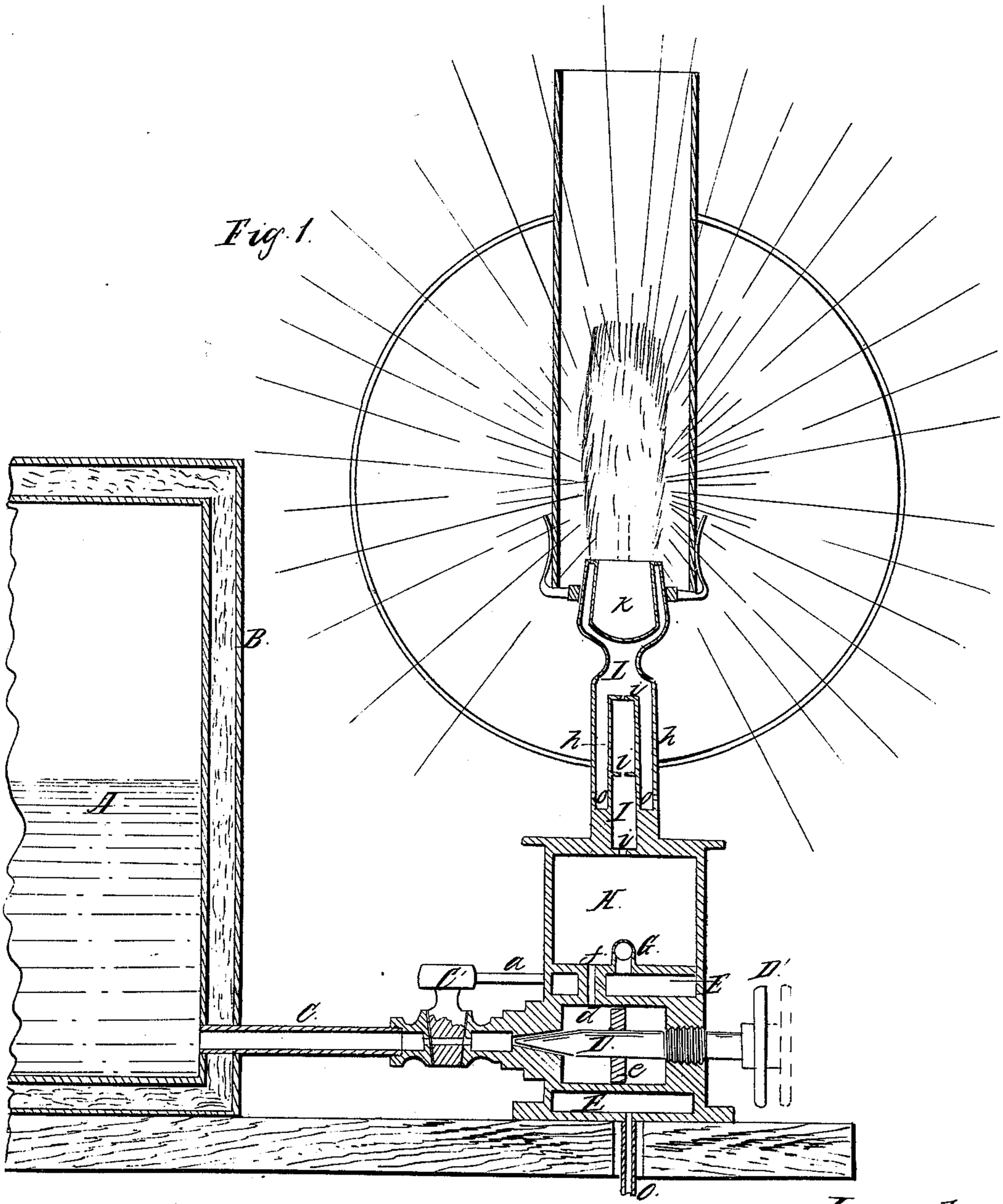
Sheet 1-2 Sheets.

E. H. Covell.

Gas Apps.

