

No. 614,458.

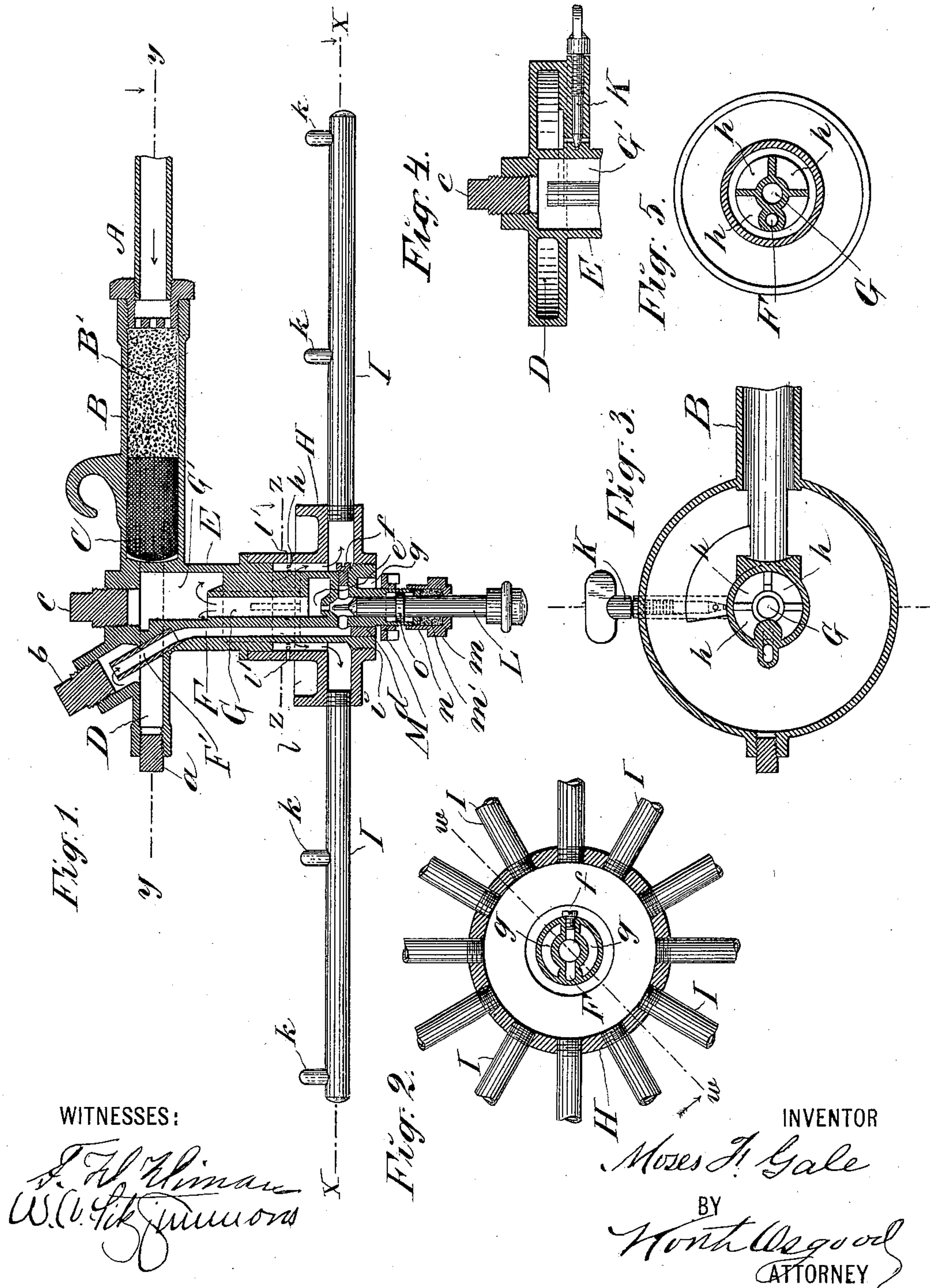
Patented Nov. 22, 1898.

M. F. GALE.
RETORT BURNER.

(Application filed Mar. 23, 1898.)

(No Model.)

