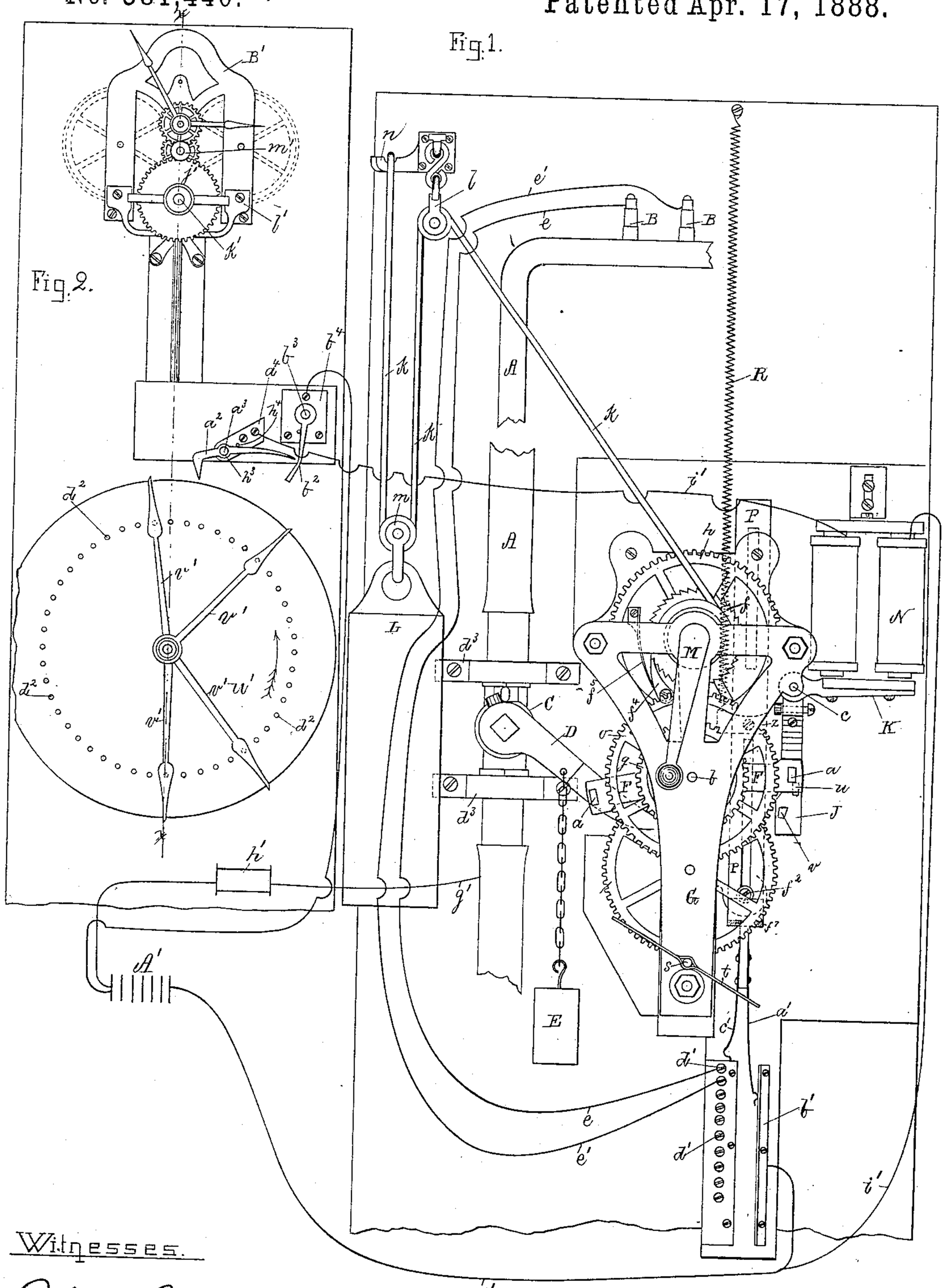

Fig. 2.

Witnesses.

Robert Wallace.
Arthur E. Jones.

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his atty.

