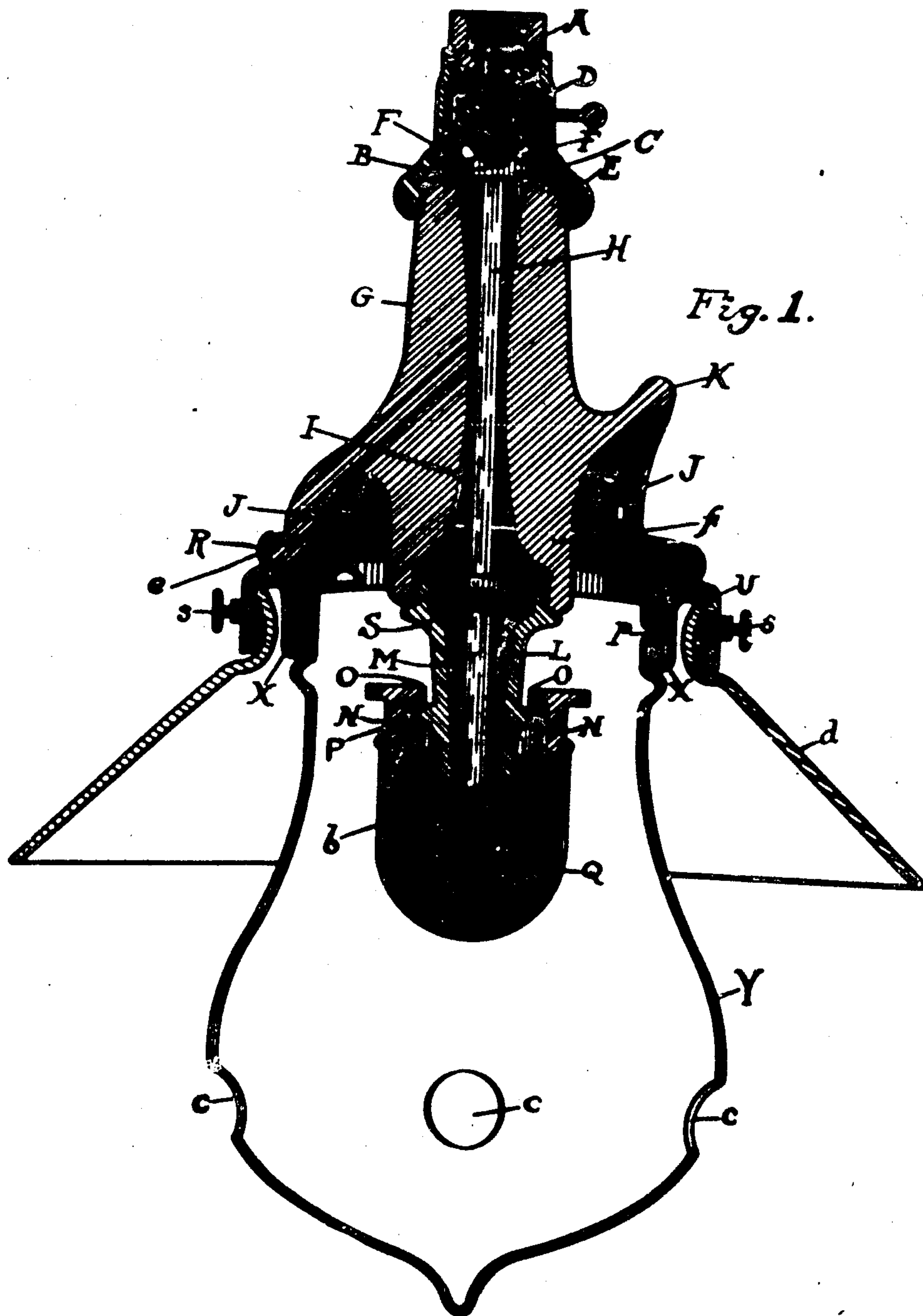


A. H. HUMPHREY.  
 INVERTED BURNER FOR INCANDESCENT GAS LIGHT.  
 APPLICATION FILED SEPT. 29, 1908.

955,874.

Patented Apr. 26, 1910.

