T. NAGEL.

VALVE FOR VAPOR BURNERS.

APPLICATION FILED MAR. 18, 1910.

984,776. Patented Feb. 21, 1911.

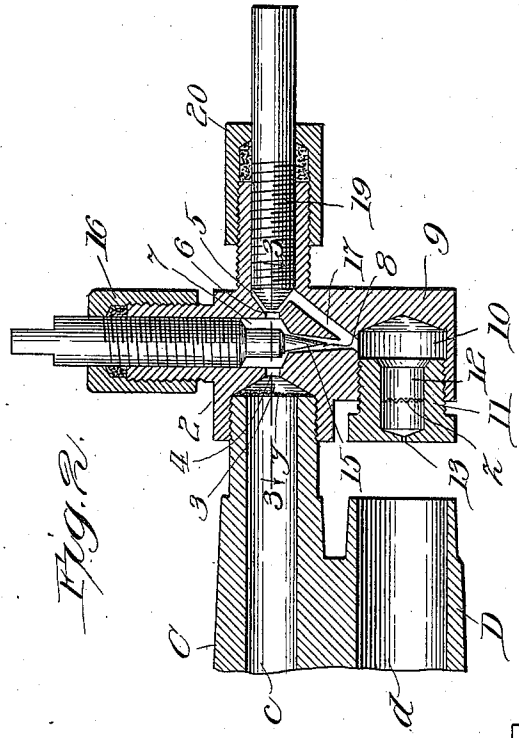

Fig. 2.

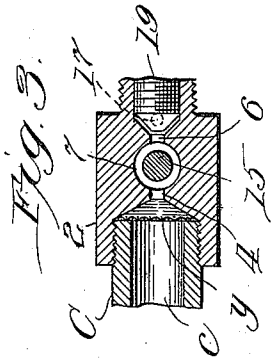

Fig. 3.

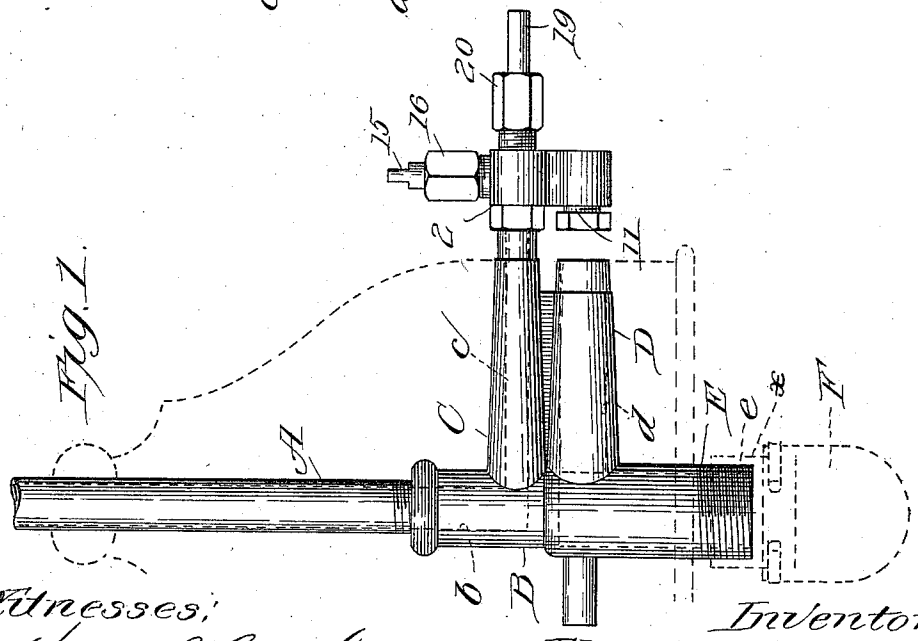

Fig. 1.

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UNITED STATES PATENT OFFICE.

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VALVE FOR VAPOR-BURNERS.

984,776. Specification of Letters Patent. Patented Feb. 21, 1911.

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To all whom it may concern:

Be it known that I, THEODORE NAGEL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Valves for Vapor-Burners, of which the following is a full, clear, and exact description.

My invention relates to valves for burners, lamps, etc., for the combustion of hydrocarbon gas, or gas formed of a mixture of air and petroleum, gasolene, or the like.

