

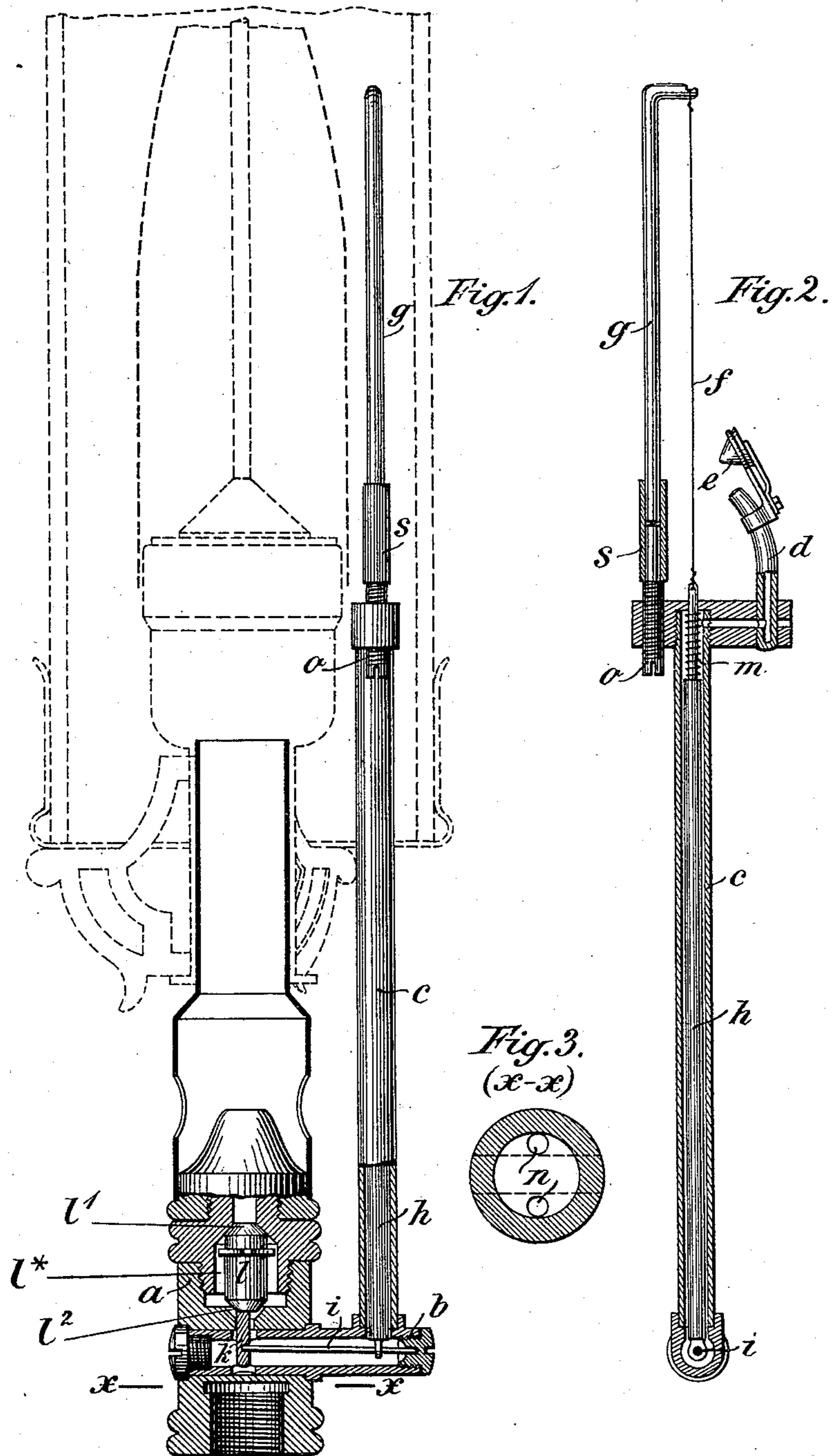
(No Model.)

H. BORCHARDT.

AUTOMATIC LIGHTING DEVICE FOR GAS BURNERS.

No. 594,376.

Patented Nov. 30, 1897.



Witnesses:

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# UNITED STATES PATENT OFFICE.

HUGO BORCHARDT, OF BERLIN, GERMANY.

