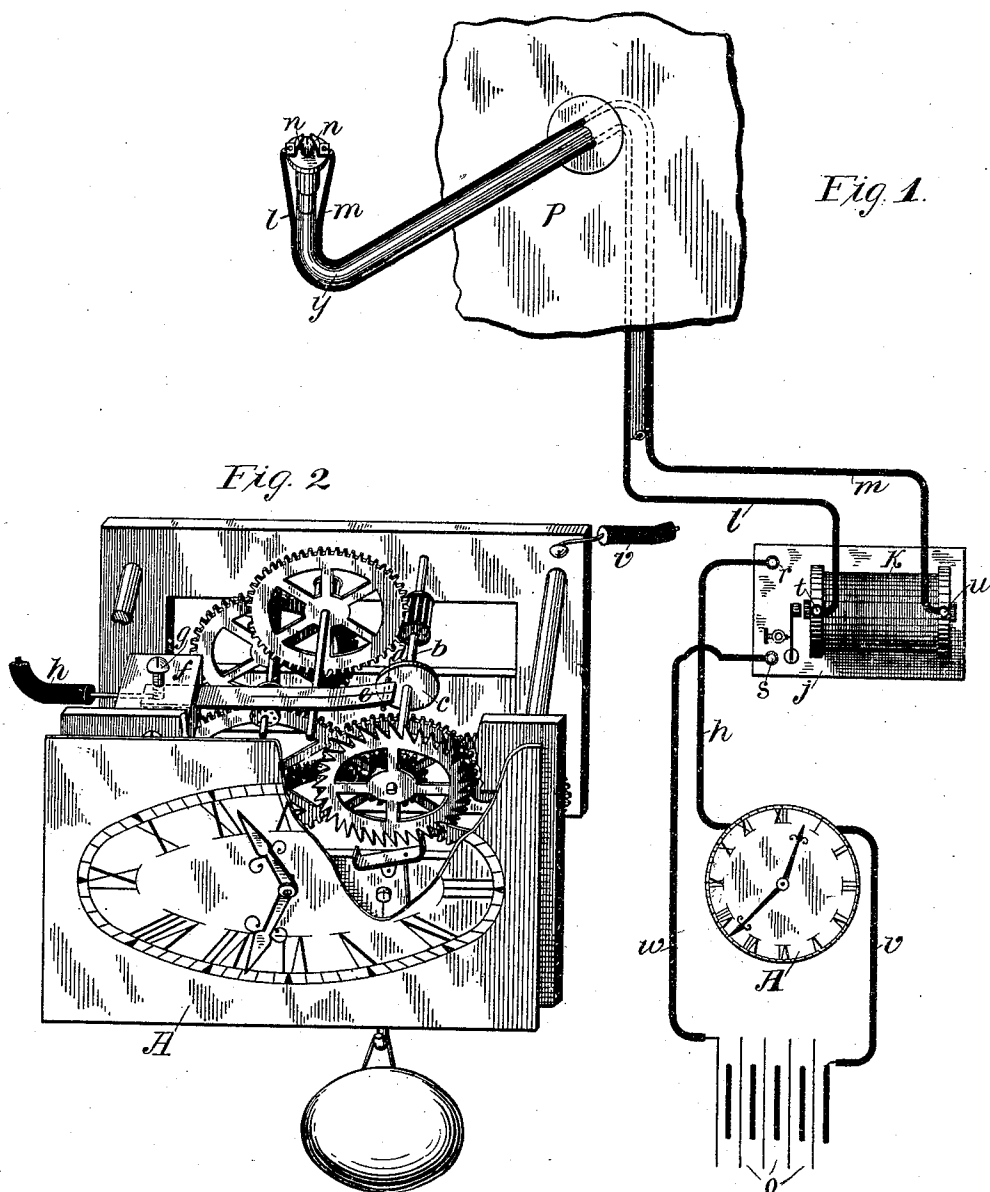


(No Model.)

F. & F. H. ENGELHARD.
GAS LIGHTING SAFETY APPLIANCE.

No. 554,665.

Patented Feb. 18, 1896.