No. 91,423. Patented Jun. 15, 1869.

Fig. 1.



Witnesses:
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Hale C. Jones

Inventor:
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attys

Sheet 2 - 2 Sheets

E. H. Covell.

Gas Apps's.

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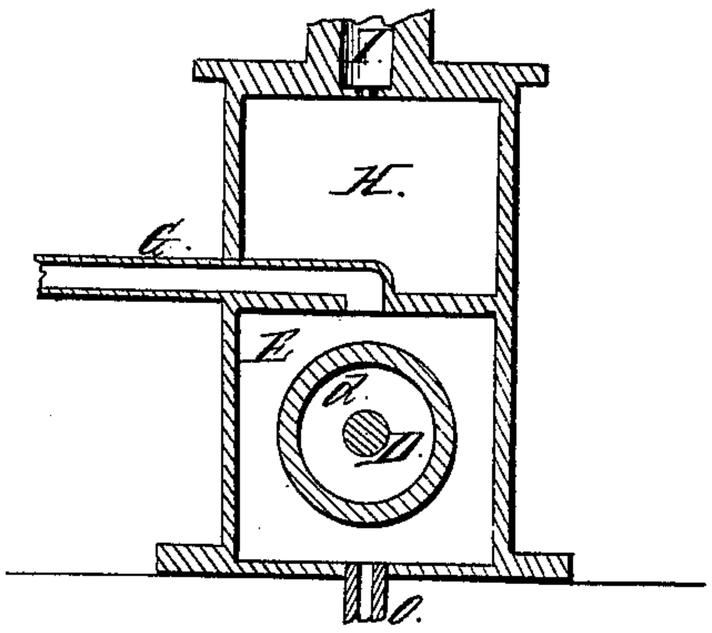
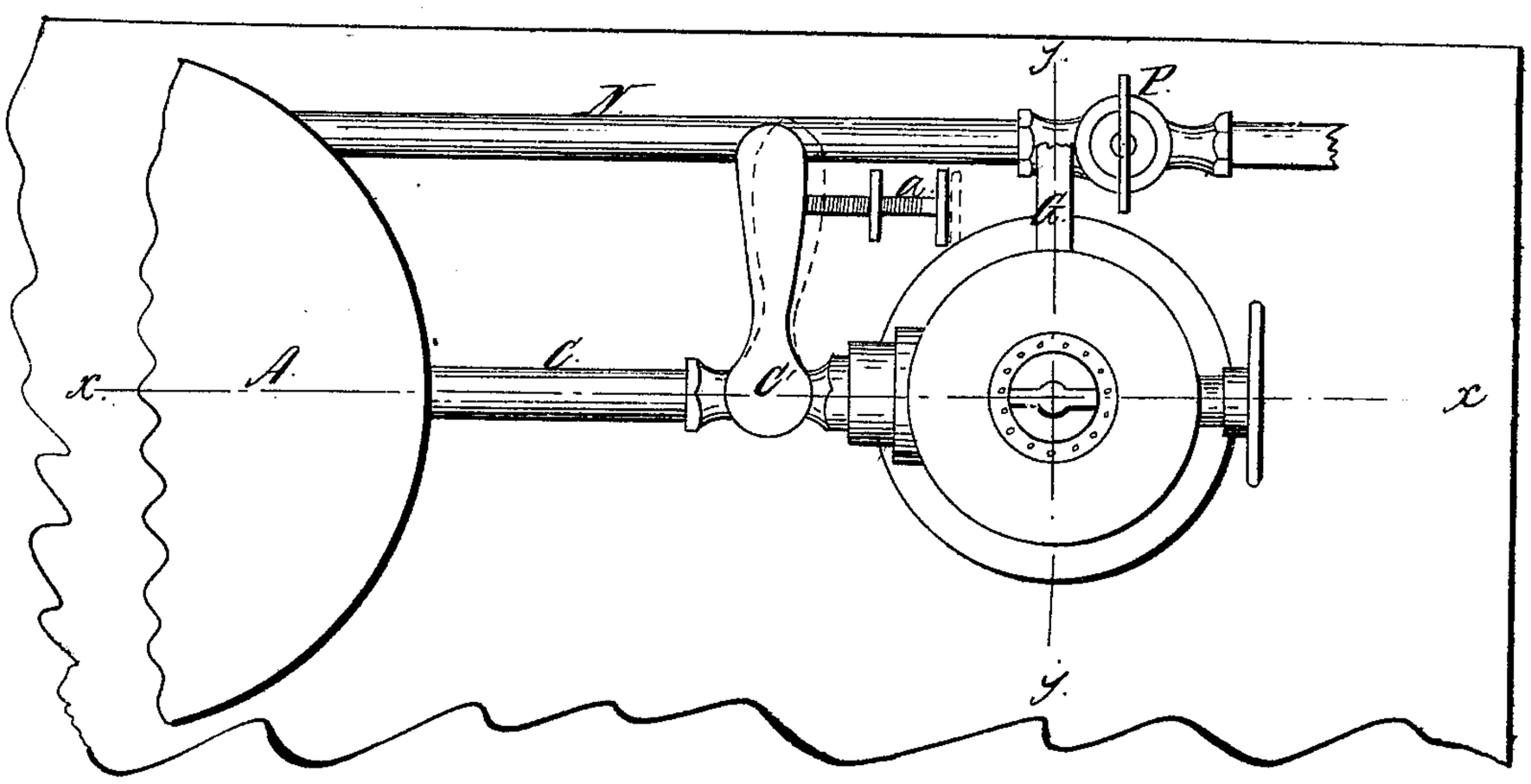
Fig. 2.