3 SHEETS—SHEET 1.



Witnesses:  
 Annie J. Irvine  
 Frank J. Almaraz

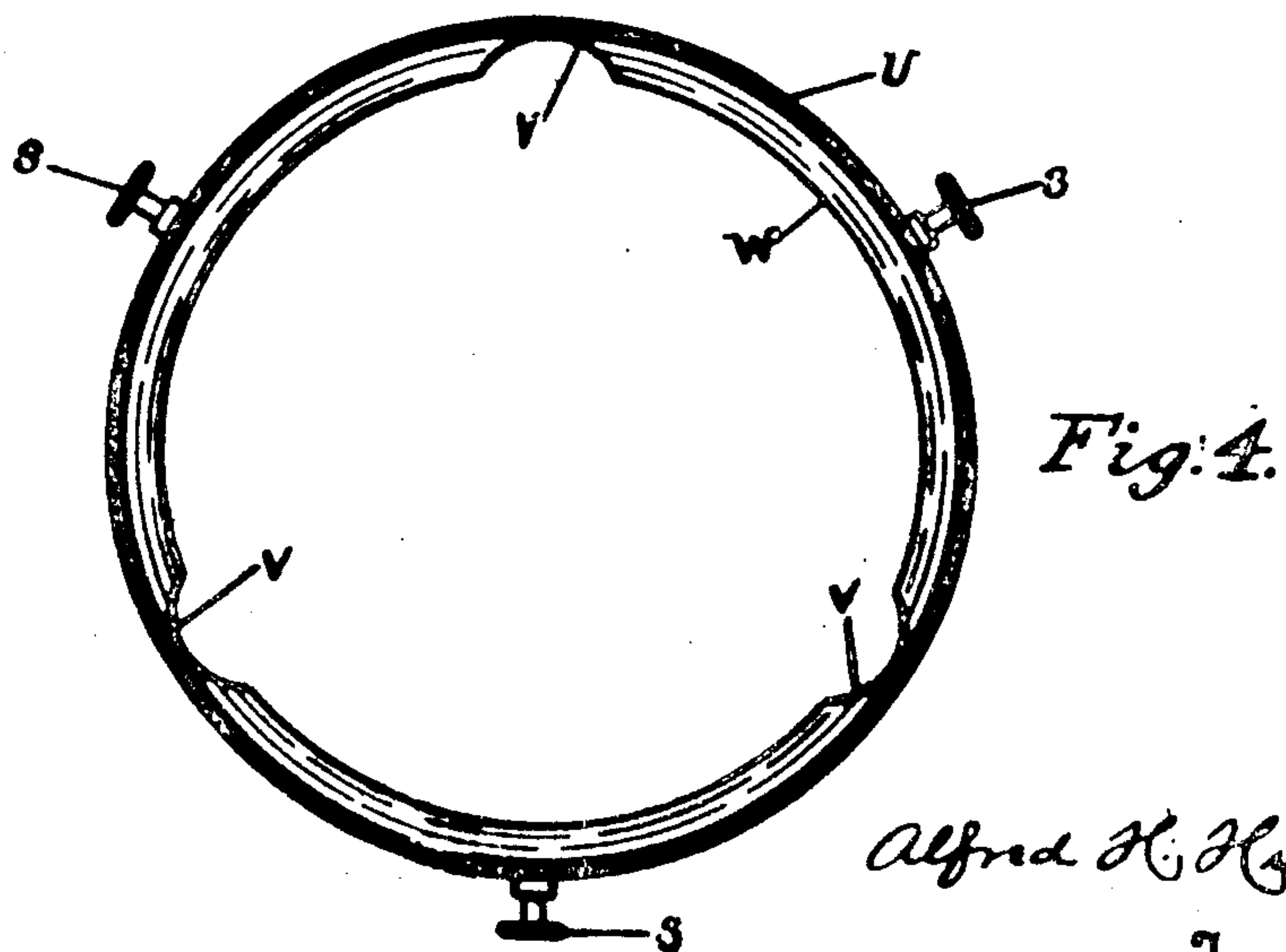
