

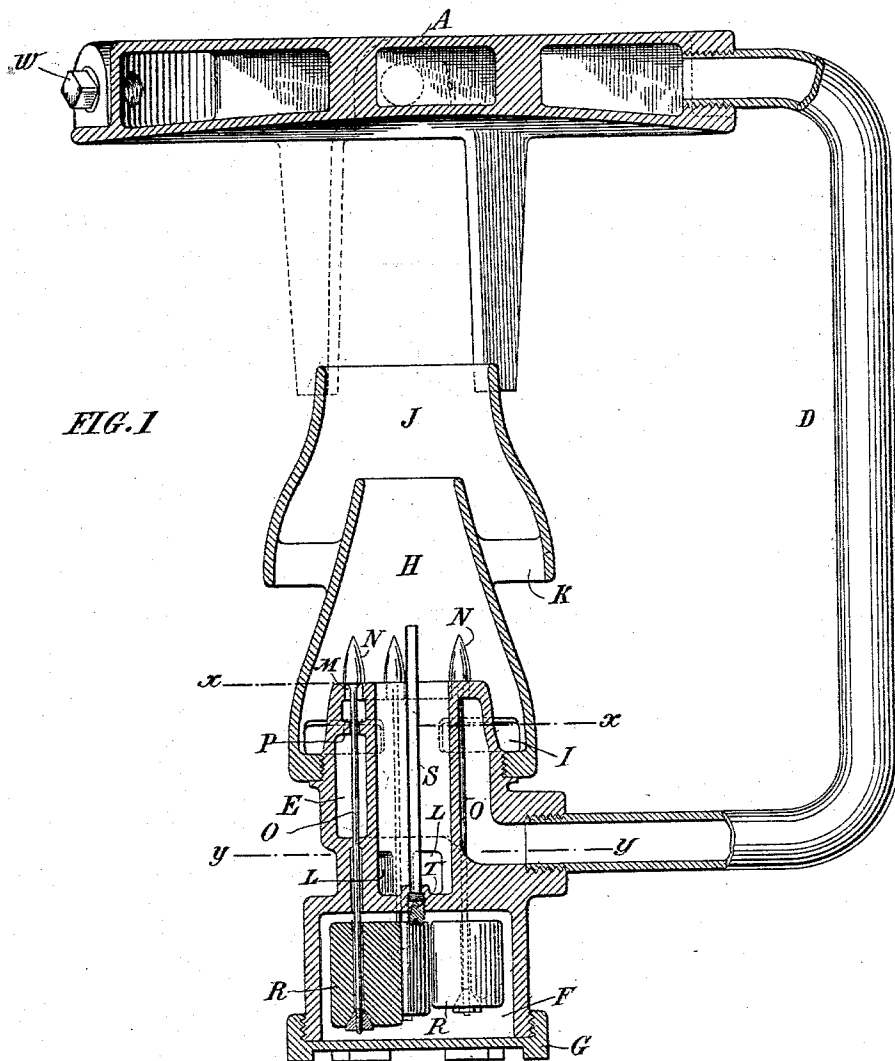
(No Model.)

2 Sheets—Sheet 1.

H. A. HOUSE.
GAS OR VAPOR BURNER.

No. 533,594.

Patented Feb. 5, 1895.



