



## UNITED STATES PATENT OFFICE

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## ELECTRIC GASLIGHTING DEVICE

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My invention relates to electric gas-lighting devices and it has for one of its objects to provide a device of this character that shall be simple and durable in construction, economical to manufacture and effective in its operation.

Another object of my invention is to provide an electric gas-lighting device embodying a resistance element that shall be protected against damage from the gas flame.

Another object of my invention is to provide electrical means for simultaneously igniting gas from a plurality of spaced gas-jet openings or burners.

Another object of my invention is to provide an electric gas-lighting device embodying a resistance element that shall be maintained in fixed igniting relation to a gas burner or burners.

Another object of my invention is to provide an electric gas-lighting device embodying a resistance element that shall be adapted to be heated to incandescence and that shall be so positioned relative to a gas burner as to not split the flame or otherwise lower the efficiency thereof.

A further object of my invention is to provide an electric gas-lighting device that shall embody a resistance element adapted to be heated to incandescence and automatic or manual means for controlling the circuit thereof.

With such objects in view, as well as other advantages which may be incident to the utilization of the improvement, the invention consists in the parts and combinations thereof hereinafter set forth and claimed, with the understanding that the several necessary elements constituting the same may be varied in proportion and arrangement without departing from the nature and scope of the invention.

Electric gas-lighting devices of many forms have heretofore been suggested, including spark-ignition means and devices em-

ploying incandescent filaments, but, to the best of my knowledge, most of them have been subject to one serious objection or another, as attested by the fact that none of them has been widely adopted.

In devices of this character employing the jump-spark principle, the principal objections are apparently the complication and expense caused by the necessity of employing an induction coil. Such devices, as heretofore suggested, have also been limited to use with a single gas outlet or jet. That is, from the nature of a jump spark device, its use for igniting a plurality of spaced gas jets or burners either individually or simultaneously in a simple economical manner is not readily suggested.

An incandescent filament is also open to certain objections as a gas-igniting means, unless various factors are taken into consideration and provided for in a simple economical manner. For instance, there are no known economically commercial resistance materials, short lengths of which may be directly connected to electric circuits of standard commercial voltages, such as house-lighting circuits employing alternating current at one hundred and ten volts, unless certain more or less expensive compensating means are placed in circuit with the short filament.

Long incandescent filaments are subject to sagging or permanent distortion and, in employing such a filament, this feature must be taken into consideration. However, to the best of my knowledge, no gas-igniting device of the prior art has embodied a long filament.

Another objection to the use of an incandescent filament, either long or short, in the direct path of a gas flame, as suggested in the prior art, is the excessive oxidation which occurs. This feature must also be guarded against, or the rate of oxidation reduced as much as possible, to ensure an effective device having a sufficient term of service to warrant its use.

Another objection to having any object, such as an incandescent filament, in the direct path of the flame, is that the flame is divided or split and thereby lowered in efficiency.

All of the gas-igniting devices of the prior art, so far as I am aware, have been devised for the purpose of causing ignition at one point or spot, such as adjacent to a single gas jet.

In most gas furnaces and stoves, the burners have a relatively large number of gas jets or openings, and, in many instances, are so placed as to be comparatively inaccessible. This feature causes considerable inconvenience and frequently is the cause of damage. For instance, in many gas stoves, the burners are not ordinarily or readily visible to a person attempting to light the same. As a result, a match is placed in the approximate position of the burner and the gas turned on. If the match is not immediately adjacent to the burner, an accumulation of gas occurs, which explodes with a puff and frequently burns the hand of the person attempting to light the gas. Also, in many forms of furnaces and stoves having large numbers of gas openings or burners, it is necessary to pass a match or other flaming element from one gas opening to another to ignite them all and prevent the accumulation of gas and a probable explosion.

There are many other objections to the use of matches for lighting gas burners, as attested by the many unsuccessful attempts to provide a simple, economical device that is effective in operation and attractive to any considerable number of prospective users.

I propose to overcome all of the above-mentioned objections and to provide a simple, effective and economical electric gas-lighting device in the form of a unit that shall be readily adapted for assembly with a stove or furnace and that may be added as part of the equipment of a stove or furnace already in use.

In practicing my invention, I provide a simple, economical filamentary resistance element that is adapted to be heated to incandescence by direct connection to a standard commercial electric circuit, that is so positioned relatively to the gas flame as to reduce the degree of oxidation of the element and to prevent lowering of the efficiency of the flame that is maintained in fixed igniting position and that is adapted to simultaneously ignite a plurality of gas openings or burners.

In order to make the invention more clearly understood, means are shown in the accompanying drawings for carrying the same into practical effect without limiting the improvements in their useful applications to the particular constructions which, for the purpose of explanation, are made the subject of illustration.

Figure 1 of the accompanying drawings is

a front view of a gas stove, of a usual type, in connection with which the electric gas-lighting device of my invention is diagrammatically shown.

Fig. 2 is a side view of the device shown in Fig. 1, taken at right angles thereto,

Fig. 3 is an enlarged broken detail view of the igniting device embodying my invention,

Fig. 4 is a sectional view, taken at right angles to Fig. 3,

Fig. 5 is a detail view of a portion of a device embodying a modification of my invention, and

Fig. 6 is a detail plan view of a portion of the device shown in Fig. 5.

The device comprises, in general, a stove 1, of a usual and well-known type, embodying side walls 2, a reflector 3 and a tube or pipe 4 extending normal to the side walls 2 at the upper rear portion of the stove. The tube 4 is provided with a plurality of spaced openings in which insulating burner tips or nipples 5 are disposed, and a valve 6, outside the stove 1, for controlling the flow of gas from a source of gas supply (not shown) to the nipples 5.