(No Model.)

3 Sheets—Sheet 2.

G. E. THAXTER.

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Fig. 4.

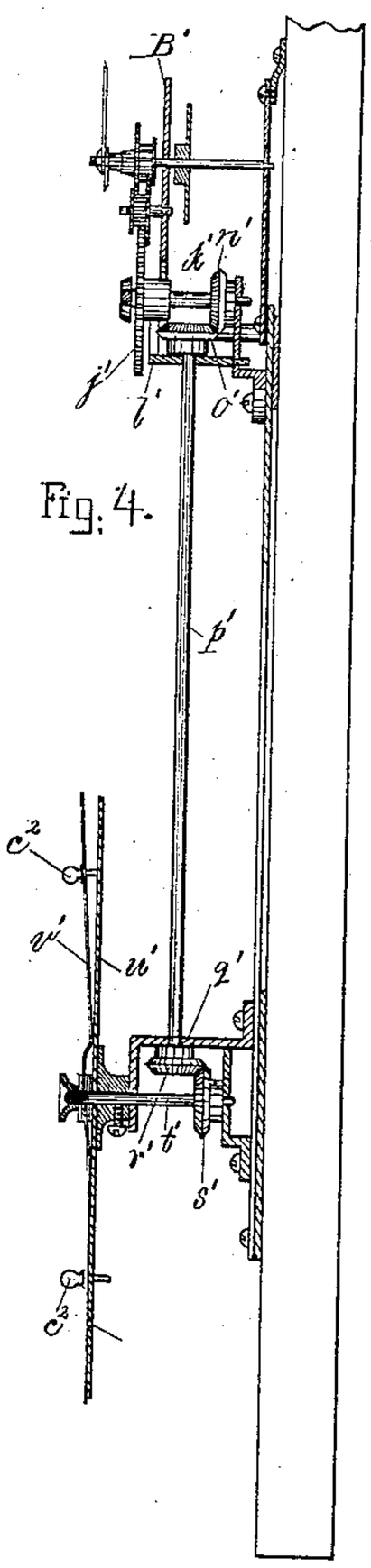
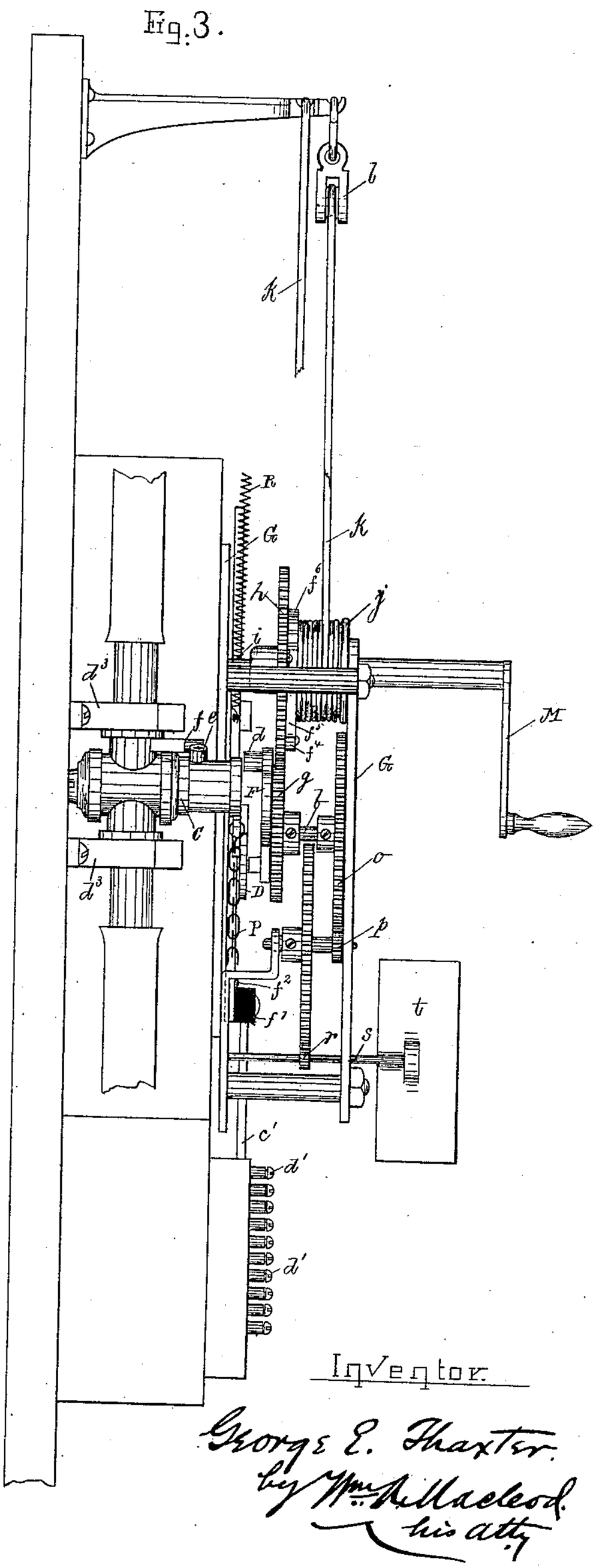