2 Sheets—Sheet I.



WITNESSES:

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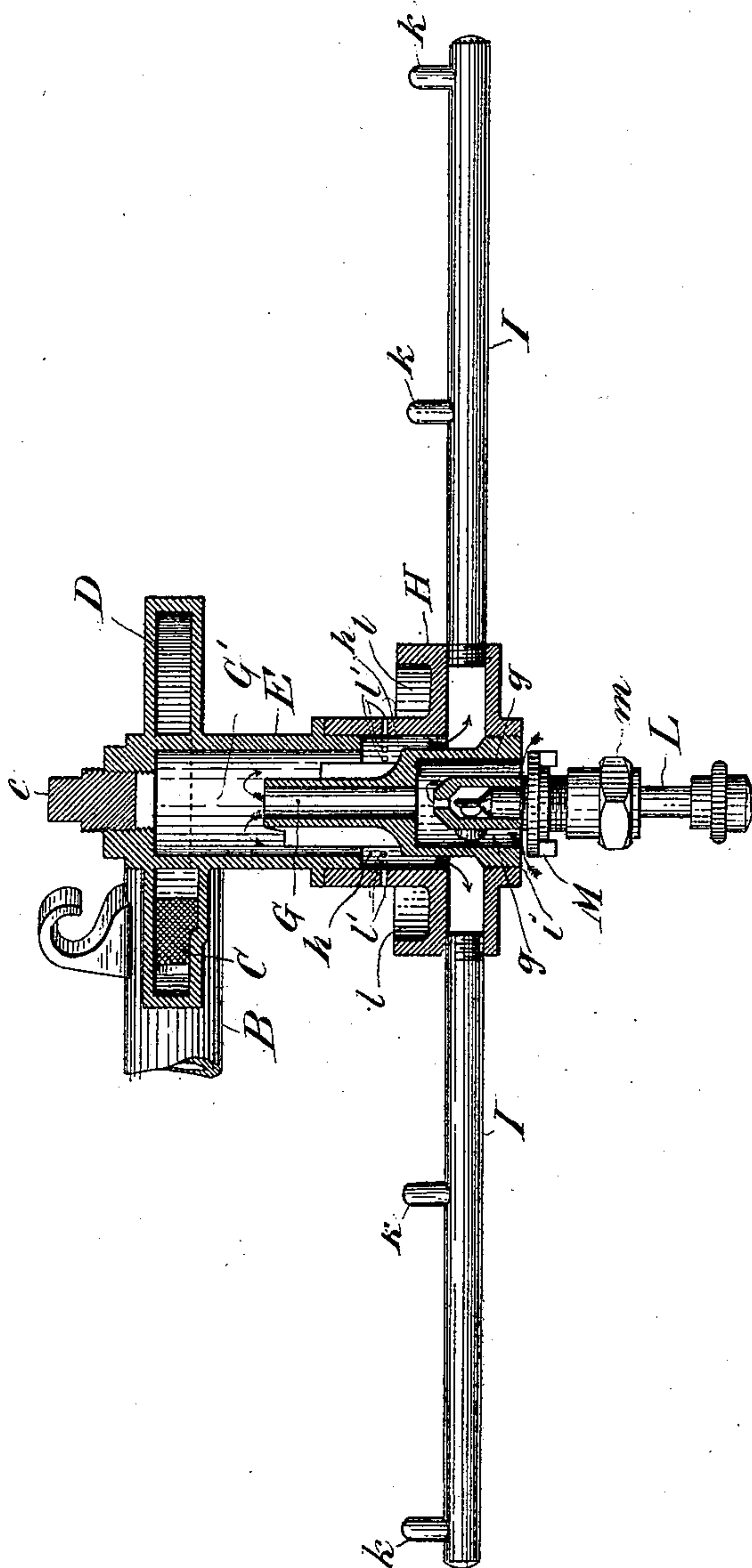
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Fig. 6.



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UNITED STATES PATENT OFFICE.

MOSES F. GALE, OF NEW YORK, N. Y.

RETORT-BURNER.

SPECIFICATION forming part of Letters Patent No. 614,458, dated November 22, 1898.

Application filed March 23, 1898. Serial No. 674,864. (No model.)