An insulating supporting rod or member 8, preferably of asbestos composition, extends between the walls 2, to which it may be suitably secured, as by angle members 9, at a position parallel to and beneath the tube 4. A tortuously formed or helically wound filamentary resistance element 10, preferably of nickel chrome, lies in a channel 11 in the supporting member 8 and may be secured in position by filamentary elements or wires 12 that are wrapped around the members 8 and the filament 10 between convolutions of the latter.

Insulated conducting leads 14 and 15 attach to the respective ends of the filament 10, the lead 14, see Fig. 1, extending, behind the reflector 3, to an outer lead 16, through a fuse 17, a switch 18 and a binding post 20 that are mounted on an insulating panel 19 on the stove 1. The lead 15, similarly disposed behind the reflector 3, extends to an outer lead 21, through a binding post 22 on the panel 19. The leads 16 and 21 are for direct connection to a standard commercial circuit (not shown). The switch 18 is preferably of a type which must be held manually in its closed position.

In the structure above described, the filament 10 is laterally spaced from the axis of the nipples 5 so that it is only sufficiently close thereto to ignite gas therefrom but is not in the direct path of the main body of the flame. This feature materially assists in the preservation of the filament and prevents splitting the flame.

Being supported by the insulating member 8, the filament 10 is prevented from sagging and is maintained in fixed igniting relation to the nipples 5.

The filament 10 is wound tortuously to provide sufficient length of conductor of proper cross-sectional area to absorb the voltage of a standard commercial house-lighting or other circuit, in consideration of the degree of incandescence required. Any relatively short filament would require auxiliary voltage reducing means or would have to be connected to a battery or other special circuit.

In operation, when it is desired to ignite gas from the nipples 5, it is only necessary to depress the handle of the switch 18, which closes the circuit of the element 10 and causes the latter to heat to incandescence, and to turn the valve 6 to its "on" position. This operation causes the gas to ignite, whereupon release of the switch 18 opens the circuit of the element 10.

In Fig. 5, in which correspondence parts are designated by corresponding reference characters, the construction is substantially the same as in the above described form, except that means is provided to automatically control the operation of the device. This means comprises a bimetallic element 24 connected between the filament 10 and the lead 14 through an adjustable contact screw 25. The element 24 is preferably mounted on the insulating member 8 and located or adjusted to be responsive to heat from the gas rather than from the filament 10.

With this construction a usual snap switch may be substituted for the switch 18, or a combined switch and gas valve device 27 substituted for the valve 6 and the switch 18, so that the circuit of the filament 10 may be permanently closed.

The heat from the ignited gas causes the element 24 to interrupt the circuit of the filament 10 and should the gas subsequently become accidentally extinguished, the element 24 will automatically close the circuit of the filament to reignite the gas.

The device 27 comprises a gas-valve portion 28, similar to a valve of usual form, connected between a source of gas supply and the tube 4 and an electric switch portion 29 connected in circuit with the filament 10 between the conductors 14 and 16. The movable element 30 of the gas-valve portion 28 supports an insulating or insulated arm 31 that is adapted to depress a resiliently biased switch arm 32, connected to the conductor 16, to engage a stationary contact member 33, connected to the conductor 14. The construction and relation of parts are such that, at the beginning of the "on" turning movement, and at the end of the "off" turning movement, of the movable gas-valve element 30, the switch arm 31 makes and breaks contact with the stationary contact member 33 relatively quickly and the contact members are maintained in engagement in all intermediate positions of the element 30.

By my invention, an extremely simple, economical and effective electric gas-lighting device is provided that is adapted for direct connection to a standard house-lighting or other circuit of commercial voltage, thereby avoiding the use of complicated and expensive auxiliary apparatus. Damage incident to the ordinary methods of igniting gas is eliminated and, in general, the operation of lighting gas burners is greatly facilitated and improved.

I claim as my invention:

1. In an electric gas-lighting device, the combination with a gas burner embodying a plurality of jet openings, of a single resistance element extending through positions adjacent to each of said openings and adapted to be heated to incandescence to ignite gas therefrom.

2. In an electric gas-lighting device, the combination with a gas burner embodying a plurality of jet openings, of a single resistance element extending through positions adjacent to each of said openings and adapted to be heated to incandescence to ignite gas therefrom, and means for compensating for distortion of said element and maintaining the same in fixed igniting relation to said openings comprising means for supporting said element intermediate its terminals.

3. In an electric gas-lighting device, the combination with a gas burner embodying a plurality of jet openings, of a single wound resistance element extending through and between positions adjacent to each of said openings and adapted to be heated to incandescence to ignite gas therefrom, and a single insulating member for supporting said element throughout its length in fixed igniting relation to said openings.

4. In an electric gas-lighting device, the combination with a gas burner embodying a plurality of jet openings, of a single helically-wound resistance element extending through positions adjacent to each of said openings and adapted to be heated to incandescence to ignite gas therefrom, and a single insulating member having a channel in which said element is supported substantially throughout its length in fixed igniting relation to said openings.

5. In an electric gas-lighting device, the combination with a plurality of gas-jet elements, of a single electric-circuit gas-igniting means including a plurality of portions each adjacent to an opening in one of said elements and adapted to be heated to incandescence to ignite gas therefrom.

6. In an electric gas-lighting device, the combination with a plurality of gas-jet elements, of a single electric-circuit gas-igniting means including a plurality of portions each adjacent to an opening in one of said elements and adapted to be heated to incandescence to ignite gas therefrom, and means for

compensating for distortion of said igniting means and maintaining said portions in fixed igniting relation to said elements comprising means for supporting said igniting means intermediate its terminals.

5 In testimony whereof, I have hereunto subscribed my name this 26th day of February, 1924.

JOHN WAYLAND MAYO.

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