Fig. 3.



Witnesses.

Robert Wallace.
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MACHINE FOR LIGHTING AND EXTINGUISHING GAS.

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Fig. 5

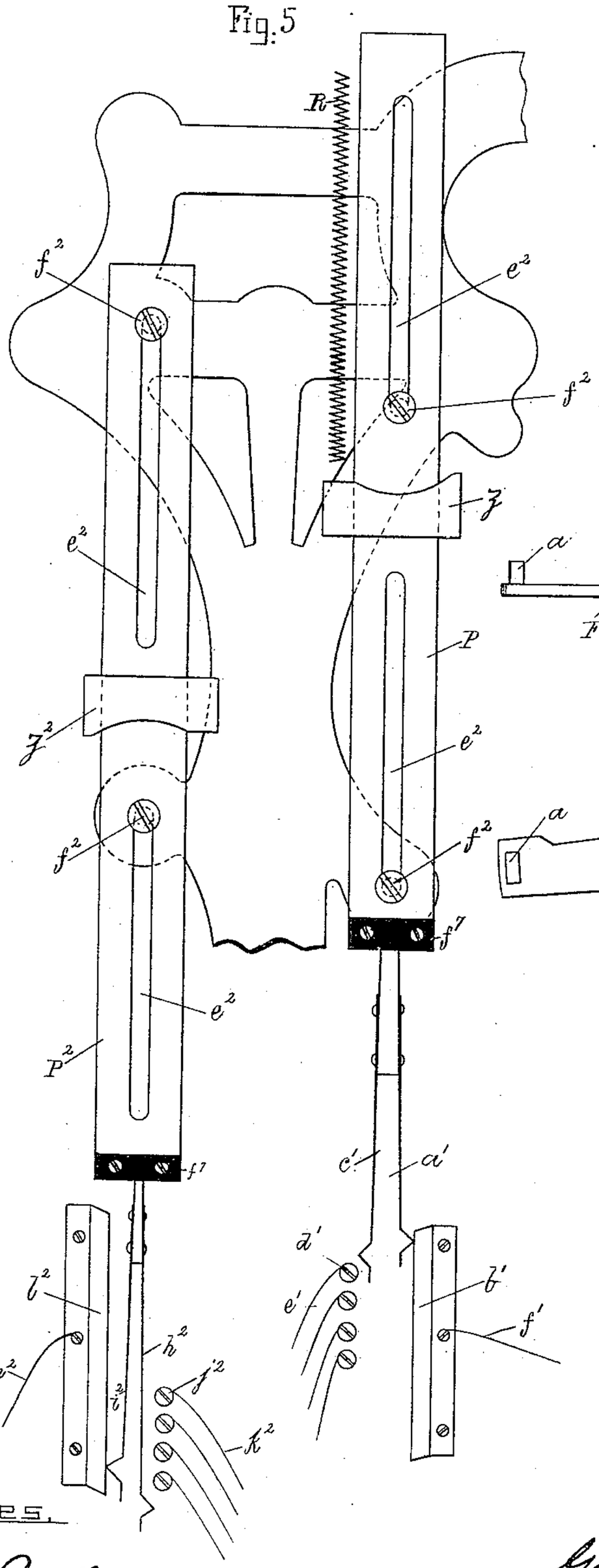
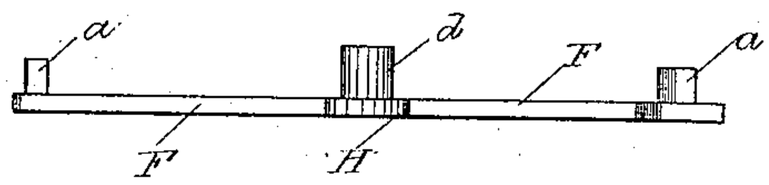


