

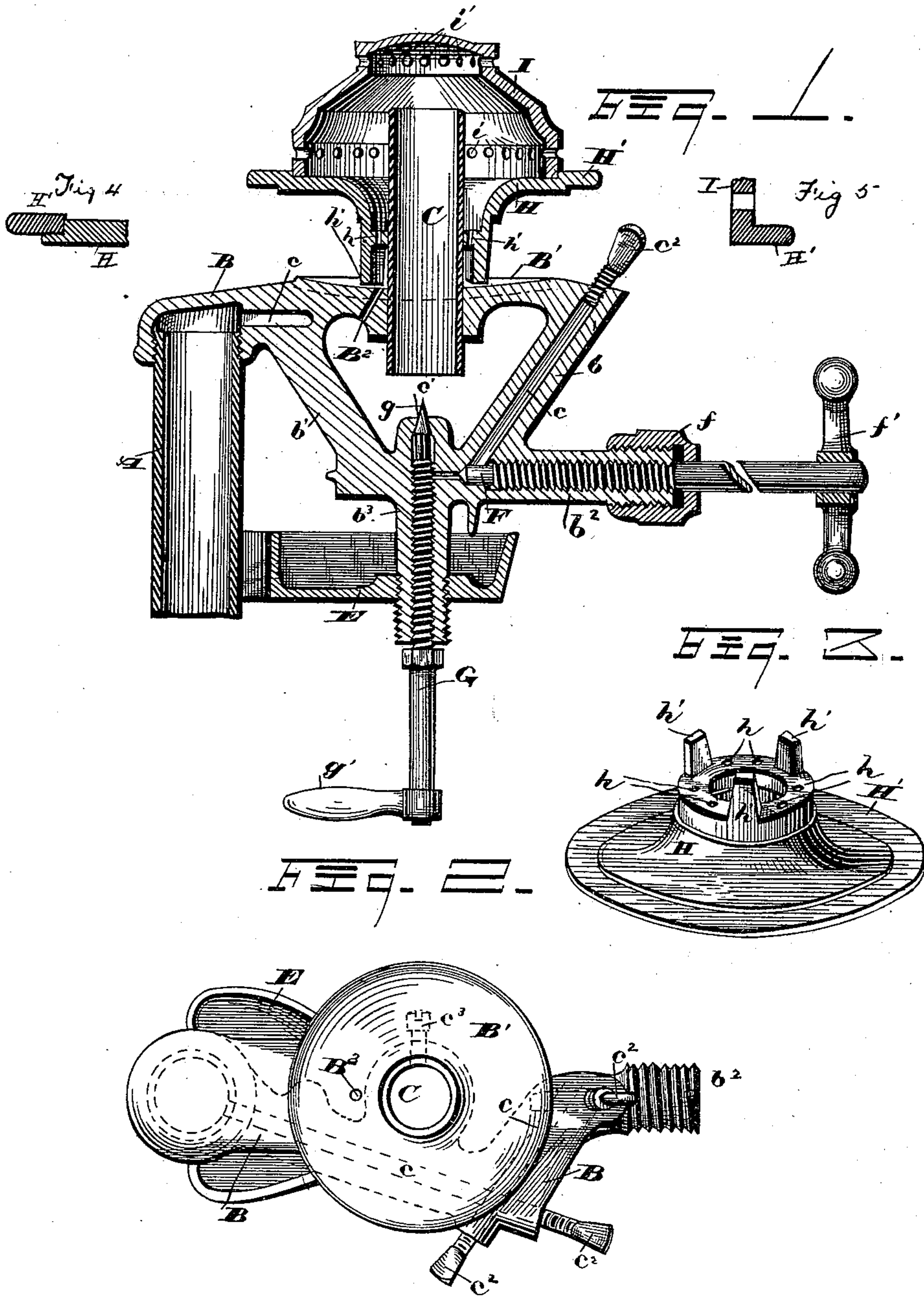
(No Model.)

F. A. LYMAN.

# VAPOR BURNER.

No. 350,439.

Patented Oct. 5, 1886.



WITNESSES

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# UNITED STATES PATENT OFFICE.

FORDYCE ALLEN LYMAN, OF CLEVELAND, OHIO.

## VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 350,439, dated October 5, 1886.

Application filed August 5, 1885. Serial No. 173,623. (No model.)

*To all whom it may concern:*

Be it known that I, FORDYCE ALLEN LYMAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vapor-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to vapor-burners for heating; and it consists in a hollow horizontal arm integral with a disk, the two forming a generator, the disk having a concaved upper surface and drip-holes for collecting and discharging gasoline into the lighting-cup below, the disk having also a central opening for the passage of a vertical commingling-tube.

My invention further consists in an inverted cone or dish above the disk and embracing the commingling-tube, with a series of vertical jet-orifices in the bottom of the cone for discharging gasoline or jets of flame into the concavity of the disk, said cone being elevated on legs above the disk to give a free passage of air between the disk and cone to support the combustion, and also to give a greater length to the commingling-tube.

My invention further consists in a flange or plate lying in a horizontal plane intermediate between the holes at the bottom of the cone and jet-orifices of the cap or burner above, to deflect the ascending currents of hot air caused by the jets of flame at the bottom of the cone, so that these upward currents will not interfere with the horizontal jets of flame from the burner.

My invention further consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation in section of my improved vapor-burner, a portion only of the retort-tube being shown. Fig. 2 is a plan view of the same with the cone and burner removed. Fig. 3 is a view in perspective of the cone, the latter being shown in an inverted position; and Figs. 4 and 5 are views of modified constructions.

A represents the retort-tube, that at the bottom is connected, in the usual manner, with a supply-pipe. (Not shown.) This tube A at the top is connected with the generator, that con-

sists of the hollow arm B and the disk B', that are integral with each other, and with the brace-arms  $b$  and  $b'$ , the latter being integral with the horizontal arm  $b^2$  and the vertical arm  $b^3$ . A passage-way,  $c$ , leads from the chamber of the tube A through the arms B,  $b$ ,  $b^2$ , and  $b^3$ , terminating in a jet-orifice at  $c'$ , presenting upward, and located directly under the commingling-tube C, the outer ends of the holes drilled in forming this passage-way being closed by plugs  $c^2$ . The vertical tube C passes through a central opening in the disk B', and is secured by the set-screw  $c^3$ . The upper surface of the disk B' is concaved, and has a drip-hole,  $B^2$ , discharging into the cup E, the latter being screwed onto the lower end of the arm  $b^3$ .

F is a valve operating in the arm  $b^3$ , for closing the passage-way  $c$ , and is provided, in the usual manner, with a stuffing-box,  $f$ , and a hand-wheel or thumb-piece,  $f'$ .

G is a spindle screwed into the arm  $b^3$ , and terminates above in a needle-point,  $g$ , and is provided below with a lever or thumb-piece,  $g'$ , for operating the spindle. This spindle in its normal position is depressed, leaving the jet-orifices  $c'$  open, and is usually only turned up a few times during a season to clear the orifice when the latter becomes obstructed. In case the orifice should become enlarged, the spindle might be used to graduate the opening; but such use is only incidental.

In Fig. 1 the spindle is shown in its elevated position; but when the burner is in use the spindle, as aforesaid, is depressed, leaving the jet-orifice open.

H is a cup or inverted cone terminating in a laterally-projecting annular flange or rim, H'. Through a central hole in the bottom of the part H passes the tube C; also, several vertical jet-orifices,  $h$ , pass through the bottom, and attached thereto are depending legs  $h'$ , that, when the parts are in position, rest on the disk B' and elevate the cone some distance above the disk, enough to admit a free circulation of air between these parts; also, by elevating the cone, a greater length is had for the tube C, for purposes hereinafter shown.

I is the cap or burner, that rests upon the cone, and has series of lateral jet-orifices, respectively  $i$  and  $i'$ .

