H. G. SICKEL.

Vapor Burner.

No. 6,624. Patented Aug. 7, 1849.

Fig. 2

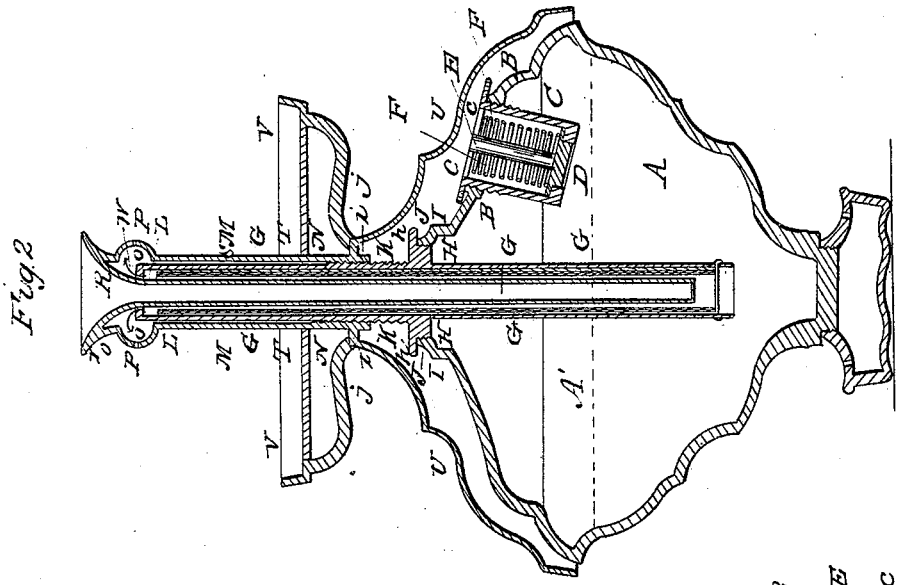


Fig. 4

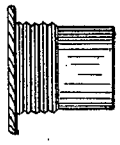


Fig. 3

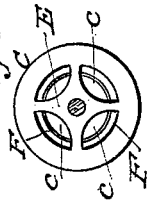
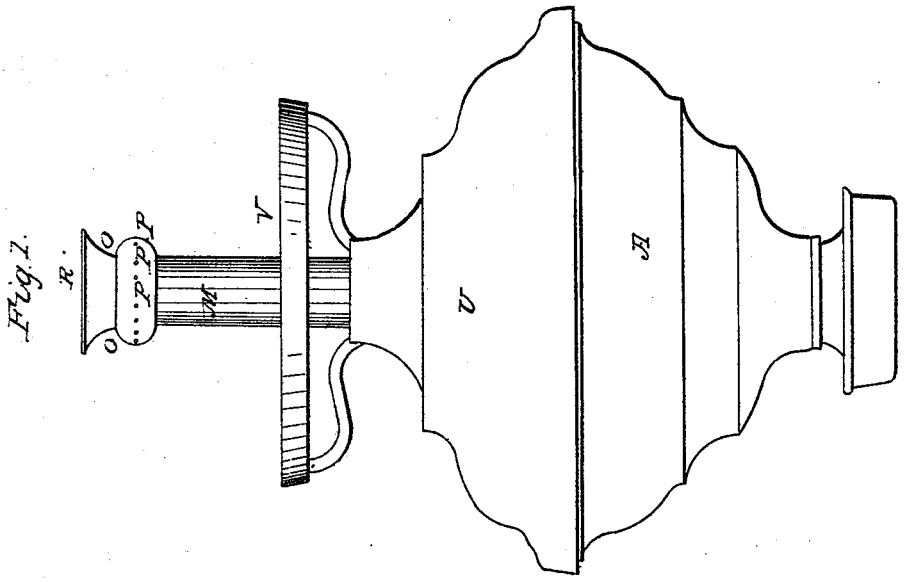


Fig. 1.



UNITED STATES PATENT OFFICE.

HORATIO G. SICKEL, OF PHILADELPHIA, PENNSYLVANIA.

GAS-LAMP.

Specification forming part of Letters Patent No. 6,624, dated August 7, 1849; Reissued May 31, 1859, No. 734.

To all whom it may concern:

Be it known that I, HORATIO G. SICKEL, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in the Construction of a Lamp for Burning Vapor, called "Sickel's Improved Vapor Burner," which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1, is an elevation of the burner. Fig. 2, is a vertical section through the center of the burner. Fig. 3, is a side and top view of the tubular stopper detached from the lamp. Fig. 4 is a plan of the safety valve.

Similar letters in the several figures refer to corresponding parts.

A is a reservoir into which is poured the spirit (generally composed of a mixture of alcohol and spirits of turpentine) to be heated for producing the vapor to be ignited to produce the required light.

B is the opening at which the spirit is introduced to the reservoir.

C is a tubular valve stopper for closing opening B, screwed into the reservoir.

D is the valve.

E is the stem of the valve passing through a central aperture in the top of the stopper, which top has four or more segmental openings *c* for the escape of the vapor. F is a helical spring pressing upon the valve to keep it closed and against the open end of the stopper. This stopper is made in the form of a hollow cylinder with openings in each end, and a rim around the upper end, and a screw formed on its outer surface next the rim, the opening in the bottom being closed by the valve *f*, the openings *c* in the top being always open for the escape of vapor when the valve D is open, or raised. G is the inner cylinder extending down into the reservoir to near the bottom thereof for conducting the vapor to the burner.

H is a screw formed on the same below the milled head *h* by which the cylinder is turned for securing the cylinder G to the reservoir A. I is a circular rim or curb in which is formed a female screw J, in which the male screw H, just mentioned, is screwed.