## AUTOMATIC LIGHTING DEVICE FOR GAS-BURNERS.

SPECIFICATION forming part of Letters Patent No. 594,376, dated November 30, 1897.

Application filed February 12, 1897. Serial No. 623,154. (No model.)

### *To all whom it may concern:*

Be it known that I, HUGO BORCHARDT, a citizen of the United States of America, residing in the city of Berlin, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Automatic Lighting Devices for Gas-Burners; 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.

Automatic lighting devices for gas-jets, and more particularly for incandescent gas-light burners, have before been proposed, and the following is the principle upon which they were based: An additional or secondary jet, ignited by means of a platinum sponge, was employed to heat a body which, by expanding, opened the pipe by which the main burner was fed with gas, so that the gas issuing from such pipe in its turn became ignited by contact with the secondary flame or jet. Then the further expansion of the body referred to had the effect of cutting off the supply to the secondary flame, after which the main flame alone remained burning. Devices of this class as hitherto constructed are attended with the drawback that the mechanism which serves to turn on or off the gas-supply is of an extremely delicate construction and liable to get out of working order through becoming obstructed by dust or other foreign matter or impurities. Besides, the body which is to be expanded by heat must of necessity be adjusted with perfect precision—a requirement which none of the lighting devices that have up to the present time been introduced meet in anything like a complete manner. Now the subject of this invention is an improved automatic lighting device in which the remedy for the first of the inconveniences I have mentioned consists in the fact that the entire mechanism for turning the gas-valve on or off is located within the gas-piping and consequently protected from any injurious external influences, while the last-mentioned defect is obviated by the novel arrangement of the

part carrying the body to be expanded, which carrier is not, as before, immovably fixed in position, but is loose within a sleeve or socket and is supported upon a set-screw which may readily be raised or lowered and the carrier consequently adjusted as desired.

In the accompanying drawings, in which like parts are indicated by similar letters of reference, Figure 1 is a sectional elevation of an incandescent gas-burner having the present invention applied thereto. Fig. 2 is a vertical section of part thereof, taken at right angles to Fig. 1; and Fig. 3 is a horizontal section taken on the line  $x x$  of Fig. 1.

$a$  represents the base of the main burner, which is adapted to be screwed onto the gas-fitting, (not shown,) and to the burner  $a$  is fitted a branch pipe  $b c$ , upon the part  $c$  of which is placed the secondary or lighting burner  $d$ , provided with a platinum sponge  $e$ , and a carrier  $g$ , loosely placed upon a set-screw  $o$ , but retained in position by a sleeve or guide  $s$ , while a platinum wire  $f$  is suspended from the said carrier  $g$ . To the lower end of such wire  $f$  a rod  $h$  is secured, and this rod is located within the branch pipe  $c$  and is depressed by a spring  $m$ . The rod  $h$  at its lower end terminates in a ring or eye by which it engages a lever  $i$ , one end of which is supported in the plug of the branch  $b$ , while its other extremity engages the rod  $k$  of the valve  $l$ , which arrangement leaves the lever  $i$  a certain amount of play. The valve  $l$  is formed with two conical faces and the valve-chamber  $l^*$  is provided with corresponding seats  $l' l^2$ , and the disposition of the valve  $l$  is such that when lifted it closes against the seat  $l'$  and cuts off the gas-supply to the main burner, while upon being lowered it closes against the seat  $l^2$  and checks such supply to the secondary burner.

The operation of the arrangement above described is as follows: When at rest, the mechanism assumes the position shown in the accompanying drawings—that is to say, the cold platinum wire  $f$ , which necessarily contracts on cooling, overcoming the resistance of the spring  $m$ , draws the rod  $h$ , together with the lever  $i$ , in an upward direction, thereby lift-