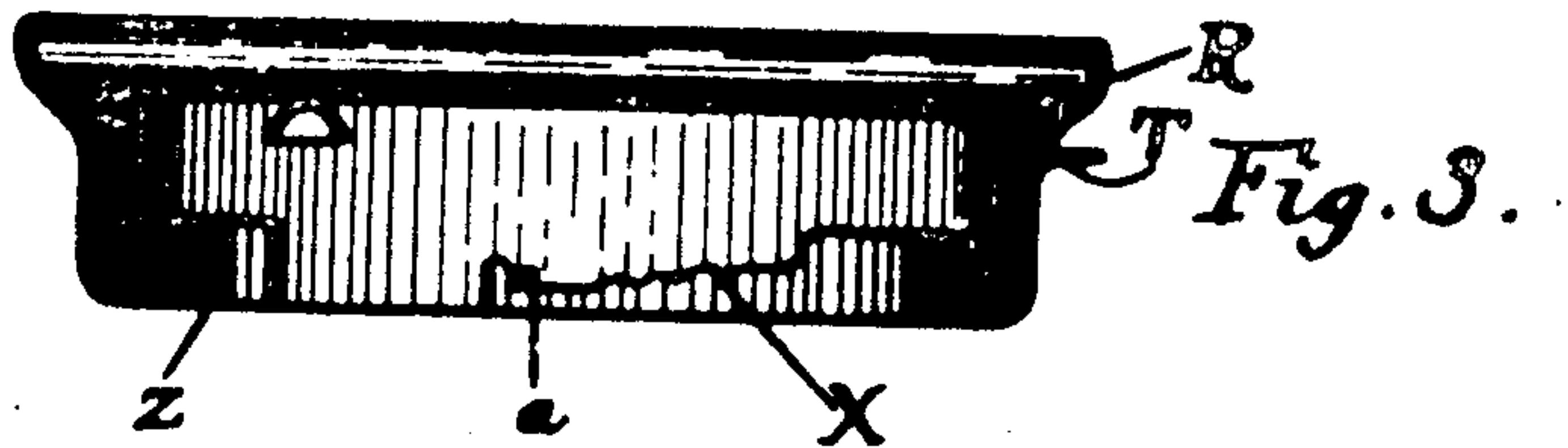
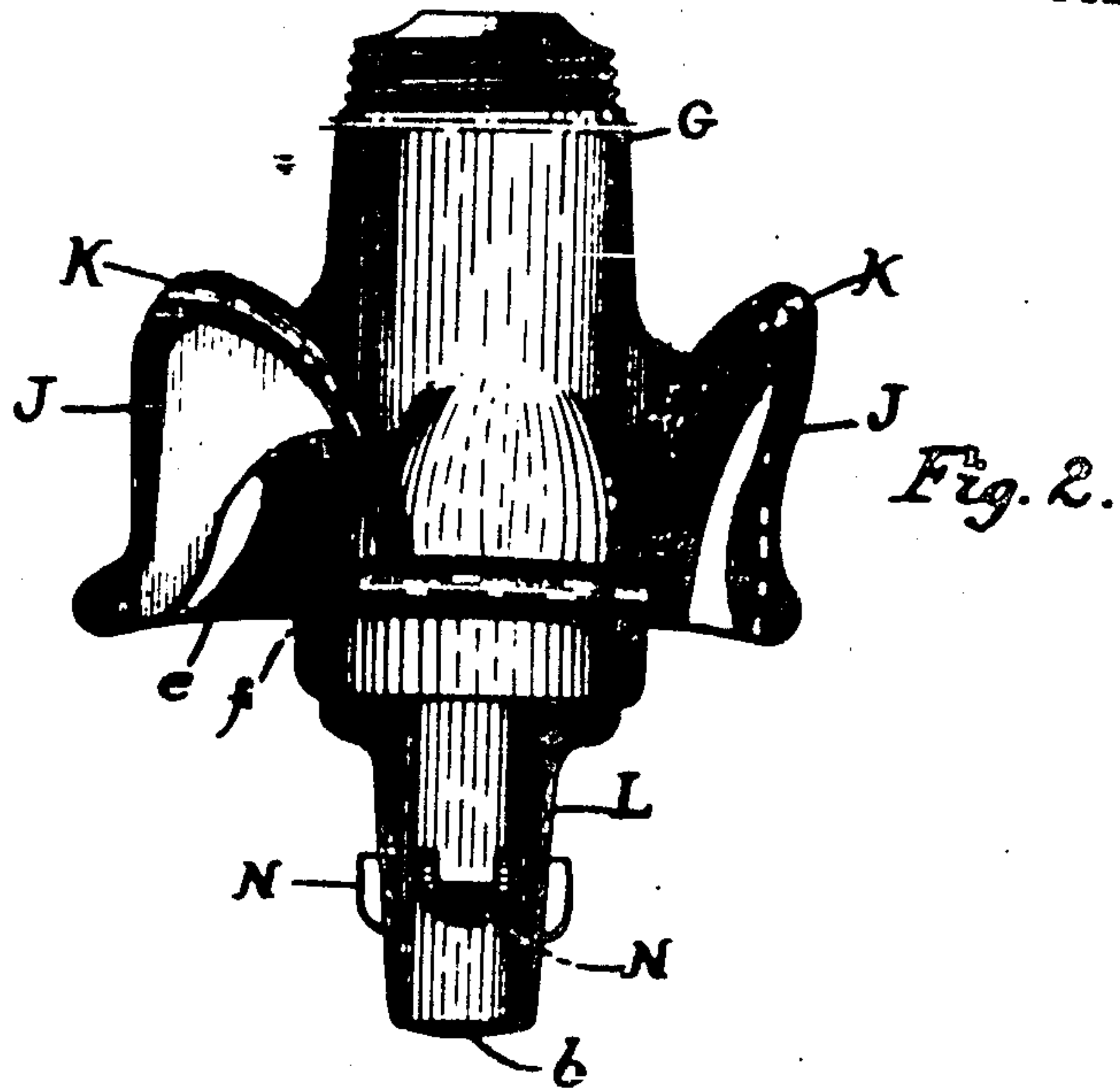
Alfred H. Humphrey  
 Inventor  
 By his Attorney Louis H. Hight