Heretofore burners of this kind have always been subject to the risk of clogging or distending the minute discharge orifice out through which the gas flows, and when this happens the burner operates poorly or becomes practically useless.

The object of my invention is to provide a burner in which this discharge orifice is unaffected by the mechanism controlling the discharge of the gas, and which will, when "turned down," cut off the full supply of gas and permit the passage of a limited supply thereof for a pilot light, without subjecting said orifice to the slightest danger of clogging or distention.

Another object of my invention is to regulate the discharge of gas for the pilot light independent of the means for controlling the full discharge thereof. And another object of my invention is to heat the vaporizing chamber or passage in transit to the gas-discharge devices by direct transmission of the heat from one part to another, instead of by radiation as heretofore.

These objects I accomplish by the means and in the manner hereinafter fully described and as more particularly pointed out in the claims, reference being had to the accompanying drawings forming a part hereof, in which,

Figure 1 is a side elevation of my improved vapor-burner valve. Fig. 2 is a central vertical section thereof, drawn to an enlarged scale. Fig. 3 is a horizontal fragmental section thereof taken on line 3—3, Fig. 2.

Referring to the drawings, A represents a vertically disposed supply-pipe, the lower end of which is screw-threaded and tapped into the upper arm B of a suitable coupling. This coupling preferably comprises a casting provided with tubular arms C, D, and E, and the latter arm extends downward in alinement with the axis of the supply-pipe A, and is provided with a cap x on its lower end to which an incandescent mantle F of the inverted type is secured. The arms C and D are preferably of the Siamese construction, that is, they are disposed one above the other and project from the same side of the coupling and are connected together by an integral web cast in one piece therewith and with said coupling. The bores of the upper arm B and of the lower arm E of the coupling do not communicate but the bore c of arm C meets the bore b of the upper vertical arm of this coupling at substantially right angles, and the bore d of the arm D meets the bore e of the lower vertical arm E also at right angles. Thus, two separated gas passages are formed, the upper one leading from the fluid reservoir to a suitable housing to be hereinafter more fully described, and the lower one leading to the incandescent mantle F, substantially as shown.

The valve housing just referred to comprises a suitable casing 2 that is cast somewhat in the shape of a "cross" coupling or a double elbow. The horizontal members aline with each other, and the bore 3 of the arm into which the outer screw-threaded end of arm C is tapped, is reduced in diameter near the center of the housing to provide a comparatively small orifice 4. The bore 5 of the oppositely disposed horizontal arm of casing 2, is similarly reduced in diameter to form an orifice 6 which is in axial alinement with, is preferably of the same dimensions as and is located opposite orifice 4. The upper vertical member of this valve casing is, preferably, at right angles to the horizontal arms and its bore intersects the axes of bores 3 and 5 mediate orifices 4 and 6, and below the plane of these orifices, it has a reduced portion 8 that gradually tapers or decreases in diameter as it passes into the lower vertical arm of the housing, forming a continuous passage intersecting the axes of the horizontal passages 3, 5.

The lower vertical arm 9 of the casing is provided with a horizontally bored chamber 10, the axis of which alines with and is bored from the side next the arm D of the coupling. The opening into this chamber is preferably closed by a suitable hollow screw-threaded nozzle 11 tapped into the same a suitable distance. The hollow portion 12 of the nozzle 11 is reduced in diameter toward its head, to form a microscopic discharge ori-

fice or jet-opening 13 that is opposite and alines with the bore of arm D and is separated a slight distance therefrom.

The interior of the bore 7 of the upper vertical member of the housing is preferably threaded and has the stem 14 of a suitable needle valve 15 screwed therein, substantially as shown. About the plane of the top of bore *c*, arm C, stem 14 is reduced to provide a shoulder and slightly below the plane of the axis of the passage 3, 5, this stem is again reduced in diameter and then tapers to needle point 15, adapted to seat in the countersunk upper edge of the passage 8, the angle of the converging walls of which latter being less than that of the needle point. The upper portion of the stem projects outside the housing and a gland-nut 16 is screwed onto the threaded outer portion of the upper arm of said casing to prevent the escape of the gas. Now a suitable by-pass 17 leads from bore 5 of the casing and meets the passage 8 at an acute angle slightly above the chamber 10 in the lower arm of said casing. This by-pass, passage 5 and orifice 6 are adapted to be closed by the tapered or conical end of a screw-threaded valve-stem 19 which latter is tapped into the threaded interior of passage 5 and seats in the tapered approach of the orifice. Stem 19 projects outside the casing in the same manner as the stem of the needle-valve and a gland-nut 20 is also provided and screwed onto the exterior of the arm of the casing into which it enters.