To all whom it may concern:

Be it known that I, MOSES F. GALE, a citizen of the United States, residing in the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Retort-Burners, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to that class of burners wherein liquid fuel, principally hydrocarbons, is converted into vapor or gas for illuminating purposes. These burners have received various names, each according to some peculiarity of construction or operation, and my invention relates to that variety wherein the gas is heated in a chamber or retort before being allowed to issue at the point where it is to be consumed. This variety has been called "retort-burners," and it is to such that my improvements are principally applicable.

The object of my invention is to produce a burner of the class and variety named which shall be simple, cheap, and effective in use and which shall afford an abundance of illuminating-gas for a considerable number of flames, all drawing their supply from the same source and all preferably burning at the same time and with substantially the same intensity and with uniformly equal lighting qualities.

To accomplish all of the above and to secure other and further advantages in the matters of construction, operation, and use, my improvements involve certain novel and useful arrangements or combinations of parts, peculiarities of construction, and principles of operation, as will be herein first fully described and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical view, partly in section and partly in elevation, upon a plane through the vertical axis of the burner, showing the parts assembled as for use. Fig. 2 is a horizontal section and partial plan view upon a plane through line $x x$ of Fig. 1, the burner-tubes being for the greater part broken away. Fig. 3 is a similar view of the upper part of the burner upon

a plane through line $y y$ of Fig. 1. Fig. 4 is a vertical central section and elevation upon a plane through the upper part of the burner, but at right angles to that of Fig. 1. Fig. 5 is a horizontal section and partial plan view upon a plane through line $z z$ of Fig. 1. Fig. 6 is a vertical section and elevation on a plane through line $w w$ of Fig. 2.

In all the figures like letters of reference wherever they occur indicate corresponding parts.

A is the supply-tube, serving to convey oil or liquid to the burner from any suitable reservoir. The reservoir (not shown in the drawings) is ordinarily elevated so as to deliver the fuel to the burner under a certain amount of pressure, and it is usually supplied with a valve to stop or regulate the flow when required; but of course the fuel may be delivered under pressure supplied by any suitable means.

B is the neck of the retort, which neck is filled with a suitable packing B' , and this packing is prevented from entering the body of the retort by a perforated metallic or other suitable cylinder C, which, though it arrests the packing, permits the necessary free flow of liquid or gas.

D is the chamber or passage which constitutes the retort. As will be seen, the walls of this retort are made amply strong and heavy to withstand any pressure to which they may be subjected and to better receive and convey the heat necessary for vaporization of the fuel. The retort is substantially circular in plan, (see Figs. 3 and 4,) so as to be uniformly heated from below. Depending from the retort is a neck E, on which the cluster is sustained and which contains the channel leading down from the retort, the inlet-passages for air, the commingling-tube, and the outlets for the illuminating-gas. The retort and its necks are preferably cast together, so as to afford the requisite stability and best heat-conducting effects; but they might be made in more than one piece, if preferred. The plugs $a b c d$ are merely for the purpose of closing the drill-openings after the drilled channels have been completed, but they may be removed if ever desired to reach the interior for cleaning.

F is the gas-passage leading from the retort

down to the inducing-jet orifice *e*. This passage is to convey gas from a point above the retort, so that only the most thoroughly vaporized material shall be employed, and to effect this the passage *F* is elongated a trifle by the insertion of a short tube, as *F'*, in its upper part, the same being covered by plug *b*, under which is a small chamber, as shown, the chamber communicating with the retort at bottom. The lower end of passage *F* is made to communicate with the orifice *e* by drilling through from the exterior of the neck *E* and then closing the outside perforation—as, for instance, by a plug, as *f*.

When the burner is in operation and the orifice *e* open, gas issues therethrough under considerable pressure, always sufficient to induce the inflow of all the air that is necessary to convert the gas by commingling therewith into the best illuminant which it is possible thus to make of it. This air from the exterior flows in through passages *g g* in the bottom of neck *E* and up to the chamber just over the orifice *e*, from whence it is forced, with the gas, through the commingling-tube *G*. The commingling-tube discharges into a larger chamber above it, as *G'*, and this latter extends up about as high as the top of the retort, although it does not communicate with the interior of the retort. (See Fig. 4.) From the chamber *G'* the mingled gas and air passes downward around tube *G*, through passages *h h* to the interior of the hub, to be hereinafter described.