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# UNITED STATES PATENT OFFICE

ALFRED H. HUMPHREY, OF NEW YORK, N. Y.

## INVERTED BURNER FOR INCANDESCENT GAS-LIGHT.

955,874.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed September 29, 1908. Serial No. 455,305.

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

Be it known that I, ALFRED H. HUMPHREY, a citizen of the United States, residing in the city, county, and State of New York, have invented new and useful Improvements in Inverted Burners for Incandescent Gas-Light, of which the following is a specification.

This invention relates to inverted burners of the Bunsen type for incandescent gas-light and has for its object the production of such a burner so constructed, and composed of such material, as to protect the parts thereof exposed to the heat and products of combustion, arising from the Bunsen flame, from being discolored or corroded, and the gas-supply pipe and connected parts from becoming overheated and to secure the other advantages hereinafter described.

Referring to the drawings forming part of this specification, Figure 1 represents an elevation, in vertical section, of an inverted burner for incandescent gas-light made in accordance with this invention; Fig. 2 is an elevation, in perspective, of a part of the burner shown in Fig. 1, composed of a refractory material that is a non-conductor or poor conductor of heat; Fig. 3 is an elevation, in vertical section, and Fig. 4 is a plan view from above of details of the burner shown in Fig. 1.

Referring to the several figures of the drawings, in which like letters indicate like parts, A is a gas-supply pipe provided at its lower end with an orifice B for the exit of gas into the mixing chamber C.

D is a gas-check, of any suitable construction, for the regulation of the flow of gas from the orifice B.

E is a hollow, cylindrical part suitably secured, as by screw threads, at its upper end, to the gas-supply pipe A, and at its lower end to part G. The part E is provided with air-inlet holes FF for the admission of air into the mixing chamber C.

G is a part composed preferably of a single piece of an earthy refractory material that is a non-conductor or a poor conductor of heat, such as porcelain. The part G is provided with a channel leading downwardly through it from mixing chamber C and so shaped that its upper part H forms a downwardly tapering mixing tube, and its lower part I forms an upwardly tapering

expansion tube, for the gas and air mixture. As shown in Fig. 2, part G is provided with a glazed surface which can be kept clean. Part G is made, preferably, of a single piece of suitable material, which, as above stated, is refractory and is a non-conductor or a poor conductor of heat and has, preferably, the shape of a bell provided at its lower and expanded portion with openings JJ and deflectors KK outwardly and upwardly inclined above the openings. As shown in Fig. 1, the lower end of part G is provided with a central portion f surrounding the lower end of the channel H--I and adapted to receive and hold, in suitable manner, as by screw threads, a delivery-piece L also made of refractory material that is a non-conductor or a poor conductor of heat, such as porcelain. Piece L is provided with a downwardly tapering or upwardly expanding channel M forming a continuation of the channel H--I of part G. The channel H--I of part G, together with channel M of the delivery-piece L, forms a downward duct of the inverted burner for the gas and air mixture. The delivery-piece L is provided with projections NN upon which rest projections OO of the support P, to which the inverted mantle Q is secured. Delivery-piece L and part G being made, preferably, in two separate pieces and secured together, as described, the insertion of a wire-sieve or gauze S, at or near the place where the said parts are joined together and, preferably, where their channels are widest, is a simple matter. The wire-sieve S extends across the duct in the channel of part L or of part G.