ing the valve *l* against its seat *l'* and closing the orifice through which the main burner is supplied with gas. This closing of the valve for the time being is perfectly tight, the tension of the platinum wire, which is considerable, being transmitted by the lever *i* with a certain degree of resiliency to the valve *l*. Now when a tap or cock fitted in the main supply-pipe or gas-fitting (not shown) is turned on by hand, or if gas be admitted to the burner in any other manner, the gas passing through the perforations *n*, Fig. 3, will flow laterally around the pipe *b* and into the valve-chamber *l\**, and thence past the valve-seat *l'*, through the branches *b* and *c*, to the lighting or secondary burner *d*, being there ignited by contact with the platinum sponge *e*. The secondary or lighting flame now envelops and heats the platinum wire *f*, and owing to the expansion of such wire under the influence of heat the rod *h* descends. The valve *l* in consequence gradually moves downward, thereby allowing the gas to pass by the valve-seat *l'* through the supply-orifice of the main burner, when upon meeting the flame of the secondary burner *d* it becomes ignited. The main flame now still further heats the platinum wire *f*, so that the rod *h*, lever *i*, and valve *l* descend still farther, thereby allowing the valve *l* to close upon the seat *l'* and cut off the gas-supply to the auxiliary or secondary burner *d*, leaving the main burner alone lighted. When the flame of the main burner is extinguished in consequence of its gas-supply being cut off in the ordinary manner, the operations above described are repeated, but in the reverse order—that is to say, the extinction of the flame of the main burner results in the cooling of the platinum wire *f*, the consequence being that the rod *h*, together with the lever *i* and valve *l*, rises, the latter closing against the seat *l'*, and the whole arrangement resumes the position illustrated in the drawings. The fact that the passage to the secondary burner *d* remains open while the apparatus is at rest is immaterial, as owing to the small sectional area of the branch pipe which is further reduced by the rod *h* nearly filling the bore of the branch *c*, and to the absence of pressure in the main supply-pipe the supply-cock of which is turned off, no appreciable quantity of gas can escape. The tension of the platinum wire *f* is adjusted in the manner required by means of the set-screw *o*.

It will be obvious that the platinum wire *f* might be replaced by another suitable material and that the arrangement of the parts may be to some extent modified without departing from the spirit of the invention.

What I claim is—

1. In a gas-lighting device, the combination, with a gas-valve, and a wire operatively connected with the said valve; of a carrier supporting the upper part of the said wire,

a guide encircling the lower part of the carrier, a stationary support, and a screw engaging with the said support and supporting the said guide and carrier, substantially as set forth.

2. In a gas-lighting device, the combination, with a branch pipe, a valve for closing one end of the said pipe, and a burner at the other end of the pipe; of a wire supported in front of the said burner, and intermediate connections between the said wire and valve, said connections being arranged within the said pipe, substantially as set forth.

3. In a gas-lighting device, the combination, with a branch pipe, a valve for closing one end of the said pipe, and a burner at the other end of the pipe; of a wire supported in front of the said burner, a lever pivoted inside the said pipe and operatively connected with the said valve, and a rod arranged inside the said pipe and having its lower end connected to the said lever and its upper end connected to the said wire, substantially as set forth.

4. In a gas-lighting device, the combination, with a branch pipe provided with a vertical and a horizontal portion, a valve for closing one end of the said horizontal portion, a plug closing the other end of the horizontal portion, and a burner at the upper end of the vertical portion; of a lever pivoted in the said plug and connected with the said valve, a rod passing through the said vertical portion of the pipe and connected to the said lever, and a wire supported in front of the said burner and connected to the upper part of the said rod, substantially as set forth.

5. In a gas-lighting device, the combination, with a branch pipe a valve closing one end of the said pipe, and a burner at the other end of the pipe; of a wire supported in front of the said burner, intermediate connections between the said wire and valve, and a spring holding the said wire in tension, said connections and spring being arranged within the said pipe, substantially as set forth.

6. In a gas-lighting device, the combination, with a main gas-pipe provided with a valve-seat, of a branch pipe having a horizontal portion passing transversely through the said gas-pipe and provided with an opening in its side communicating with the said valve-seat, a burner carried by the said branch pipe, a valve for closing the said valve-seat, a wire supported in front of the said burner, and intermediate connections between the said wire and valve, said connections being arranged inside the said branch pipe, substantially as set forth.

7. In a gas-lighting device, the combination, with a main gas-pipe provided with an upper and a lower valve-seat, of a double valve arranged between the said valve-seats and operating to close them alternately, a

branch pipe having a horizontal portion passing transversely through the said gas-pipe below the said valves and provided with an opening communicating with the said lower  
5 valve-seat, a burner carried by the said branch pipe, a wire supported in front of the said burner, and intermediate connections between the said wire and double valve, said

connections being arranged inside the said branch pipe, substantially as set forth. 10

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

HUGO BORCHARDT.

Witnesses:

PAUL AULICH,  
BERTHOLD SCHOLZ.