Witnesses:
Raphael Netter
James W. Crallow

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Henry A. House
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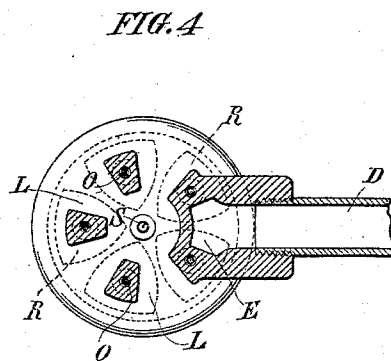
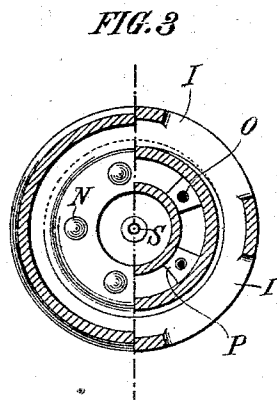
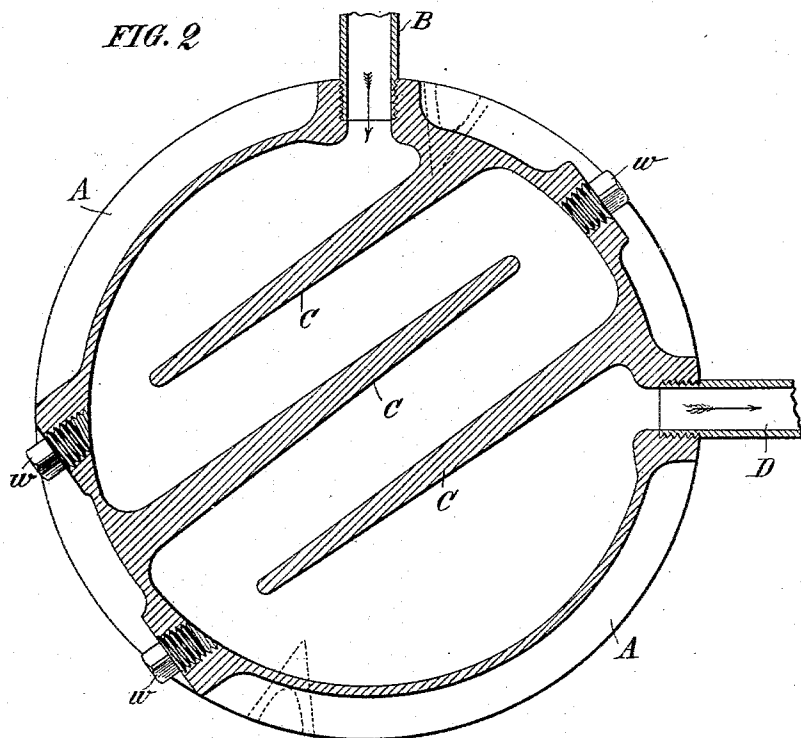
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2 Sheets—Sheet 2.

H. A. HOUSE.
GAS OR VAPOR BURNER.

No. 533,594.

Patented Feb. 5, 1895.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY A. HOUSE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR OF ONE-HALF
TO ROBERT RINTOUL SYMON, OF LONDON, ENGLAND.

GAS OR VAPOR BURNER.

SPECIFICATION forming part of Letters Patent No. 533,594, dated February 5, 1895.

Application filed April 16, 1894. Serial No. 507,628. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Gas or Vapor Burners, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

In an application for Letters Patent, Serial No. 480,417, filed July 13, 1893, by H. A. House and H. A. House, Jr., is shown and described a gas or vapor burner for heating purposes such as the generation of steam and the like, in which is employed a weighted valve seated in or over the orifice from which the gas issues and normally closing the same but adapted to be raised by and in proportion to the pressure of gas within the chamber from which it issues, so as to give a constant pressure to the gas whatever quantity may be passing through the said orifice.

My present invention relates to and is an improvement in burners of this character.

The main object of my improvement is to so increase the capacity of a single burner that it may have a much greater range of heating effect and available, without waste of fuel or the necessity of adjustment or attention for producing any desired amount of heat within very wide limits.

To this end my invention consists in the combination in the same burner of a plurality of valves of different degrees of sensitiveness, in the sense that they are differently weighted, or restrained against movement by any similar means, such as by springs, so that the pressure of the escaping gas may be controlled not only by each valve acting independently but by the number of valves affected by the pressure of gas acting upon them.

A burner of this description is illustrated in the accompanying drawings, in which—

Figure 1 is a central sectional view of my improved vapor generator and burner. Fig. 2 is a central horizontal section of the generator; Fig. 3, a broken section of the burner on line $x-x$ of Fig. 1, and Fig. 4 a horizontal section on line $y-y$ of Fig. 1.

A is the generator which may be of any de-

sired construction, but which is preferably composed of a hollow reservoir into which a hydrocarbon liquid in regulated quantity is introduced through the pipe B.

The interior space of the generator is divided by transverse webs or partitions C that extend partially across the same and form a serpentine passage with an outlet at pipe D through which the vaporized hydrocarbon is conducted to the burner.

At one or more points in the sides of the generator openings are formed which are provided with screw plugs w which may be removed to afford access to the interior of the generator, should it become necessary to clean the same of any deposit which may form therein.

The general plan of construction of the burner may be greatly modified, but the most practicable and efficient form which I have devised is constructed in the following manner:

E is an annular chamber into which the gas or vapor is conducted. F is a closed chamber below the same and is generally provided with a detachable screw-cap or cover G.

