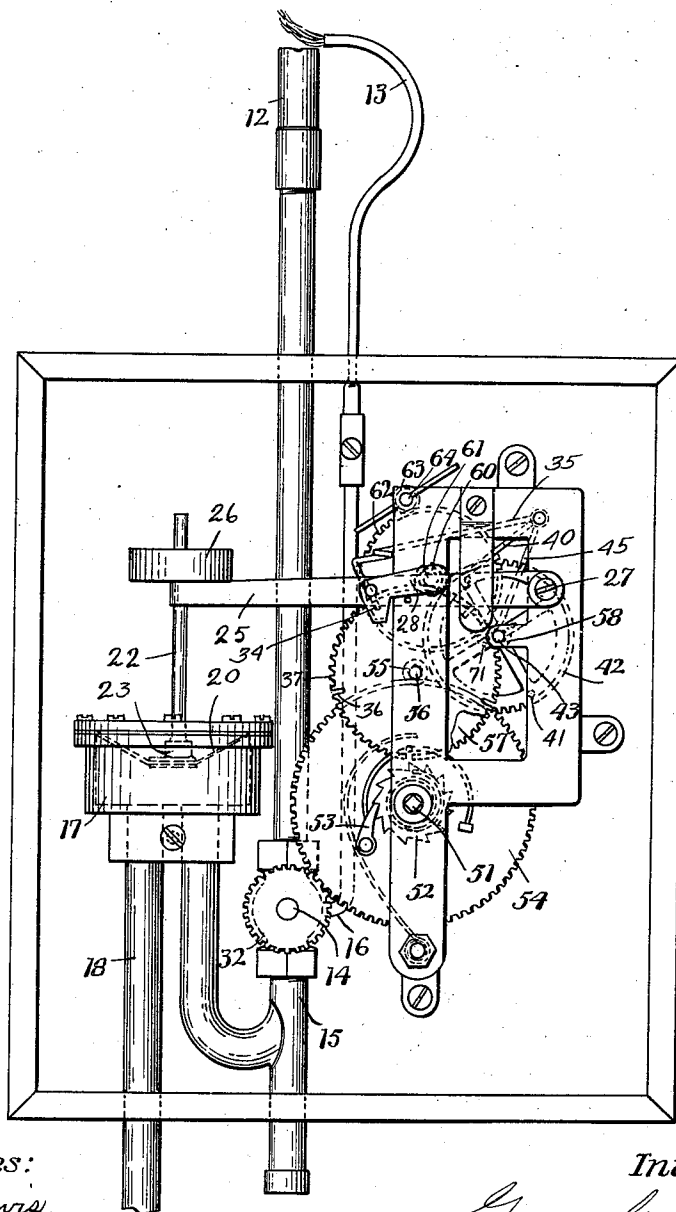


G. C. INNIS.
 AUTOMATIC GAS LIGHTER AND EXTINGUISHER.
 APPLICATION FILED SEPT. 16, 1911.

1,019,159.

Patented Mar. 5, 1912.