Fig. 6.



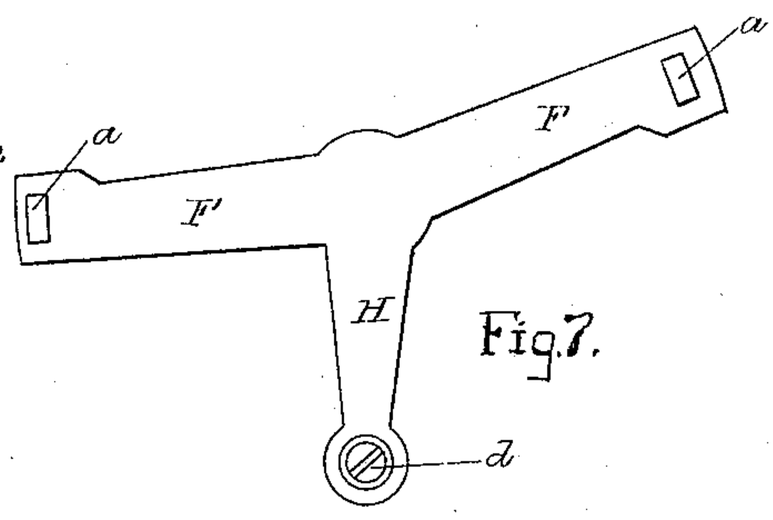


Fig. 7.

Witnesses.

Robert Wallace,

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Inventor.

George E. Thaxter.

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UNITED STATES PATENT OFFICE.

GEORGE E. THAXTER, OF BOSTON, MASSACHUSETTS.

MACHINE FOR LIGHTING AND EXTINGUISHING GAS.

SPECIFICATION forming part of Letters Patent No. 381,440, dated April 17, 1888.

Application filed June 9, 1887. Serial No. 240,710. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. THAXTER, of Boston, county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Machines for Lighting and Extinguishing Gas, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof, in which—

Figure 1 is a front view of that part of the apparatus which turns the gas on and off and which makes the circuit which lights the gas at the burners, showing also the wire-connections. Fig. 2 is a front view of the clock apparatus by means of which the circuit is closed at desired times and the apparatus shown in Fig. 1 caused to operate. Fig. 3 is a side view of the apparatus shown in Fig. 1, viewed from the left of said figure. Fig. 4 is a longitudinal section on line *x x*, Fig. 2, viewed from the right of said figure. Fig. 5 is a front view of a modified form of the circuit-making apparatus shown in the lower part of Fig. 1, showing the device as modified when it is desired to use it in connection with automatic lighters and extinguishers. Figs. 6 and 7 are a plan and side view, respectively, of the actuating-lever.

The object of my invention is the construction of an apparatus by which gas jets or burners may be automatically lighted and extinguished at any given times; and it consists in the mechanism hereinafter described, operated by a weight or other suitable power controlled by an electro-magnet, the circuit of which is made or broken by a device actuated by clock mechanism, as also in the combination and arrangement of the various devices to produce the desired result.

I will describe my invention as illustrated in the accompanying drawings, using like letters of reference to indicate like parts.