From a consideration of the construction thus far described it will be apparent that, all the parts being heated to a high degree, the incoming air is well heated before mixing with the inducing-gas, which is itself highly heated, and that the mixed air and gas are carried to the upper part of the structure, where they are again heated before delivery for burning, the last operation constituting what may be termed a “superheating” of the illuminant before combustion. With the use of this kind of gas the superheating, as above explained, is found to be especially beneficial, especially as the material is to be conducted some distance through the burner-carrying tubes before finally utilized.

H is the hub, which is threaded upon the lower end of neck *E*, as at *i*, and sustains the burner-carrying tubes *I I*, which may be of any desired number and of any required length, according to the capacity of the apparatus. The upper neck of the hub slides to place over the neck *E* and covers the outlets from channels *h h*, so that the latter can only discharge into the interior of the hub, substantially as shown. From the hub the illuminating-gas is distributed to the burner-carrying tubes *I* and then to the burners *k*, where it is consumed to afford the required illumination. The hub is provided with an annular open-top channel *l*, into which some of the liquid fuel is delivered from a small orifice in neck *E*, controlled by a thumb-screw

valve *K*. This fuel is ignited to supply the initial heat to start the burner, and the retort is kept constantly heated while in use by gas burned at the small orifices *l' l'* through the upper neck of the hub and communicating with the gas-channels *h h*.

L is the stem of the shut-off valve, of which the inner extremity is pointed and arranged to pass through the orifice *e* when the valve is completely closed, so as to keep that orifice clear of any accumulations or obstructions. The stem *L* is supported in the lower end of neck *E* by a packing-nut *m*, threaded on the reduced extremity of the neck, as shown, and containing a packing *m'*, which may be compressed to any desired degree by turning nut *m*, which carries the packing against a washer *n*, the latter bearing against the stationary extremity of neck *E*. The stem *L* is adjustable by sliding it up or down, and it is provided with a ring *o* to limit its extent of travel. By reason of making the stem *L* to slide instead of threading it in place, as is ordinarily the custom, I am enabled to make the apparatus safe against accident by falling. If it should fall, the stem *L* will first strike the ground or floor and will be thus forced in to close the orifice *e*, thereby instantly extinguishing all the flames.

Above nut *m* and threaded on the reduced portion of neck *E* is the air-regulator *M*. This consists of a ring of width sufficient to cover the lower mouths of the air-inlet passages *g* and which may be easily adjusted up or down by simply turning it upon its threaded seat. By use of this regulator the proper amount of air may be allowed to flow in to insure the best possible illumination under the circumstances under which the burner may be working. The operator has only to observe the flames and to adjust the air-regulator until the best results are obtained.

The hub, with its burner-carrying tubes, constitutes the cluster, which, as before indicated, may be of any desired size.

The apparatus is intended to afford a considerable illumination and is chiefly designed for use on pleasure-grounds, in circuses, and in any such situations where it may be available.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a burner of the character herein set forth, the combination with the retort, of the gas-passage leading therefrom, the gas-jet orifice, the commingling-tube located within the neck of the retort, the air-inlet passages in the lower end of said neck, and the outlet-channels for the combined air and gas leading from the enlarged chamber above the commingling-tube, located and arranged substantially as shown and described.

2. In a burner of the character herein set forth, the combination with the retort carrying gas and air passages as explained and the central commingling-tube, of the chamber lo-

5 cated above said commingling-tube, the said chamber being closed at the top and extending up through the retort but not communicating therewith, and the channels for combined air and gas leading from the bottom of said chamber, substantially as shown and described.

10 3. In combination with the retort having the neck containing the air-channels and the gas-channels arranged as set forth, the hub threaded on the lower end of said neck above

the air-inlets and carrying the cluster of gas-conducting tubes, substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand, in the presence 15 of two witnesses, at New York, N. Y., this 18th day of March, 1898.

MOSES F. GALE.

Witnesses:

W. C. FITZ SIMMONS,
WORTH OSGOOD.