In operating the device, when the valve F



is opened, the gasoline, by reason of the elevation of the container, is projected from the jet-orifice  $c'$  through the tube C, and strikes against the under side of the central portion of the cap I, and falls by gravity into the bottom of the cone H, and, passing through the holes  $h$ , drops into the concavity of the disk B', and from thence is discharged through the hole B<sup>2</sup> and falls into the lighting-cup E. It will be observed that no movable stop or deflector is required in filling the lighting-cup. When the cup E is filled, the valve F is closed and the contents of the cup lighted, and, being directly under the arm B and disk B', the flames have a broad under surface to act upon, and the result is, the generator is quickly heated, and the gasoline in the concavity of the arm B is vaporized; also, the connecting-arms  $b$ ,  $b'$ ,  $b^2$ , and  $b^3$  are soon heated, so that when the gasoline in the lighting-cup is burned out and the valve F is again opened, gas instead of gasoline is discharged from the orifice  $c'$ . This gas passes up through the tube C, drawing in and commingling with a large quantity of air in its passage. This commingled air and gas is mostly discharged through the jet-orifices  $i$  and  $i'$ , where it is burned for the ordinary heating purposes; but a portion thereof is discharged down through the orifices  $h$ , the flames from which impinge the disk B' for heating the retort. The elevation of the cone H above the disk serves two purposes, as aforesaid, to wit: It gives a sufficient space between the cone and disk for bringing the gases at this part to heat the generator, and, second, it admits of a longer commingling-tube. If the cone were depressed the length of the legs, so that it would rest on the disk, and the commingling-tube were correspondingly reduced in length, the air and gases would not thoroughly commingle in the passage through the tube C. In a variety of vapor-burners heretofore constructed with such short commingling-tubes this difficulty was in a measure overcome by elevating the container to give considerable force to the discharged gas, to project it with force against the under side of the burner, so that the air and gases, that were only partially mixed at this point, would be more thoroughly commingled by the reverberator. With such construction the result was not entirely satisfactory, and some objectionable features were developed. The necessary elevating of the container made it unhandy to fill. The force of the blast inside the burner caused a roaring disagreeable noise, and would sometimes cause the jets of flame outside of the burner to flicker and burn unsteady. With a longer commingling-tube—say three inches (more or less) in length, such as is shown in Fig. 1—the container need be elevated only about two feet (more or less) above the burner, and with such a low head the gas passes more slowly through the tube, the length of which is such

that the air and gas are well mixed when they enter the burner, the chamber of which thus serves as a reservoir from which the gas passes out through the different orifices, giving steady flames and operating noiselessly. 70

The tube C might be extended below to give the required length to the same; but this necessitates the lengthening of the arms  $b$  and  $b'$ , and any extension of these arms would carry them farther from the generator, and the lower ends thereof would not be sufficiently heated to deliver the gas at the jet-orifices at the desired high temperature. 75

It is not at all essential that the flange H' should be integral with the cone H. Instead, it might be made on the bottom of the cap I, as shown in Fig. 5, or might be made separate from either, as shown in Fig. 4, the only essential feature being its location between the jet-orifices  $i$  and  $h$ , for the purpose aforesaid. 80

It is never necessary to light the gas from the orifices  $h$ , as this gas will light itself the instant that the gas is lighted outside of the cap I at the orifice  $i$ ; also, it will be observed that but one valve is required for operating the burner. 85

What I claim is—

1. The combination, with the hollow arm and disk, formed integral, the latter having a concave upper surface and a drip-hole, of a burner located above the disk; a commingling-tube extending through the disk and terminating in the burner, and a conduit leading from the hollow arm to a point below and directly underneath the lower end of the commingling tube, substantially as set forth. 90

2. The combination, with the hollow arm B and disk, formed integral, the latter having a concave upper surface, of the commingling-tube passing through the disk, the cone surrounding the upper portion of the tube and having legs or supports which rest on the concave surface of the disk, the vertical jet-orifices formed in the bottom of the cone, and a conduit leading from the hollow arm to a point directly underneath the lower end of the commingling-tube, substantially as set forth. 105

3. The combination, with a generator having a drip-opening extending through same, a cone seated on said generator and provided with jet-orifices in the bottom thereof, a burner-cap, and a lighting-cup located in a position to receive the oil from the drip-opening, of a commingling-tube terminating inside of the burner-cap and a conduit leading from the generator to a point below the lower end of the commingling-tube, substantially as set forth. 110

In testimony whereof I sign this specification, in the presence of two witnesses, this 8th day of May, 1885. 125

FORDYCE ALLEN LYMAN.

Witnesses:

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CHAS. H. DORER.