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FRANK ENGELHARD AND FREDERICK H. ENGELHARD, OF SPRINGFIELD,
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GAS-LIGHTING SAFETY APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 554,665, dated February 18, 1896.

Application filed June 3, 1895. Serial No. 551,476. (No model.)

To all whom it may concern:

Be it known that we, FRANK ENGELHARD and FREDERICK H. ENGELHARD, citizens of the United States of America, residing in Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Automatic and Intermittent Gas-Lighting Safety Appliances, of which the following is a specification, reference being had to the accompanying drawings and letters of reference marked thereon.

Heretofore very many serious accidents have been caused and deaths have resulted from escaping gas, and especially have such accidents resulted because of defective means for entirely shutting off the gas from a burner and because of the failure of the occupant of a room to turn off the gas when retiring, and many suicides have been committed by the employment of the ready means furnished by escaping gas in hotels and other rooms.

The object of our invention is to provide a device whereby all danger of injury from escaping gas shall be avoided because of the fact that the gas which is escaping will become ignited, and thus all danger to life and health from this source be avoided.

We accomplish the objects of our invention by providing a device which will, at certain predetermined intervals of time, cause an electric spark to be projected adjacent to the exit-orifice of the gas-burner, whereby if the burner be not lighted and the gas is escaping therefrom the same will become ignited and burn.

Our invention further consists in the construction and arrangement of the various parts, as hereinafter more particularly pointed out.

In the accompanying drawings, in which like letters of reference indicate like parts, Figure 1 illustrates an arrangement of a source of electrical energy, a series of conductors, a gas-burner, an induction-coil, and a device making and breaking the circuit; and Fig. 2 is a perspective view of an ordinary clock mechanism having the circuit making and breaking mechanism attached thereto, the latter figure being on a larger scale than the first.

In detail, A indicates a clock-face; *b*, the escape-wheel pinion; *c*, a disk mounted thereon; *d*, a pin mounted in said disk; *e*, an elastic contact-piece; *f*, a post wherein the latter is mounted; *g*, a set-screw; *h*, a conducting-wire; *j*, a base upon which the spark-coil is mounted; *k*, a spark-coil; *m*, conductors leading from the spark-coil to the gas-burner; *n n*, spark-points; *o*, a source of electrical energy; *p*, a wall; *r*, *s*, *t*, and *u*, fastening-screws; *v*, a conductor leading from the source of electrical energy to the circuit making and breaking mechanism; *w*, a conductor leading from the source of electrical energy to the induction-coil, and *y* an ordinary gas-burner.

The construction and operation of our device are as follows:

A source of electrical energy is provided, which may consist of a gravity or other battery, or the electrical energy may be generated by a dynamo. From this source of electrical energy ordinary conducting-wires are carried, one to the terminals of the primary circuit of the induction-coil and one to the circuit making and breaking device, and a conductor is extended from the circuit maker and breaker to the induction-coil. Conducting-wires are also carried from the terminals of the secondary coil to the burner adjacent to the exit-orifice, each of which wires is provided with any suitable form of spark-point *n*, or if desired a grounded circuit may be employed, in which event one conductor leading to the burner will be sufficient, the gas-pipe serving as the negative conductor.

Any suitable means of making and breaking the electrical connection or circuit may be employed which will at certain predetermined periods of time make the electrical connection, thus causing the current to flow through the primary circuit of the induction-coil, thereby inducing a current of high potential, which induced current is led by wires from the terminals of the secondary coil to the burner and thereby ignite the escaping gas.

We prefer to employ an ordinary clock-movement for the making and breaking of the circuit and upon the escape-wheel pinion *b* a disk *c*, which disk is provided with a projecting pin *d*. A post *f* is mounted at some con-

venient point, and upon said post is mounted a flexible strip *e*, which projects to a point adjacent to the disk *c* and into the track of the pin *d*, so that once in every revolution of the escape-wheel pinion *b* the pin *d* is brought in contact with the free end of the flexible strip *e*. The escape-wheel pinion *b* is electrically connected with one of the conducting-wires, *v*, or the whole mechanism may be connected with one conductor and the post *f* be insulated from it. The flexible strip *e* is electrically connected through the medium of the set-screw in the post *f* with the conducting-wire *h*.