2 SHEETS—SHEET 1.



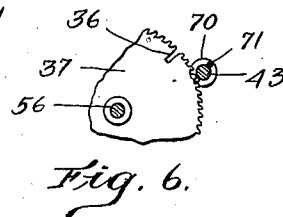
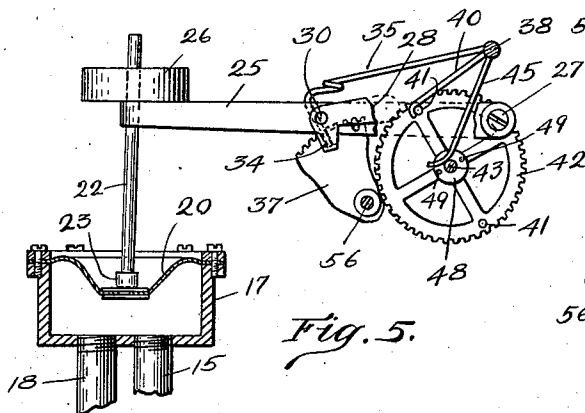
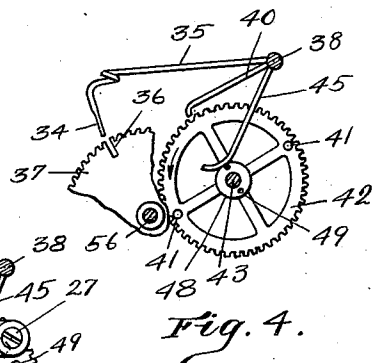
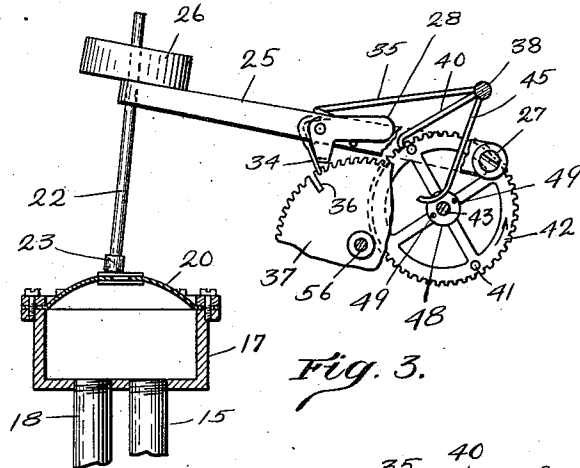
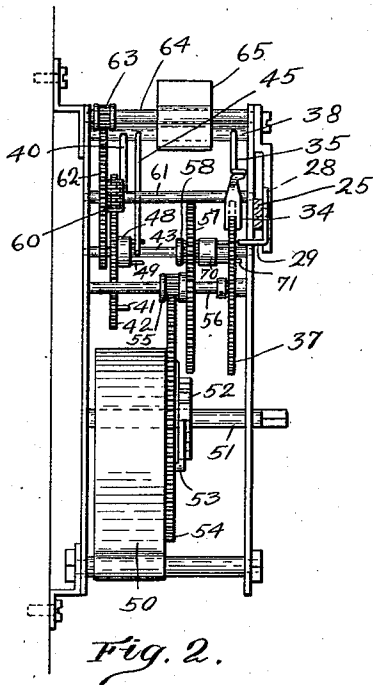
Witnesses:
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Fig. 1

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1,019,159.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE C. INNIS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM H. KIMBALL,
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AUTOMATIC GAS LIGHTER AND EXTINGUISHER.

1,019,159.

Specification of Letters Patent.

Patented Mar. 5, 1912.

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To all whom it may concern:

Be it known that I, GEORGE C. INNIS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Automatic Gas Lighters and Extinguishers, of which the following is a specification.

This invention relates to improvements in automatic gas-lighters and extinguishers of the type involving the employment of a motor for operating the gas-cock to turn on and off the gas, and means operated by an intentional increase in the gas pressure to release said motor permitting it to operate; and the invention has for its object improvements in the construction of the motor and in the means employed to release it, and in an operating-device for said releasing-means adapted to be operated by an intentional increase in the gas pressure to operate said releasing-means to release the motor, and then to become disengaged therefrom permitting return of both the operating-device and of the releasing-means to normal or engaging position independently of each other, and also in controlling-means for the releasing-means, whereby the releasing-means is permitted to resume its normal or engaging position at the end of a predetermined period of time and stop the motor. The provision of releasing-means and an operating-device therefor, each adapted to resume its normal or engaging position independently of the other enables the motor to be released upon an intentional increase in the gas pressure and to be stopped at the end of a predetermined period of time regardless of the gas pressure.

The invention has for another object the construction of the releasing-means for the motor and operating-device therefor, whereby the releasing-means will not be operated to release the motor on the usual fluctuations in the gas pressure.

Figure 1 is a front elevation of an automatic gas lighter and extinguisher embodying this invention. Fig. 2 is a side elevation of the motor, the releasing-means therefor, the operating-device and controlling-means for said releasing-means. Fig. 3 is a fragmentary detail of the motor, the releasing-means therefor, the operating-device and controlling-means for said releasing-means, the parts being in the position they will occupy when the releasing-means has been operated to release the motor and the motor has started. Fig. 4 is a detail of the releasing-means for the motor and controlling-means for the releasing-means, the parts being in an intermediate position. Fig. 5 is a detail similar to Fig. 3, illustrating a movement of the operating-device caused by usual fluctuations and not an intentional increase in the gas pressure. Fig. 6 is a detail to be referred to.

