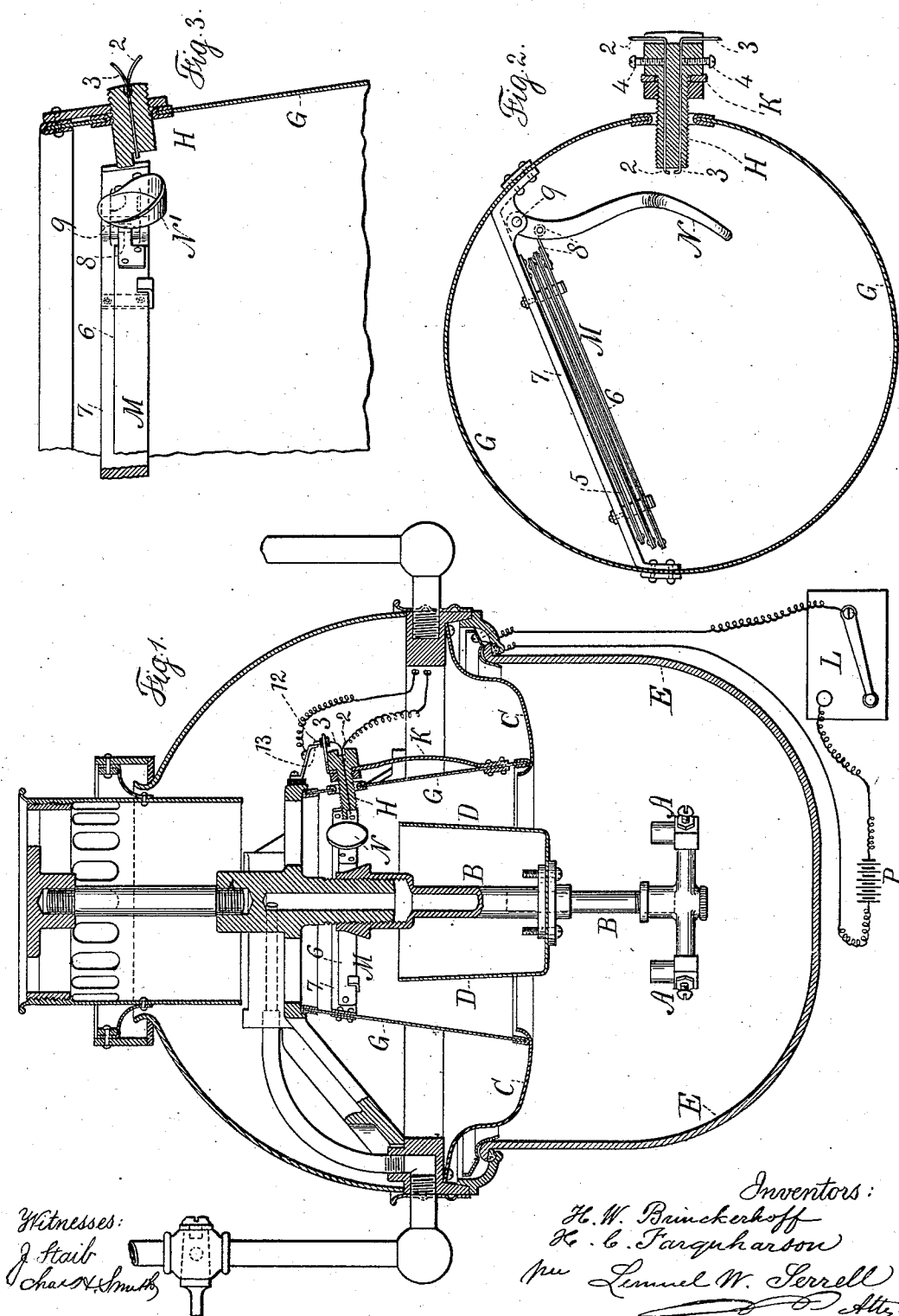


(No Model.)

H. W. BRINCKERHOFF & H. C. FARQUHARSON.
ELECTRIC GAS LIGHTING APPARATUS.

No. 553,330.

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UNITED STATES PATENT OFFICE.

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ELECTRIC GAS-LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 553,330, dated January 21, 1896.

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To all whom it may concern:

Be it known that we, HENRY W. BRINCKERHOFF, residing at Brooklyn, in the county of Kings, and HENRY C. FARQUHARSON, residing at the city of New York, State of New York, citizens of the United States, have invented an Improvement in Electric Gas-Lighting Apparatus, of which the following is a specification.