A is a gas-pipe, which supplies only the burners which it is desired to extinguish. It case it is desired to extinguish only a part of the lights which are supplied by the pipe A, then the gas cannot be turned off by the machine; but the lights which the machine is desired to operate upon may be supplied with automatic burners, which may be operated by the machine.

B represents gas jets or burners, which are on the gas-pipe A. A faucet is provided in the pipe A at C. This faucet may be of ordinary construction, and is adapted to open or close the pipe. A lever, D, is provided for turning the faucet, and a weight, E, attached to the lever operates, when the free end of the lever is unsupported, to pull the lever down and open the faucet in the pipe. The lever D is prevented from falling below a given point by the projection *e* on the valve coming in contact with a rigid projection, *f*, on the pipe. (See Fig. 3.) When the light is to be extinguished, the lever D is raised, thus cutting off the gas-supply from the burners. The lever is raised and held in its raised position by contact with a projection, *d*, on the end of the arm H of the lever F. The lever F is centrally set on a shaft, *b*, journaled in the frame G. Both ends of the lever F are provided with projections *a*, and each end acts alternately with the other as the lever revolves with the shaft *b*. The movement of the lever F is stopped when one of the projections *a* comes in contact with a projection on the vertical lever J, which is rigidly secured to the armature K, forming a bell-crank lever, which is pivoted in the frame G at *c*. (See Fig. 1.)

For the purpose of moving the lever F when the projections *a* are not in contact with the projections on the vertical lever J, I provide the shaft *b*, on which the lever is secured, with a gear, *g*, (see Fig. 3,) which meshes with a gear, *h*, fast on a shaft, *i*, journaled in the upper part of the frame G. The shaft *i* carries a drum, *j*, which receives the cord *k*. The drum is free to move in one direction on its shaft independently of gear *h* to allow of its being wound up, but moves with the gear *h* in the opposite direction by reason of the pawl f^4, pivoted to the face of the gear and held in contact with the ratchet f^6 on the drum by the spring f^5. The cord passes from the drum over a sheave, *l*, secured in a convenient position above the drum, and thence under a pulley, *m*, which sustains a weight, L. The end of the cord then passes upwardly to a convenient point, as *n*, where it is secured. When the cord is wound up on the drum by means of the crank M, the weight L acts constantly to revolve the drum, thus revolving the gear *h*,

which meshes with the gear *g* and causes the shaft *b* and lever F to revolve. In place of the weight and drum a spring or other suitable device for driving the gear *h* may be employed. A train of reducing-gears, *o p q r*, connecting with the shaft *s*, to which is secured the fan *t*, (see Fig. 3,) is employed to reduce or regulate the speed of the shaft *b*, which carries the lever F.

If, now, the magnet N be energized by the passage of an electric current, it will attract the armature K, thus throwing the vertical lever J outwardly away from the lever F and moving the projection *u* on the lever J out of contact with the projection *a* on the lever F. The weight L, acting through the drum mechanism above described, now causes the lever F to move until its projection or stop *a* comes in contact with the lower projection, *v*, on the lever J, which it will do if the armature K continues to be attracted by the magnet. If, however, the armature, when attracted to allow the lever F to pass the projection *u*, is immediately allowed to fall again, the projection *v* on the lever J will be out of the path of the projection *a* on the lever F and the lever will continue to revolve. The two projections *u* and *v* on the lever J are for the purpose, when the armature is attracted, of allowing the lever F to move from the projection *u* to the projection *v*, thus moving the arm H out of contact with the raised lever D, allowing the lever D to drop into the position in which it is shown in Fig. 1. When the lever D drops, it opens the faucet in the gas-pipe and allows the gas to fill the pipe and the burners, so that the burners are all ready to light when a spark is communicated to them. As soon as a sufficient time has elapsed to allow the burners to fill with gas the magnet-circuit is broken, allowing the armature K to drop, thus moving the projection *v* out of contact with the projection *a* on the lever F and allowing the lever to rotate, which it does until the opposite end of the lever comes in contact with the projection or stop *u*. This rotation of the lever F throws the projection *d* on the arm H of the lever into contact with the cross-piece *z* on the circuit-maker P, forcing the circuit-maker P downwardly against the resistance of the spiral spring R. As the circuit-maker P passes downward, the spring *a'* is in contact with the strip *b'*, connected with one pole of the battery in the lighting-circuit, and the spring *c'* comes in contact successively with the binding-posts *d'*, each of which is in connection with a burner, thus making the circuit with each burner and lighting it in the well-known manner. The contact-springs *a' c'* are mounted in a block of hard rubber, *f'*, or other insulating material, in order to insulate them from the piece P and connected parts. As soon as the circuit-maker P has passed downward far enough to make contact with each of the burner-wires *e'*, the projection *d* leaves the cross-piece *z*, and the spiral spring R acts to raise the part P up to its normal position ready for the next revolution of the lever F when the burners are to be again lighted.