12 represents the main gas burner; 13 the pilot burner; 14 the gas-cock which is connected in a pipe 15, leading to the main burner, and 16 a pipe leading from the side of the gas-cock to the pilot burner.

The gas-cock 14 is constructed in any well-known manner whereby when in one position it is adapted to open a way to the main burner and close the way to the pilot burner, and when in another position to open the way to the pilot burner and close the way to the main burner.

The pipe 15 is bent, and one of its ends is extended to a cylindrical or other shaped receptacle 17, which serves as a gas reservoir, and a pipe 18 leads from said receptacle 17 to a main gas supply-pipe, not shown.

The top of the receptacle 17 is closed by a flexible diaphragm 20, which is adapted to be moved by the pressure of the gas in the receptacle, that is to say, to expand and contract, it being made of thin sheet metal or other suitable material, which is tightly connected around its edge to the top of the receptacle by means of a gas-tight joint. An upright stem 22 is arranged above the diaphragm 20, having a flat end piece 23 to rest upon or otherwise engage the diaphragm and said stem extends up through a hole in one end of a lever 25, and is fastened to said lever, and on its upper end portion which projects above said lever a suitable weight 26 is arranged, which is removable in order that weights or different sizes may be employed, as may be required.

The lever 25 is pivoted at 27 to the frame, and in order that it may serve as the operating-device for the releasing-means for the motor, it has pivotally connected to it a dog 28, one end of which is bent at right angles to its main portion, as at 29, see Fig. 110

2, and its main portion is weighted to overbalance its bent end portion, so as to lift said bent end portion and by resting upon a pin which projects laterally from the side of the lever normally holds the bent end portion 29 in engaging position.

The releasing-means for the motor consists of an arm 40, secured to a rock-shaft 38, said arm normally engaging one or another pin 41, projecting laterally from one of the train wheels of the motor, as the gear-wheel 42 for instance, there being two pins 41 arranged on said wheel. When said arm is moved to disengage a pin 41 the motor is released and permitted to operate. Controlling-means are provided for holding said releasing-arm in its disengaged position, whereby it is permitted to resume its normal or engaging position only at the end of a predetermined period of time, and said controlling-means comprises two elements, one consisting of an arm 35 attached to said rock-shaft 38 and a radially slotted gear-wheel 37 with which it coöperates, which is adapted to be advanced step by step by means operated by the motor, and the other consisting of an arm 45 attached to said rock-shaft 38 and a hub 48 bearing pins 49, which is driven by the motor, the pins successively engaging and lifting the arm. The releasing-arm is adapted to be moved to disengage the gear-wheel 42 by the aforesaid operating-device, and for the accomplishment of this result the operating-lever 25 is designed to engage one of the arms which is secure to the rock-shaft 38 for the purpose of moving the arm to rock the shaft and thereby move the other arms which are attached to said shaft. The arm 35 is herein selected to be engaged and moved by the operating-lever, and for the accomplishment of the result the end 29 of the dog on said operating-lever is arranged to extend beneath the end 34 of said arm 35, so that when said operating-lever is lifted it will engage and raise the arm 35 and thereby rock the shaft 38 and in turn move the releasing-arm 40 to disengage the gear-wheel 42, and also move the arm 45. The end 29 of the dog normally occupies a position considerably below the end 34 of the arm 36, as shown in Fig. 1, so that considerable upward movement of the operating-lever is required to engage and lift the arm 35 to release the motor, and such provision is purposely made so that the usual fluctuations in the gas pressure will not operate to release the motor, an intentional increase in the gas pressure being required, but upon the occurrence of such intentional increase in the gas pressure the operating-lever will be moved sufficiently to cause the arm 40 to release the motor. As the operating-lever is raised the dog moves in the arc of a circle about the pivot center 27,