The supply-pipe A and the passage through its connected arm C may be filled with asbestos or other fluid-retarding material, if desired, and I prefer to place a fine-mesh copper wire screen *y* at the outer end of the said arm C and a similar screen *z* inside the bore of the screw-threaded nozzle 11 to filter the gas as it flows toward the discharge orifice from chamber 10.

It is essential in the operation of this device that the needle-valve 15 be kept away from its seat in the passage 8, so that when the lamp is turned down the vapor entering casing 2 and through orifice 4 will fill the space 7 surrounding the lower reduced portion of the valve-stem and then pass down through passage 8 into chamber 10 and then out through the microscopic orifice. From the latter the discharged gas enters the lower arm of the coupler, and from thence to the burner, where it becomes ignited and on account of the insufficient feed will burn in a blue flame above the mantle and generate heat enough to heat the lower arm and through it the upper arm C of the coupler. When the main-valve spindle 19 is unseated the vapor passes from the chamber 7 into the bore 5 of the outer horizontal arm of the casing and thence through the by-pass 17 to the chamber 10, where it is fed in a larger charge and under greater pressure out through the miscropic orifice 13 into the lower arm of the coupler and this increased amount of gas reaching the mantle is sufficient to cause the latter to become incandescent.

What I claim as new is:—

1. A gas controlling head for vapor burners, having a main passage, a needle valve adapted to close the end thereof opposite its intake end, a pilot light passage intersecting the main passage and having converging walls, a needle valve therein, the taper of the point of which is greater than the angle of convergence of the walls of its seat, and a by-pass connecting the valve occupied portion of said main passage with the discharge portion of said pilot light passage.

2. A gas controlling head for vapor burners, having a discharge orifice and a chamber from which said orifice is the only outlet, having a main passage, a needle valve adapted to close the end thereof opposite its intake end, a pilot light passage intersecting the main passage and having converging walls, a needle valve therein, and a by-pass connecting the valve occupied portion of said main passage with the discharge portion of said pilot light passage, and together therewith discharging into said chamber.

3. A gas controlling head for vapor burners, having a discharge orifice and a chamber from which said orifice is the only outlet, having a main passage, a needle valve adapted to close the end thereof opposite its intake end, a pilot light passage intersecting the main passage and having converging walls, a needle valve therein the taper of the point of which is greater than the angle of convergence of the walls of its seat, and a by-pass connecting the valve occupied portion of said main passage with the discharge portion of said pilot light passage, and together therewith discharging into said chamber.

4. In a vapor burner, a casing having a vertical passage the lower end of which is contracted, a valve-controlled horizontal main-passage intersecting said vertical passage above the plane of said contraction and reduced at the points where it communicates therewith, and an angling by-pass connecting the portion of the horizontal passage opposite its intake and the lower end of said vertical passage.

5. In a vapor burner a casing having a vertical passage the lower end of which is contracted, a horizontal main passage intersecting said vertical passage above the plane of said contraction and reduced at the points where it communicates therewith, an angling by-pass connecting the portion of the horizontal passage opposite its intake and the

lower end of said vertical passage, and a valve controlling said main passage, between said vertical passage and said by-pass.

6. In a vapor burner, a casing having a vertical passage the lower end of which is contracted, a needle valve controlling said passage at the contraction, a valve controlled horizontal main-passage intersecting said vertical passage above the plane of said contraction and reduced at the points where it communicates therewith, and an angling by-pass connecting the portion of the horizontal passage opposite its intake and the lower end of said vertical passage.

In witness whereof I have hereunto set my hand this 15th day of March 1910.

THEODORE NAGEL.

Witnesses:
MARION E. MARTIN,
E. K. LUNDY.