When the lights are to be extinguished, the magnet N is again energized for an instant and frees the lever F from the stop *u*, thus allowing the further movement of the lever F through a half-revolution, during which the projection *d* is brought under the faucet-lever D, thus raising the lever, closing the faucet, and shutting off the gas from the burners.

The battery-circuits are as follows: A' is the battery, the lighting-circuit of which is represented by the wire *f'*, which passes from the zinc of the battery to the plate *b'*, where contact is made by means of the springs *a' c'* with the binding-posts *d'*, from which the wires *e'* extend to each burner B. Thence the circuit is made by the gas pipe to the wire *g'* through the spark-coil *h'* to the carbon of the battery. For the magnet-circuit the wire *i'* passes from the zinc-wire of the battery to the electro-magnet, and thence to the contact-making device of the clock mechanism, (see Fig. 2,) hereinafter to be described, and thence to the carbon of the battery.

The magnet-circuit which controls the movement of the armature K, and thus controls the operation of the machine, is made and broken by means of the mechanism shown, Figs. 2 and 4, which is operated by a clock, and so arranged as to be capable of being set so as to operate when the clock-hands indicate a given time.

A clock of common construction, (shown at B',) is provided with a gear, *j''*, set on an arbor, *k'*, journaled in a frame, *l'*, secured to the clock support or frame. The gear *j''* meshes with one of the pinions *m'* of the clock mechanism, and on the arbor *k'* is secured a beveled pinion, *n'*, (see Fig. 4,) which meshes with a pinion, *o'*, fast on the upper end of the vertical shaft *p'*. The shaft *p'* is supported at its upper end in the frame *l'* and at its lower end in the frame *q'*. The lower end of the shaft *p'* is provided with a beveled pinion, *r'*, which meshes with the beveled pinion *s'*, fast on the arbor *t'*, which is set in the frame *q'*. (See Fig. 4.) On the arbor *t'* is secured a dial, *u'*, which revolves with the arbor. The size of the gear *j''* is such that the dial *u'* will revolve once while the hour-hand of the clock is passing around the clock-dial twice—that is, the dial *u'* is a twenty-four-hour dial. This arrangement is desirable, obviously, to simplify the mechanism, since the lights are usually to be lighted and extinguished at regular times during every twenty-four hours. On the dial *u'*, the face of which is graduated to represent the different hours, as shown, Fig. 2, are the hands *v'*, which are set on the arbor *t'* of the dial, as shown. The ends of these hands *v'* project slightly beyond the periphery of the dial, so that as the dial revolves, which it does in the direction indicated by the arrow, Fig. 2, they will come in contact with the contact-lever a^2, which is pivoted at a^3 to the plate a^4, directly above the dial *u'*, and in the same plane with

the hands v'. When a hand v' comes in contact with the lever a^2, the free end of the lever is moved downwardly into contact with the opposing lever, b^2, which is pivoted at b^3 to its plate b^4, thus making the magnet-circuit and raising the armature K. As soon as the hand v' has passed the contact-lever a^2, the lever flies up again out of contact by the action of the torsional spring h^3 on the pivot of the lever, which tends to hold the lever normally against the stop-pin h^4.

