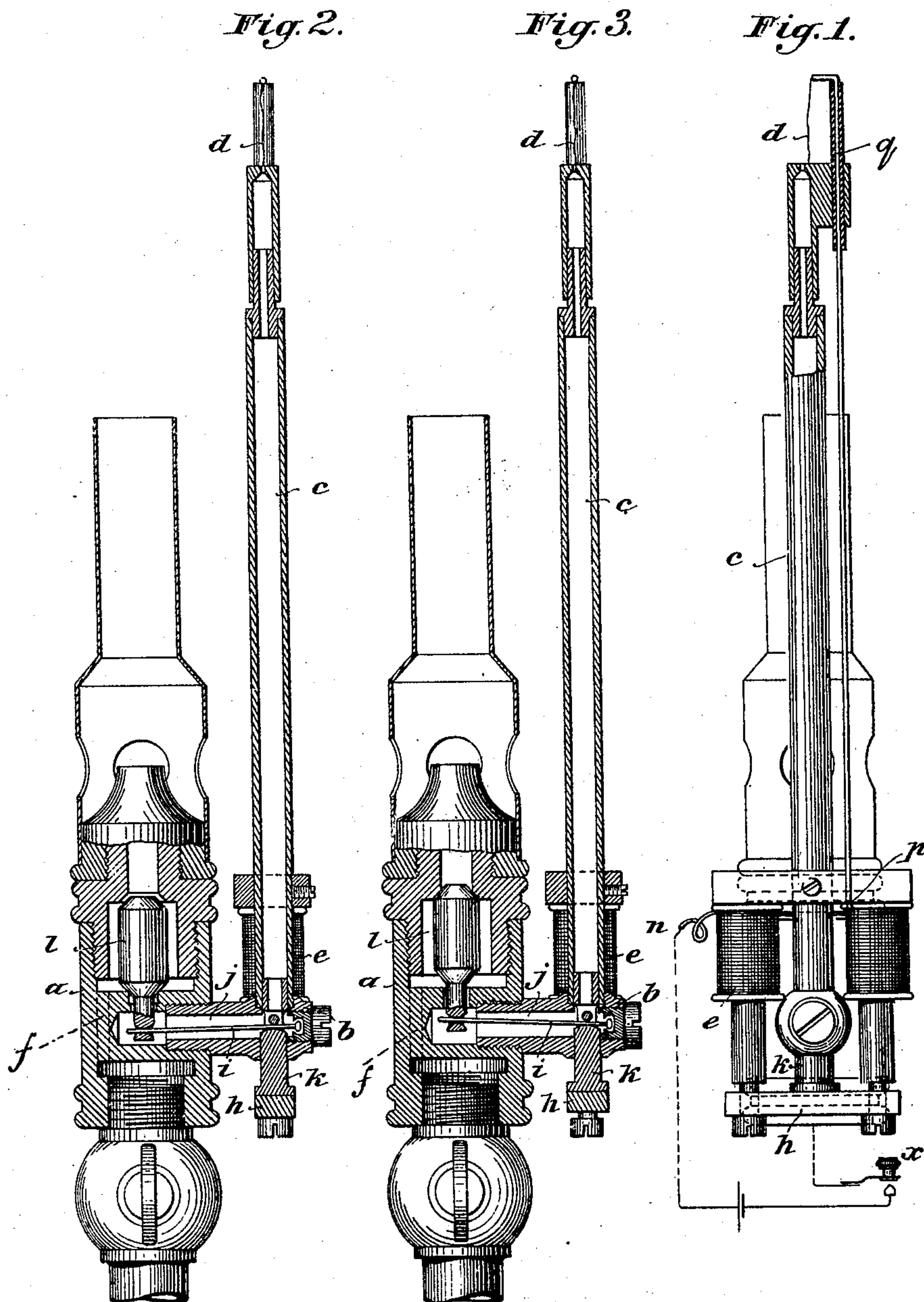


No. 689,379.

Patented Dec. 24, 1901.

H. BORCHARDT.
MEANS FOR LIGHTING GAS.
(Application filed Mar. 30, 1901.)

(No Model.)



Witnesses:
James M. Spear
A. G. Keyfman

Inventor.
Hugo Borchardt.
by Herbert W. Jenner.
Attorney

UNITED STATES PATENT OFFICE.

HUGO BORCHARDT, OF BERLIN, GERMANY.

MEANS FOR LIGHTING GAS.

SPECIFICATION forming part of Letters Patent No. 689,379, dated December 24, 1901.

Application filed March 30, 1901. Serial No. 53,624. (No model)

To all whom it may concern:

Be it known that I, HUGO BORCHARDT, engineer, a citizen of the United States of America, residing at 91 Kurfürstenstrasse, Berlin, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Means for Lighting Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an igniting device applicable to gas-burners and adapted to be operated electrically, the burners for which it is intended being those which comprise an additional tube for an accessory or "pilot" jet and a valve arrangement whereby a passage for the gas leading to such pilot-tube may be opened for the purpose of supplying gas to form the pilot-flame.

The features peculiar to the new igniting device are, first, that an igniting (platinum) wire, without being connected to a platinum sponge in accordance with the practice usual hitherto, undergoes preparatory heating under the action of an electric current conducted through it, so as to initiate the heating effect which is gradually intensified by the gas-current itself until the igniting temperature is attained, and, secondly, that by electromagnetic operation the valve arrangement is so controlled as to open the passage which leads to the point where ignition is to take place.