K is a screw formed around on the outer surface of the inner cylinder G above the said milled head *h* on which screw the outer cylinder M is screwed.

L is a lip formed around the upper end of the inner cylinder G for the button to shut against when extinguishing the lamp.

M is the outer cylinder for regulating the light, to which the button R ring V and guard U are affixed.

N is the spiral thread or female screw formed on the inside of said outer cylinder M, corresponding with the male screw K on the outside of the inner cylinder, G. O is the head of the outer cylinder M in which the burners are formed. P are the burners, through which the vapor issues.

Q is a central tube or heater for heating the liquid to produce the vapor or gas closed at its lower end and open at its upper end, which is formed into a trumpet shaped top or button R, but which may be of a conical, spherical, or other shape, suitable for producing the intended effect. This tube is secured to the head of the outer cylinder at *r* and rises and falls with it, forming, in combination with the inner cylinder G a valve for regulating the discharge of vapor through the burner. The tube Q is surrounded by a reticulated cylinder S at a suitable distance therefrom and which is wrapped with cotton wick T for conducting the liquid to the hottest part of the inner cylinder for a quick generation of vapor by radiation. The reticulated cylinder is to prevent the cotton wick from touching the central tube and thereby becoming charred. The liquid receives its heat from the heater Q by radiation as well as by contact. U is a guard or shield attached to the base of the outer cylinder M, being of greater diameter than the reservoir and embracing a little more than one half of its external surface to prveent the flame igniting any vapor that might escape from the reservoir.

V is a ring attached to the outer cylinder by a small ring *i* and arms *j* for supporting the glass shade and for turning the outer cylinder M in order to increase or diminish the light.

W W is the passage for the vapor from the inner to the outer cylinder (or burner) formed by the under surface of the button R and top of the inner cylinder G which is shaped to fit the button, and thus form a close joint when the button is shut down tight upon it to prevent the ascent of any

vapor. This portion of the combination forms what I term a valve and is the essential part of my improvement as it completely regulates the light and consumption of gas and vapor without the use of double perforated concentric cylinders used in Jennings' lamp.

The level of the liquid is the same in the tube G, as in the reservoir A, as shown by the dotted line A′ and is always in contact with the heating tube Q. The liquid in the tube G, is raised above the level by the conducting wick T, and reticulated wire S, by capillary attraction. The liquid below the dotted line is heated by its contact with the heater Q. That which is above the dotted line is heated by radiation from the heater Q.

Operation: The operation of this lamp is as follows. The volatile liquid, or liquids, to form the vapor is poured into the reservoir A through the opening B and the aperture closed by the insertion of the stopper C. The outer cylinder is then screwed upon the inner cylinder and descended until the vapor way W is of the required size. The tubular heater Q, guard U, and glass holder V, descends, or ascends, simultaneously with the outer cylinder M, being all combined with it. A small quantity of the spirit is then poured into the tube Q through the funnel or trumpet shaped button R wherein it is ignited. This temporary light soon heats the tube Q to that degree necessary for the production of vapor in the cylinder G to supply the burners P. The vapor ascends through the said inner cylinder G, ways W, and passes into the cavity O′ of the head O of the outer cylinder, from whence it issues in small streams through the perforations P, being inflamed on the outside of the head of the burner where it burns in the manner of gas lights—there being any required number of radial perforations P through which the vapor issues. The arrows show the direction that the vapor takes in passing from the inner to the outer cylinder. Should too much vapor issue through the perforations P the ring V must be turned to the right which will cause the outer cylinder M, guard U, tubular heater Q, and button R, to descend—making the openings W smaller. To extinguish the lights the cylinder M must be turned in the same direction, till the button R comes in close contact with the beveled end L of the inner cylinder. To increase the discharge of vapor the motion of the outer cylinder must be reversed. When the button R is down upon the end of the inner cylinder G the guard U will be nearly down upon the convex surface of the reservoir A. This guard prevents the possibility of any vapor, that might chance to escape at the joints, becoming ignited by the flame from the burner. It likewise adds to the beauty of the lamp and conceals the stopper and other projections. Should there be too great pressure of vapor in the reservoir the valve D will rise from its seat, contract the helical spring F, and let out the vapor through the openings *c* in the top till the pressure is so far reduced as to permit the spring to reclose the valve. By the use of this valve all danger of explosion from excessive pressure of vapor within the reservoir is removed. The vapor that is let off will pass below the lower edge of the guard and be condensed without the danger of ignition—thus rendering this lamp much more secure than others in use.

I do not claim as my invention a generating tube or vapor burner separately considered, but

What I do claim as my invention and improvement in lamps for producing light by burning the vapor or gas generated within itself in the manner of gas burners and which I desire to secure by Letters Patent is—

1. The mode of regulating and extinguishing the light, when required, by means of a valve formed by the top of the inner cylinder G at L and the end or surface of the button R attached to the head O of the outer cylinder M, whether the several parts forming said valve be made and arranged in the manner above described, or other mode substantially the same, by which similar results shall be produced.

2. I also claim the employment of the safety valve C, D, E, in combination with the guard plate constructed substantially as above described.

3. I likewise claim the use of the guard U in combination with the combined burner and generator, arranged and operating in the manner and for the purpose above set forth.

4. I also claim combining the generator Q, R,—burner M, O,—ring V and guard U in a single piece made to ascend and descend simultaneously in the manner and for the purpose substantially as herein set forth.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

HORATIO G. SICKEL.

Witnesses:
LUND WASHINGTON, Senr.,
WM. P. ELLIOT.

[FIRST PRINTED 1913.]