Witnesses.

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UNITED STATES PATENT OFFICE.

E. HALL COVEL, OF NEW YORK, N. Y.

IMPROVED APPARATUS FOR MAKING LIGHT FROM HYDROCARBON LIQUIDS.

Specification forming part of Letters Patent No. **91,423**, dated June 15, 1869.

To all whom it may concern:

Be it known that I, E. HALL COVEL, of the city, county, and State of New York, have invented certain new and useful Improvements in an Apparatus for Producing Illuminating-Gas from Hydrocarbon Liquids; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical section of my improved apparatus on the line *x x* of Fig. 3, with Argand burner and parabolic reflector applied. Fig. 2 is a transverse vertical section on the line *y y* of Fig. 3, showing the vaporizing-chamber *d*, its surrounding steam-jacket E, and the storing or reserve chamber H, detached from the other parts of the apparatus. Fig. 3 is a general plan view of the apparatus, a part only of the tank being represented.

Corresponding letters on the different views indicate the same parts.

It is the object of my invention to produce a simple and compactly-formed generator of vapor from hydrocarbon liquids of such construction as will enable it to be used in the lanterns of locomotive-engines, on board vessels, and in light-houses, or in other situations subject to agitation or vibrations of temperature, and to be easily managed and operated uniformly and reliably; and it consists in the features and arrangements hereinafter described and claimed.

An essential part of my apparatus is a reservoir for containing the hydrocarbon liquid from which the vapor or gas is generated. This may be a vessel of any suitable size and shape, but preferably cylindrical, as at A. This cylinder I surround with a jacket or another inclosing cylinder, B, and fill the space between the two, *b*, with felt, plaster-of-paris, or any other non-conducting substance, the object being to prevent its contents from absorbing heat from the flame of the burners when placed near together in the reflector-box of a locomotive-lantern.

The cylinder A is hermetic, and provided with a receiving-pipe, N, and a delivery-pipe, C, connected with the gas-forming apparatus. A pump may be connected with the receiving-pipe and the cork P opened, by which the liquid is introduced, filling the tank to about half of its capacity, the remaining space being occupied by atmospheric air, which I prefer to employ in a state of condensation equaling about two atmospheres. The air may be compressed by using the same pump with which the oil is introduced, or by forcing the liquid in which the air is confined in the vessel, or other means. The pressure thus obtained insures the uniform delivery of the oil to the vaporizer. The latter consists of a chamber, *d*, (the capacity of which is variable,) as hereinafter described, said chamber being surrounded by a steam space or jacket, E, for maintaining a temperature sufficiently high to instantly vaporize the oil which is introduced, the steam for this purpose being taken directly from the boiler (where this apparatus is used upon a locomotive) through the pipe G and exhausting or escaping through the pipe O. In situations where steam cannot conveniently be used, hot water or heated air may be employed with the same effect.