The object of the entire arrangement of the new igniting device, which in its essence is not unlike an electric-light switch, is in all cases to induce an igniting effect unaccompanied by a shock such as attends an explosion, so that the mantle fitted onto the burner shall be subject to no concussion. In addition to this, in the arrangement described hereinafter by way of illustration the moment at which the pilot-jet transfers its flame to the main burner and itself becomes extinguished is made to coincide with the moment when the circuit-closing device or contact-piece is released, whereby the greater or less interval, which in automatic igniters or fuses elapses before the full igniting effect is attained, is here avoided.

I will describe my invention by the aid of the accompanying drawings, in which—

Figure 1 is a side view of one form of the new gas-igniting arrangement, illustrating the disposition of the electromagnet at the lower end of the pilot-jet tube, at the head of which is placed the igniting device acting partly by means of initial heating by electricity, while Figs. 2 and 3 are sections showing the valve arrangement in its two main positions, respectively.

The casing *a*, forming the base of the burner, is arranged above a suitable cock, whence the gas passing through a passage, such as *f*, finds its way into the valve-chamber which contains the valve-body *l*, cooperating with an upper and a lower valve-seat. The valve-body *l*, in its normal position, Fig. 2, by descending upon the lower valve-seat cuts off the gas-supply from the passage leading through the valve-lever chamber *j* or tube *b* to the pilot-jet tube *c*. The valve-lever *i*, which enables the valve-body to be raised for the purpose of opening the passage last mentioned for the passage of the gas, (with the simultaneous result of closing the gas-passage leading to the main burner,) is so arranged that it may be operated mechanically, say, by being connected with a jet-tube *b* and a knob or slide *k*, situated on the extension of the axial line of the tube *c*. In the vicinity of the tube *b* or in any other convenient position an electromagnet *e*, together with a movable armature *h*, forming part thereof, is so arranged that the sliding knob or button *k* rests against such armature, so that by the attraction of the electromagnet *e* the said knob or button shall be moved upward, such knob or button and the armature being retained in their lowered or withdrawn position by the weight of the valve-body *l* acting upon the lever *i*.

The tube *c* is at its upper end fitted with the igniting device, which serves to effect the initial heating by electricity. It consists of a platinum wire *d*, situated above the narrow pilot-jet aperture, which wire, supported by an insulated holder *q*, is connected both with the main and return conductors forming part of the circuit of any source of electricity, which source of electricity need only be pow-

erful enough to heat the wire to about 200° whenever current is sent through. As shown in the drawings, the battery-circuit, Fig. 1, wherein the electromagnet *e* is included, includes also the igniting-wire *d*, seeing that a conductor leads from the electromagnet-coil at *p* to the platinum-wire holder *q*. The opposite end *n* of the electromagnet-coil is electrically connected with the battery and with the contact-piece *x*, by means of which one is able to light the burner. The circuit is completed by a return-conductor, which may be formed by the metal body of the burner, including the tubes *b* and *c*, which effect the connection with the platinum wire *d*.

Now, assuming that the gas-supply to the valve-chamber is first of all to be turned on, by operating the cock belonging to the gas-burner proper the operation of the improved device is as follows: All that is necessary after turning the said cock is to press upon the contact-knob *x* or in any other way to close the circuit passing through the electromagnet *e* and igniting-wire *d*, so as at the same time, first, to open the auxiliary gas-passage leading to the tube *c* through the electromagnetic operation of the armature *h* and valve-lever *i*, as shown in Fig. 3, and, secondly, to effect the preparatory heating of the igniting-wire *d*. It follows that the gas-current issuing at this point meets this wire *d*, when it has already commenced to be heated, and it continues to heat it until it reaches the igniting temperature, so that the pilot-jet becomes almost instantly lighted. When the contact-knob *x* is relieved from pressure, whereby the electromagnet *e* is caused to release the armature *h* and the valve *i* is allowed to resume its initial position, (see Fig. 2,) the way to the pilot-jet is cut off, while the gas-supply to the main burner is opened, and the pilot-flame just before it goes out instantaneously ignites the main flame. The gas-burner is thus lighted without any noticeable shock, such as characterizes an explosion, and the igniting takes place precisely at the moment that the contact-knob or circuit-closing device is released. At the same time the gas-supply to the pilot-jet is cut off instantaneously, (not by degrees,) so that it is possible to turn out

and light the burner any number of times in rapid succession, which, as is well known, is not possible in the case of many automatic gas-lighting devices.

The electrical arrangements may be so carried out that one circuit shall comprise a number of igniting devices, such as are herein described, so that they may all be operated at the same time.

What I claim is—

1. In a gas-lighting apparatus, the combination, with a main burner, a pilot-burner, and a double-acting valve having its valve-seats arranged one above the other and which admits gas to the said burners alternately, said valve being normally held automatically in a position to cut off the gas from the said pilot-burner and to admit gas to the said main burner; of an electromagnet operating to reverse the normal position of the said valve when energized, a platinum igniter for the pilot-burner included in circuit with the said electromagnet, and a circuit-maker for energizing the electromagnet, said valve being returned to its normal position by gravity when the said electromagnet is deenergized, substantially as set forth.

2. In a gas-lighting apparatus, the combination, with a main burner, a pilot-burner, and a double-acting valve which admits gas to the said burners alternately, said valve being normally held automatically in a position to cut off the gas from the said pilot-burner and admit gas to the said main burner; of a pivoted lever for operating the said valve, an electromagnet having its armature connected to the said lever and operating to reverse the normal position of the said valve when energized, a platinum igniter for the pilot-burner included in circuit with the said electromagnet, and a circuit-maker for energizing the electromagnet, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HUGO BORCHARDT.

Witnesses:

WOLDEMAR HAUPT,
WILHELM SCHÜTZE.