To the lower end of part G is secured an annular band of metal R in any suitable manner, as by turning the upper edge of the annular band R over the lower edge of part G. The annular band of metal R is provided with projections TT which support the shade-holder U. The shade-holder U, as shown in Fig. 4, is provided with notches VV in the rim W at the upper part thereof and with set screws *ss*. In adjusting the shade-holder U to the annular band R, the projections T pass through the notches V, whereupon the shade-holder U is turned so that the projections T pass under the parts of the rim W which are not provided with notches and thus support the shade-holder.



The shade *d* is suspended from the shade-holder *U* by means of the set screws *s*, as shown in Fig. 1. The lower part of the annular band *R* is turned up on the inner side thereof so as to form a support *X* for the globe *Y*. The support *X* is provided with notches *ZZ*. In adjusting the globe *Y* to its support *X* the points *PP*, with which the globe *Y* is provided near its top, pass through the notches *Z*, whereupon the globe is turned so that the points *P* pass over the unnotched parts of the support *X* and rest in depressions *a* in support *X*, whereby the globe *Y* is secured in place. For the admission of air to the outside of the Bunsen flame, which burns at the orifice *b* of the channel *M* of delivery-piece *L*, the globe *Y* may be provided with perforations *cc*.

From the foregoing description of the parts of an inverted burner of the Bunsen type for incandescent gas-light made in accordance with this invention, the mode of operation and the advantages thereof will readily be understood. The gas and air mixture passes, from mixing chamber *C*, downwardly through the duct formed by the channels of parts *G* and *L* and issues downwardly from the orifice *b* where it is ignited and thus forms the inverted Bunsen flame of the burner which heats to incandescence the inverted mantle *Q*. The wire-sieve or gauze *S*, located in and extending across the duct at the place above described, prevents the flame from flashing back or up and burning in the mixing chamber *C*, and also prevents the gas and air mixture from issuing and burning at the orifice *b* with a roaring sound. The part *C*, being, preferably, bell-shaped in form, the lower and expanded part thereof extends over or covers the inverted Bunsen flame and the inverted mantle of the burner. The products of combustion caused by the inverted Bunsen flame and the air heated thereby ascend and pass into the chamber *e* surrounding the lower central portion *f* of part *G*, whereupon they pass out of the openings *JJ*, being deflected in their passage, by the deflectors *KK*, upwardly and outwardly or away from the parts of the burner above the openings *JJ* and deflectors *KK*. By this arrangement the heated air and products of combustion are prevented from heating, as well as from being discharged upon, such upper parts of the burner. Moreover, the parts *G* and *L*, being composed of refractory material, withstand the heat produced by the Bunsen flame, and, being composed of a material that is a non-conductor or a poor conductor of heat, prevent the gas-supply pipe and other parts of the burner above part *G* from becoming overheated through excessive conduction of heat by parts *G* and *L*. For the reasons stated, parts *G* and *L* and the parts of the burner above part *G* do not, in a burner

made in accordance with this invention, become discolored, blackened, tarnished or corroded, as happens in ordinary inverted burners of the Bunsen type for incandescent gas-light, wherein the parts exposed to the heated air and products of combustion are made of metal, such as brass, which is usually covered with lacquer, and wherein the upper parts of the burner are not protected, by intervening refractory material that is a non-conductor or poor conductor of heat, from the heat caused by the Bunsen flame. Parts *G* and *L*, being composed of material, such as porcelain, having a glazed surface can easily be kept clean so that the appearance of the burner does not become marred in the use thereof. The openings *JJ* being above such metal parts of the burner as the annular band *R* and the shade-holder *U*, the heated air and products of combustion pass out above such metal parts and do not, therefore, tarnish them. The mixing tube *H* is above the openings *JJ* and the mixing tube *H*, the expansion tube *I*, and the channel *M*, constituting a duct for the gas and air mixture, as above described, being located above the Bunsen flame, the gas and air mixture becomes sufficiently heated in its downward course to secure a proper inverted Bunsen flame when it issues from, and is ignited at, the orifice *b*.