The oil or liquid is admitted into the vaporizer in just sufficient quantity to generate an amount of gas equal to that required for combustion by the burner. This requires accurate regulating devices, and they are provided in the combination of the conical screw-valve D and cock C′, the opening of the latter being gaged by a thumb-screw stop, *a*, so as to enable it to be graduated with great nicety, and the opening kept always the same when required. The small supply which passes this cock is again regulated by adjusting the valve D, which is done by turning the head D′, its stem being threaded for the purpose. By this means a very minute quantity may be admitted into the vaporizer, equaling only the demand for the burner; and to adopt the capacity of the vaporizer to the same requirement its size is varied according to the adjustment of the valve D by means of the piston *e*, which is attached to the valve-stem and moves forward or back with it. The gas as generated escapes through the passage *f* into the reserve-chamber H, from whence it passes through the equalizing-pipe I into the throat L of the burner K. This pipe is provided with two or more diaphragms, *i i i i*, each having an orifice, (or orifices,) which is largest in that at which the gas first enters, and gradually diminishes in those nearer the burner. This renders the flow of the gas regular and uniform, and the

flame consequently steady—a result which is also aided by the regularity of production and the intermediate reserve-chamber H.

In order to prepare the hydrocarbon vapor for burning to the best advantage, it requires the mixture of a certain proportion of atmospheric air. This is effected before it reaches the burner by inclosing the pipe I with a concentric annular tube, *h h*, the lower extremity of which is perforated to admit air, which, in ascending, commingles with the vapor in the throat L before reaching the burner. As the vapor thus produced from hydrocarbon is not a permanent or fixed gas, it is liable to condensation under the influence of cold. This is prevented by arranging the pipe G, which conveys steam to the jacket surrounding the vaporizer, within the reserve-chamber H, where it constantly maintains the vapor at a temperature above condensation, and in suitable condition for burning with the best effect.

A distinguishing feature of my invention is that none of the hydrocarbon in liquid form is held in the lamp, it being retained in the tank and only admitted in minute quantity regularly supplied, which instantly vaporizes, the gas being regularly and continuously formed as it is consumed, while in other vaporizing apparatuses the liquid is admitted in a body into the lamp, and then vaporized a method which is uncertain and irregular in its results and dangerous in a high degree.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an apparatus for generating gas or vapor from hydrocarbon liquids or a head-light, a tank or vessel for holding the liquid, which is inclosed in a jacket containing non-condensing material, substantially as and for the purpose set forth.

2. The employment of the shut-off cock C′, with gaging stop-screw *a*, in the manner and for the purpose set forth.

3. The conical valve D, arranged in combination with and in relation to the supply-pipe C, generator *d*, and steam-chamber E, substantially as set forth.

4. The combination of the conical valve D with the gaged set-cock C′ for regulating accurately the influx of the liquid into the vaporizer, substantially as set forth.

5. The combination, with the valve D and chamber *d*, of the piston *e* for varying the capacity of the generating-chamber by the movements of the valve, substantially as set forth.

6. The combination, with the generator *d* and the burner or burners, of the intermediate reserve-chamber H for the gas or vapor, substantially as set forth.

7. The arrangement, in combination with the reserve-chamber H, of the steam-pipe G for maintaining the requisite temperature of the gas or vapor, substantially as set forth.

8. The equalizing device consisting of the diaphragm *i i* in the pipe I, provided with graduated openings diminishing in size as they approach the burner, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

E. HALL COVEL.

Witnesses:
J. A. DAVIS,
JNO. D. PATTEN.