Gas-lamps are extensively employed in railway-cars, the burners being at the lower end of a gas-pipe and below an annular reflector and a central reflector, the heat from the gas-flames passing through the annular space between the two reflectors, and a half glass globe connected with a frame has been employed below such light, and above the annular reflector a cone of mica has usually been used. In gas-burners of this character and in gas-burners sometimes termed "regenerative gas-burners" difficulty is experienced in lighting the gas because the half glass globe has to be swung downward out of the way, the gas turned on and then ignited, and the globe is liable to injury and sometimes there is considerable escape of gas before the same can be lighted.

The object of the present invention is to ignite the gas by an electric spark.

In devices heretofore employed for igniting gas by an electric spark, the spark-points are often exposed to the action of the heat and become oxidized, and where the flame is below an annular chimney difficulty is experienced in locating the spark-points, because when placed above the flame they are exposed to a high temperature and are liable to become corroded or coated with carbonaceous or other deposits from the flame. We make use of conductors located above the flame, so that the gas will surround the spark-points and be ignited when the current of electricity is directed through the conductors, and in order to protect the spark-points from injury by the heat or from becoming corroded or coated we make use of a shield acted upon by a thermostat, so that when the lamp is not in use the contraction of the thermostat draws the shield away and exposes the spark-points, and as soon as the flame is ignited the

thermostat acts upon the shield to move the same and protect the spark-points from injury.

While the present improvement is especially adapted to use with Pintsch gas-burners it may be made use of in any gas-burning apparatus wherein the products of combustion can act upon a thermostat above the flame.

In the drawings, Figure 1 is a vertical section illustrating the present improvement in connection with a Pintsch gas-burner. Fig. 2 is a sectional plan view of the mica cone or chimney, showing also the spark-points; and Fig. 3 shows a modification of the device.

The gas-burners A are to be of any desired character and they are represented as at the lower end of a gas-pipe B.

C represents the annular reflector, and D the central reflector through which the gas-pipe B passes.

E is a hemispherical glass globe received at its edges into a ring that is connected to the upper part of the lamp, and G shows the mica cone or chimney resting at its base upon the top of the annular reflector C.

The mica cone or chimney G is employed by us for holding the electrical device for igniting the gas by a spark, and with this object in view the conductors 2 and 3 pass through the holder H which is of non-conducting refractory material, preferably similar to that made use of in the lava tips of gas-burners, but it may be asbestos, soapstone or similar mineral substance, and it is advantageous to pass the metal conductors 2 and 3 through holes in the holder H and to bring their ends sufficiently near each other for the spark to pass from one to the other, when an electric circuit is closed to such conductors, and we find it advantageous to employ clamping-screws 4 passing into the holder and acting against the conductors, and it is also advantageous to slot the back end of the holder crosswise so that the conductors 2 and 3 can be bent outwardly and away from each other, but within the transverse slot, so that the conductors will be held from rotating, and thus be maintained in their proper relative positions.

In Fig. 3 the holder H is represented as supported by a ring or thimble in the mica of the cone or chimney G. In Fig. 1 the holder is represented as supported by a spring K which is connected at one end with the mica chimney so that the spark-points can be either within the chimney or they can be pressed backward and outward so that the spark-points are closely adjacent to or outside of the mica chimney, the spring K yielding when the parts are so pressed backwardly.

The conductors 2 and 3 are to be led to any suitable source of electric energy and the circuit is to be closed to such conductors in any desired manner. In electric-lighting apparatus the current has heretofore been directed to the spark-points in the act of turning on the gas cock or valve. Any suitable device may be employed, but we have represented at L a switch as a means for closing the electric circuit to the conductors 2 and 3 for obtaining a spark between the ends of the said conductors.

If the devices heretofore described were alone made use of, the spark-points would be exposed to injury either from the heat or from the carbon escaping from the flame. To protect such spark-points we make use of a shield N acted upon by a thermostat M so that when the heat reaches such thermostat the expansion of the same moves the shield N to protect the spark-points, and when the lamp is extinguished and cools down the contraction of the thermostat draws the shield away from the spark-points so that the gas reaches such spark-points and is ignited when the current is closed through such spark-points, and then the heat of the flame acting upon the thermostat moves the shield to protect the spark-points.