Above and partially surrounding the annular chamber E is a mixing chamber H which is provided with a series of openings I around its base and which extends up into another chamber J also provided with openings K round its base. This latter chamber constitutes a nozzle or chimney at the orifice of which the combustion of the mixture of gas or vapor and air takes place. A further provision for the admixture of atmospheric air with the vapor or gas is made by holes L at the bottom of the central space or bore of the annular chamber E.

In the top of the chamber E are orifices M which are normally closed by valves N N. Said valves have attached to them stems O which extend vertically down through guide webs P and perforations in the bottom of the chamber E into the chamber F. To the ends of the stems O are attached suitable devices that oppose the lifting of the valves, such as weights R of different and predetermined sizes.

It is desirable to provide a pilot burner for the device, which is in the form of a tube extending up from the chamber F to a point

slightly above the valves N N. Sufficient gas finds its way around the valve stems into the chamber F to maintain a flame at the end of this tube, the amount of gas being regulated by a screw plug T provided with a slot. In the use of the burner a small quantity of aqueous vapor sometimes passes through the valve openings and by its sudden expansion under the intense heat, extinguishes the main flame. The pilot flame, however, from its position is not affected and serves to relight the gas as soon as the disturbance has ceased.

The operation of the device is as follows: Liquid hydrocarbon in an amount proportioned to the steam power to be generated is admitted to the generator A and being vaporized therein, by heat applied thereto when necessary, passes to the burner. The pressure of this vapor will raise to a greater or less extent say, the lightest valve, and the escaping jet draws up through the holes in the mixing chamber H and the nozzle J sufficient atmospheric air to maintain a perfect combustion of the vapor. One valve may regulate the pressure necessary for producing say, from one to five horse power. If a higher power is required the quantity of oil is increased and the pressure of vapor in the burner proportionately raised. If a single valve were relied upon to regulate for this increased pressure, it would be found that the jet of escaping vapor would be too thin to draw up enough air for perfect combustion, but the increased pressure raises the two lightest valves so that the air is now drawn in by the combined effects of two jets. In this way by the use of a plurality of valves and the proper adjustment of the same, one burner may be used and perfect combustion maintained for any number of horse power.

A special advantage is secured by making, in this kind of burner, the chamber E in annular form with a central air passage through it, as it prevents eddying of the gases, and affords a means of supplying air to both sides of the jets.

It will be understood that such of the heat as is not absorbed by the generator is utilized for generating steam or any other purpose.

Having now described my invention, what I claim is—

1. In an apparatus for burning a gas or vapor, the combination with a source of gas subject to variations of pressure, a chamber into which the gas or vapor is introduced and a mixing chamber into which the gas chamber opens through a series of orifices, of a plu-

60 rality of weighted valves normally closing said orifices and adapted to be raised by the pressure of vapor or gas within the gas chamber, as set forth.

2. In a gas or vapor burner, the combination with a chamber into which gas or vapor is introduced having a plurality of independent and differently weighted valves normally closing orifices for the escape of gas from the chamber and adapted to be raised by the pressure of gas or vapor within said chamber.

3. In a gas or vapor burner, the combination with a chamber into which gas or vapor is introduced, and a second chamber beneath the same, of one or more valves normally closing orifices for the escape of gas and weights contained in the lower chamber and connected with the said valves, as set forth.

4. In an apparatus for burning a gas or vapor, the combination with a source of gas subject to variations of pressure, an annular chamber into which the gas or vapor is introduced and a mixing chamber into which the gas chamber opens through a circular series of orifices in the top of the gas chamber of a plurality of weighted valves normally closing said orifices and adapted to be raised by the pressure of vapor or gas issuing through the orifices, as set forth.

5. The combination with the gas chamber E and the lower chamber F of one or more valves controlling orifices in the top of the gas chamber, stems O extending down into chamber F and weights of different sizes attached to said stems, as described.

6. The combination with the annular gas chamber E having a central air passage, and the lower chamber F of valves controlling orifices in the top of the annular chamber and weights contained in the chamber F and suspended from the valves by stems passing through the gas chamber into the chamber F, as set forth.

7. The combination with the annular gas chamber E having a central air passage and the lower chamber F of valves controlling orifices in the top of the annular chamber, weights contained in the chamber F and suspended from the valves of stems passing through the gas chamber into the chamber F and a pilot burner in proximity to the valved controlled orifices supplied with gas from the lower chamber F, as set forth.

HENRY A. HOUSE.

Witnesses:

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