If now the escape-wheel pinion *b* revolves once in every five minutes or less, it will be seen that at the expiration of each five minutes the pin *d* will be brought in contact with the stripe *e* and the electrical connection made, thus sending a current of electricity through the conducting-wire through the primary of the induction-coil and the induced current to the spark-point or the burners, and thus igniting the gas escaping therefrom, so that if a person were to either inadvertently or intentionally allow the gas to remain turned on without the same being lighted, or if a person were to blow out or otherwise extinguish the gas without shutting off the supply of gas to the burner, the electrical spark would operate to light the same automatically, thus rendering it impossible to allow gas to escape without the same being lighted and at once calling attention to the fact that the gas was escaping.

It will be seen, therefore, that all danger from suffocating from escaping gas may be entirely avoided, as no substantial amount of gas would escape between the brief periods during which the contact is not made, and if it were found upon examination that a person had interfered with the conducting-wires or spark-points at the burner and thereby rendered the operation of the device defective it might reasonably be inferred that such interference with the device was intentional and with a suicidal intent. It will readily be seen, however, that a cover or shield may be provided at the gas-burner and gas-fixture, so that interference with the conducting-wires may be entirely avoided whether intentional or otherwise.

The conductors from one induction-coil may be carried to each burner in all the rooms in a hotel or other building and the clock mechanism or other device employed to make and break the circuit be located in the office and the conducting-wire so arranged as to connect a bell to ring whenever the circuit is complete, so that the clerk or person at the point will be advised as to the condition of the apparatus, and if the bell were to fail to ring at the proper intervals such fact would indicate that the device was not properly operating, and by that arrangement of the

wires in the well-known manner with reference to annunciators a tab may be moved and a figure exposed whenever the device fails to operate in any particular place, thus indicating at once in what room the device is out of order.

Having therefore described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination of a source of electrical energy, one or more gas-burners, suitable conductors extending from the source of electrical energy to the terminals of the primary circuit in the induction-coil and suitable conductors for the secondary of said induction-coil to the burner, and a clock-movement interposed in the electrical circuit and provided with a disk *c* mounted on the escape-wheel pinion, a projection or pin *d* on the disk an elastic contact-piece projecting at its free end in the path of the pin *d* and connected electrically at its opposite end with the conductor *h* whereby the circuit is made when the pin *d* engages the piece *e*, substantially as and for the purposes shown.

2. The combination of a source of electrical energy, one or more gas-burners, suitable conductors extending from the source of electrical energy to a point adjacent to the exit-orifice in the burners, an induction-coil interposed therebetween, a clock-movement electrically connected with the source of electrical energy and having a contact-piece *e* mounted adjacent to the clock-movement and insulated therefrom except as the same is electrically connected by the operation of the clock-movement and a conductor extending from the contact-piece to complete the electrical connection first described substantially as shown.

3. The combination of a clock-movement, a post *f* mounted in said clock, a disk *c* mounted on a pinion to revolve therewith and provided with a projection as *d* to engage the contact-piece one or more times during each revolution, a source of electrical energy, one or more gas-burners, an induction-coil and electrical conductors to conduct the electrical current from the source of electrical energy to the disk *c* and through the contact-piece *e* when the same is in contact and thence through the induction-coil to a point adjacent to the exit-orifice in the burner, substantially as and for the purposes shown.

4. The combination of a source of electrical energy, a spark-coil connected thereto, a gas-jet, sparking-points adjacent to said gas-jet and electrically connected to said spark-coil, a clock mechanism and a make-and-break mechanism operated by the escapement of said clock mechanism and adapted to make and break the circuit connecting said electrical source and the spark-coil, substantially as described.

5. In a make-and-break mechanism, the

5 combination of a clock-frame with clock mechanism mounted therein, a wire connected to said frame and to a source of electrical energy, a wire insulated from said frame and connected to a contact-strip *e*, a disk operated by the escapement of said clock mechanism and in electric connection with said clock-frame, and a contact-piece *d* on said disk and adapted to engage said contact-strip *e* and to periodi-

cally complete and break the electric circuit, 10 substantially as described.

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