The thermostat M may be made in any desired manner. We have, however, represented the same as formed of alternate bars 5 and 6 of iron and copper, and these are connected together in such a manner as to obtain the desired extent of movement from the differences in the expansion of the two metals, and the thermostat is supported by a cross-bar 7, to which one end of such thermostat is rigidly connected, and the other end of the thermostat is connected to a crank-arm 8 adjacent to the pivot 9, upon which the arm of the shield N swings, and by properly proportioning the parts the movement necessary can be given by the thermostat to the shield for swinging such shield against the holder H when the lamp is lighted, or for withdrawing the shield from the holder and spark-points when the lamp is extinguished.

In cases where the shield N is made use of with a holder H supported by a spring K, the shield is advantageously convex, so that it will act directly against the end of the holder and push the same backward against the action of the spring K until the shield closes the opening in the mica chimney, through which the holder and spark-points had been projected, and thereby the holder and spark-

points will be outside of the mica chimney and protected from injury from the heat or from deposits, and as the parts cool after the light is extinguished the contraction of the thermostat draws back the shield and allows the holder to be projected by its spring ready for use in again lighting the gas. When the shield is made use of with a stationary holder containing the spark-points it is advantageous to make the shield in the manner represented at N', Fig. 3—that is to say, with a bottom flange or in the form of a thimble or section of a thimble to cover over the inner end of the holder and protect the same and the spark-points from any deposit or carbonaceous corrosion—and it will be observed that the top part of the holder H is represented as projecting beyond the spark-points, the object being to prevent the shield coming into contact with the spark-points to injure the same or to close the electric circuit between the same, and the holder being of non-conducting and refractory material the wire conductors 2 and 3 are insulated thereby, and the holder is not injured by the temperature to which it is exposed.

It will be observed that the lighting mechanism being all connected with the mica chimney it only becomes necessary to disconnect the parts of the lamp sufficiently for introducing the mica chimney in position together with the thermostat and electric gas-lighter, and the conductors from the lighter can be passed out through any convenient portion of the upper part of the lamp, and they can be led to any suitable battery or source of electric energy, and the push-button or switch can be located in a convenient place for use in directing the current for producing the spark after the gas has been turned on to the burner.

We find it generally advantageous to have a push-button or similar electric device that is separate from the cock for turning on the gas, so that the spark can be repeated if the gas is not lighted when the current is first turned on through the conductors.

In Fig. 1 we have illustrated a battery at P, but the same may be any desired source of electric energy, and the switch L may be operated by hand or in any desired manner in turning the current on or off.

Sometimes an attendant may leave the switch turned on so that the battery will be exhausted unnecessarily. To avoid this we represent a circuit-closer at 12 upon the holder H, which circuit-closer 12 acts in contact with the plate 13 when the parts are cold and the holder H is projected by the spring K, and when this holder is pushed back by the action of the thermostat the plate 12 separates from the plate 13 and the electric circuit is broken at this place automatically.

We claim as our invention—

1. The combination with a gas burner and its chimney, of spark points and conductors for directing a current of electricity in lighting the gas, and a shield and a thermostatic

device for acting upon the shield to move the same and protect the spark points when the gas is burning, substantially as set forth.

2. The combination with the gas burner
5 and a mica chimney or cone, of a thermostat received upon and supported by such mica cone, a holder of refractory and insulating material, and conductors passing through and supported by the holder for forming the
10 spark points, a shield pivoted upon the mica chimney and acted upon by the thermostat for covering the spark points when the gas is burning, substantially as set forth.

3. The combination with a burner and its
15 chimney, of a thermostat, a shield acted upon by the thermostat, a holder and electric spark points for igniting the gas of the burner and a spring for supporting the holder and yielding to the pressure of the shield against
20 the holder when the thermostat is heated by the flame, substantially as set forth.

4. The combination with a gas burner, its hemispherical glass and the reflectors above the gas burner, of a mica cone supported by
25 the reflector, a thermostat connected to and supported by the mica cone, a holder and

conductors passing through the holder and terminating as spark points, a shield having an arm pivoted upon the mica chimney and a connection between the arm and the thermostat for moving the shield to cover and un-
30 cover the spark points, substantially as set forth.

5. The combination with the burner, of spark points and electric connections for
35 igniting the inflammable material of the burner and a thermostat and devices moved thereby for protecting the spark points from the flame, substantially as set forth.

6. The combination with a burner and
40 spark points and electric connections for igniting the gas, of a thermostat for acting upon the spark points and for automatically breaking the electric circuit, substantially as set forth.

Signed by us this 3d day of April, 1895.

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HENRY C. FARQUHARSON.

Witnesses:

GEO. T. PINCKNEY,
S. T. HAVILAND.