and the arm 35 swings in the arc of a circle about the rock-shaft 38 as a center, and owing to these differences in centers the dog is caused to disengage the end 34 of the arm 35, as shown in Fig. 3, when in elevated position, thereby placing the releasing-means which has thus been operated to release the motor entirely under the control of the motor, and furthermore, permitting the return of the operating-lever to engaging position independently, such return movement being permitted by the dog moving on its pivot and passing by the end 34 of the arm. The end 34 of the arm 35 is flattened or spade-shaped to enter any one of a series of slots 36, which are cut radially in the periphery of the gear-wheel 37 and arranged at equal distances apart, and said slots are made quite deep so that considerable upward movement is required to disengage the spade-shaped end of the arm therefrom. The motor herein employed comprises essentially a main spring 50 secured at one end to the frame and at the other end to a winding-shaft 51, and said shaft bears a ratchet-wheel 52, which is engaged by a pawl 53, borne by a large gear-wheel 54, mounted loosely on the shaft 51, and which engages a pinion 55, secured to a shaft 56, to which is secured a gear-wheel 57 which engages a pinion 58 secured to a shaft 43, to which is secured gear-wheel 42 which engages a pinion 60 secured to a shaft 61, to which is also secured a gear-wheel 62 which engages a pinion 63 secured to a shaft 64 bearing a fan-regulator.

The radially slotted gear-wheel 37 is mounted loosely on the shaft 56, being arranged in front of the gear-wheel 57, and made of approximately the same size, and for the purpose of advancing said gear-wheel intermittently by means operated by the motor a hub 70 is secured to the shaft 43, see Figs. 2 and 6, bearing laterally extended pins 71, there being two such pins here shown, which are arranged at diametrically opposite points, and said pins are arranged to engage the teeth of the gear-wheel 37, so that during each revolution of the shaft 43, said gear-wheel 37 will be advanced two teeth. The operating-lever 25 having been raised to disengage the arm 35 from the slotted wheel 37 and also to release the motor, and having become disengaged therefrom, said motor starts immediately, and the slotted wheel is moved one tooth, and the arm 35 falls into the first interdental space beyond the slot from which it was withdrawn, but the releasing-arm 40 is still held in disengaging position by the arm 35 engaging the periphery of said gear-wheel. Said arm 35 is then again lifted to permit the gear-wheel 37 to be advanced another tooth, and to accomplish this result the arm 45 is employed, which is formed

with a cam-faced end portion adapted to be engaged by pins 49, projecting laterally from a hub 48 secured to the shaft 43. Said pins are properly arranged to engage the arm 45 and lift it, to in turn rock the shaft 38 and thereby lift the arm 35 a short distance and at the proper time with respect to the means employed to advance said gear-wheel 37, so that as the motor continues to operate said gear-wheel is repeatedly advanced until the next radial slot comes beneath the end 34 of the arm 35, whereupon said arm is permitted to fall and to return to normal position and the releasing-arm 40 to likewise resume its normal position and stop the motor. The stopping of the motor is thus effected independently of the operating-device for the releasing-means, and is controlled entirely by the motor, and the length of the period of time is determined by the locations of the slots in the gear-wheel 37.

The specific structure here shown for carrying out my invention is simple, and the results desired are easily accomplished, but my invention, however, is not limited in all respects to such specific structure.

I claim:—

1. In an automatic gas lighter and extinguisher, the combination of a gas-burner, a gas-cock, a motor to turn said gas-cock to turn on and off the gas, releasing and controlling means for said motor adapted to be operated to release and subsequently stop the motor, when said motor has turned the gas-cock one half a revolution, a pivoted operating-lever movable in one direction in

response to an increase in the gas-pressure to first operate said means to release the motor and then to disengage said means permitting subsequent independent operation of said means and movable in the opposite direction in response to a decrease in the gas-pressure for reengagement with said means, substantially as described.

2. In an automatic gas lighter and extinguisher, the combination of a gas-burner, a gas-cock, a motor to turn the gas-cock to turn on and off the gas, a releasing-lever for said motor, means controlled by the motor to permit return of the releasing-lever to normal and stop the motor when the gas-cock has been turned one half a revolution, an operating-lever movable in one direction in response to an increase in the gas-pressure to first lift the releasing-lever and place the controlling-means therefor under the control of the motor and then disengage them, permitting independent return to normal of said releasing-lever and controlling-means, and movable in the opposite direction in response to a decrease in the gas-pressure to resume its normal position independently of said releasing-lever and controlling-means, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE C. INNIS.

Witnesses:

B. J. NOYES,
H. B. DAVIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."