From the foregoing description of the manner and means whereby the shade *d* and globe *Y* are secured to the burner, it will readily be understood that the shade or the globe can be removed from, or adjusted to, the burner without disturbing, and independently of, the other.

What I claim is:--

1. In an inverted burner for incandescent gas-light, a part composed of a single piece of an earthy refractory material that is a poor conductor of heat, provided with a channel, having a downwardly tapering mixing and an upwardly tapering expansion part, and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, substantially as described.

2. In an inverted burner for incandescent gas-light, a part composed of refractory material that is a poor conductor of heat, provided with a channel, with a chamber in its lower part, with an opening for the exit of the products of combustion from the chamber, with a deflector outwardly and upwardly inclined at said opening and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, substantially as described.

3. In an inverted burner for incandescent gas-light, a part composed of suitable material, provided with a channel, with a chamber in its lower part surrounding a lower



central portion through which the lower end of the channel passes, with an opening for the exit of the products of combustion from the chamber, with a deflector outwardly and upwardly inclined at said opening, and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, substantially as described.

4. In an inverted burner for incandescent gas-light, a part composed of a single piece of an earthy refractory material, provided with a channel, having a downwardly tapering mixing and an upwardly tapering expansion part, with a chamber in its lower part surrounding a lower central portion through which the lower end of the channel passes, with an opening for the exit of the products of combustion from the chamber, and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, substantially as described.

5. In an inverted burner for incandescent gas-light, a part composed of suitable material, provided with a channel, having a downwardly tapering mixing and an upwardly tapering expansion part, with a chamber in its lower part surrounding a lower central portion through which the lower end of the channel passes, with an opening for the exit of the products of combustion from the chamber, with a deflector at said opening, and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, substantially as described.

6. In an inverted burner for incandescent gas-light, a part composed of an earthy refractory material that is a poor conductor of heat, provided with a channel and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, and a delivery-piece provided with an upwardly expanding channel forming a continuation of the channel of said first part, substantially as described.

7. In an inverted burner for incandescent gas-light, the combination of a part composed of a single piece of an earthy refractory material that is a poor conductor of heat, provided with a channel and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, and a delivery-piece composed of like material provided with an upwardly expanding channel forming a continuation of the channel of said first part, substantially as described.

8. In an inverted burner for incandescent gas-light, the combination of a part composed of a single piece of an earthy refractory material that is a poor conductor of heat, provided with a channel and with a

lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, and a separate delivery-piece joined to said first part and provided with an upwardly expanding channel forming a continuation of the channel of said first part, substantially as described.

9. In an inverted burner for incandescent gas-light, the combination of a part composed of a single piece of an earthy refractory material that is a poor conductor of heat, provided with a channel and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, and a separate delivery-piece composed of like material joined to said first part and provided with an upwardly expanding channel forming a continuation of the channel of said first part, substantially as described.

10. In an inverted burner for incandescent gas-light, the combination of a part composed of a single piece of an earthy refractory material that is a poor conductor of heat, provided with a channel and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, a delivery-piece provided with an upwardly expanding channel forming a continuation of the channel of said first part and gauze inserted in the duct formed by said two channels, substantially as described.

11. In an inverted burner for incandescent gas-light, the combination of a part composed of a single piece of an earthy refractory material that is a poor conductor of heat, provided with a channel and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, and a separate delivery-piece joined to said first part and provided with an upwardly expanding channel forming a continuation of the channel of said first part and gauze inserted in the duct formed by said two channels, substantially as described.

12. In an inverted burner for incandescent gas-light, a part composed of earthy refractory material that is a poor conductor of heat provided with a channel having a downwardly tapering mixing part and an upwardly tapering expansion part and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, and a delivery-piece provided with an upwardly expanding channel forming a continuation of the channel of said first part, substantially as described.

13. In an inverted burner for incandescent gas-light, a part composed of earthy refractory material that is a poor conductor of heat provided with a channel having a

downwardly tapering mixing part and an upwardly tapering expansion part and with a lower portion of sufficient expansion to extend over the flame of the burner situated above the orifice for the flame, a delivery-piece provided with an upwardly expanding channel forming a continuation of the

channel of said first part, and gauze inserted in the duct formed by said two channels, substantially as described.

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ANNIE J. IRVINE.