Four hands v' are set on the dial u'. One pair of these hands lights and extinguishes the gas in the evening and the other pair lights and extinguishes the gas in the morning. Should it be desirable to render any one or more of the hands inoperative—as, for example, if it were not desired to light the gas in the morning—this may be easily accomplished by springing the outer ends of the hands away from the dial u' out of the plane of the lever a^2, as shown, Fig. 4. For the purpose of holding the hands away from the dial each hand is provided with a pin, c^2, which projects through the hand and through a hole, d^2, in the dial u'. By raising the end of the hand, so as to raise the pin c^2 out of the hole in the dial, and moving the hand slightly in either direction, so as to allow the pin c^2 to rest on the face of the dial between the holes, the hand will be held off the face of the dial and out of the plane of the contact-lever a^2. The pin c^2 is also necessary to hold the hand v' rigidly when it comes in contact with the lever a^2 in order to operate the lever.

When automatic electric burners are employed, the faucet C and lever D are not necessary, as the gas is shut off at the burners by the well-known automatic devices. It is necessary, however, to modify the machine when automatics are used in the manner shown, Fig. 5. Another circuit-maker, P^2, is arranged in the frame in the same manner as the circuit-maker P—that is, it is provided with slots e^2, cut lengthwise thereof, which receive the pins f^2, set in the frame. These pins, acting in the slots e^2, guide the piece P^2 in its vertical movement. The piece P^2 is provided with a cross-piece, z^2, adapted to receive on its under side the projection d of the arm H as the arm revolves. The piece P^2 is normally down, as shown, Fig. 5, and it is provided at its lower end with contact-springs h^2 i^2, which serve to make contact between the binding-posts j^2, which are connected with the burner-wires k^2 and the plate l^2, which is connected with the battery-wire m^2, and which is in contact with the spring i^2. As the lever F revolves, the projection d of the arm H is carried under and in contact with the piece z^2 and acts to raise the circuit-maker P^2, just as when automatics are not used it acts to raise the lever D and shut off the gas. The upward movement of the piece P^2 makes contact between the binding-posts j^2 and the plate l^2, thus operating the automatic burners and extinguishing the lights. After the projection d passes the cross-piece z^2, the part P^2 drops by its own weight into its normal position, passing downward and making a second contact with the binding-posts j^2, thus insuring the putting out of all the lights.

The gas-pipe may be secured on either side of the faucet C by bands d^3, which serve to hold it firmly to the wall or other rigid support and prevent it from vibration. (See Figs. 1 and 3.) These supporting-bands d^3 may not be required if the pipe is rigid enough without them.

What I claim is—

1. The combination, with clock mechanism, a contact making and breaking device, and an electro-magnet in circuit with said device, of a lever, as F, and its actuating mechanism, a lever, as J, on the armature of the magnet, whereby the movements of said lever F are controlled, a circuit-maker operated by said lever F, and gas-burners in the lighting-circuit, substantially as shown and described.

2. The combination, with the faucet C and its operating-lever, of the lever F, provided with an arm, as H, the armature K and its lever, provided with stop u, and the reducing-gears and their operating drum and weight by which the lever F is actuated, substantially as shown and described.

3. The combination, with the faucet and its lever and weight, of the lever F, the reducing-gears and their operating-drum, and the armature and its lever, provided with a stop, as v, substantially as shown and described.

4. The combination, with an electro-magnet and its armature and means for making and breaking its circuit at given times, of a lever secured to said armature and provided with projections or stops, as u v, the circuit-maker, as P, and the lever F, having an arm, as H, arranged to rotate when the lever F is not in contact with a stop, u v, on the armature-lever, whereby the lighting-circuits are closed, substantially as shown and described.

5. The combination, with a circuit having an electro-magnet therein and a contact making and breaking device, of clock mechanism and a dial, as u', connected therewith, said dial having a series of perforations, d^2, and pointers v', provided with pins to enter said perforations, whereby said pointers may be secured at any point on the dial or may be raised from the surface thereof, substantially as shown and described.

GEORGE E. THAXTER.

Witnesses:
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ROBERT WALLACE.