

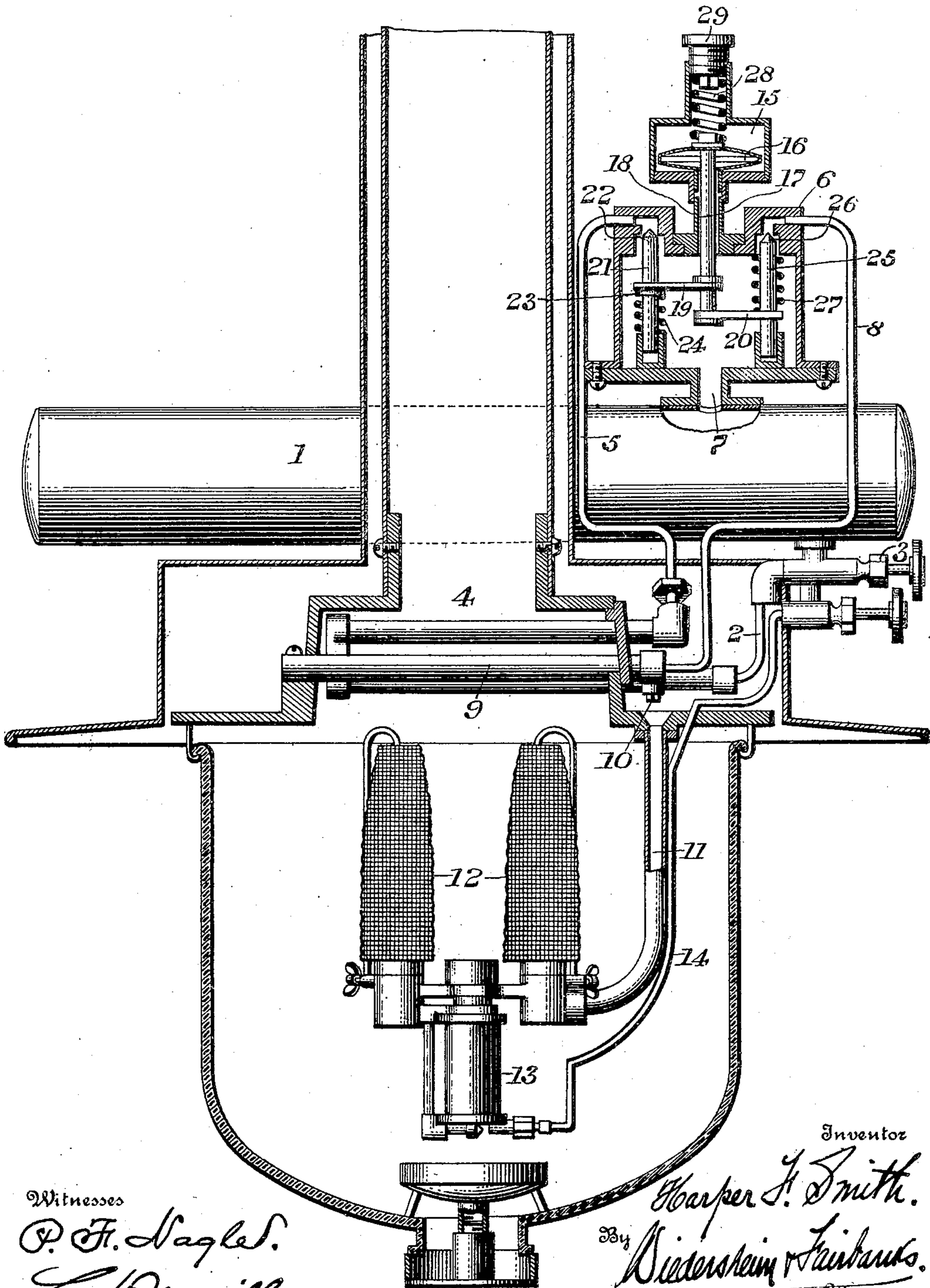
H. F. SMITH.

LAMP.

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921,904.

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UNITED STATES PATENT OFFICE.

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LAMP.

No. 921,904.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed October 19, 1903. Serial No. 177,553.

To all whom it may concern:

Be it known that I, HARPER F. SMITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Lamps, of which the following is a specification.

My invention relates to a governor adapted to control the flow of vaporized hydro-carbon in a lamp or heating device.

It consists of a governor exterior to the reservoir through which passes all the hydro-carbon vapor generated in the vaporizer on its way to the point of combustion.

It also consists in providing a plurality of valves in such governor operative successively to control the flow of such vaporized hydro-carbon.

It further consists of other novel features of construction all as will be hereinafter fully set forth.

In former applications, now pending, Serial Nos. 154,970, 162,310 and 163,303, filed respectively April 30th, June 20th and June 27th, 1903, I have shown and described a vapor burning device having governors operative to control the flow of the liquid hydro-carbon from the reservoir to the vaporizer and of the vaporized hydro-carbon from the vaporizer to the point of combustion. My present device differs from these in that the liquid hydro-carbon is permitted to freely flow from the reservoir to the vaporizer, the combustion of the device being regulated by a governor which controls the flow of the vaporized hydro-carbon only.

In the drawing, which represents partly in elevation and partly in vertical section, a vapor burning device embodying my invention, 1 designates a reservoir for a liquid hydro-carbon from which a tube 2 having a valve 3 leads to a vaporizer 4. From the vaporizer a tube 5 leads to a casing 6 shown as mounted on the reservoir and communicating therewith by a passage 7. From the casing 6 a tube 8 leads to a superheater 9. Highly heated vapor from the superheater passes from the exit orifice 10 to the mixing tube 11 thence to the burner 12. A starting or primary heating device 13 is shown as located below the vaporizer 4 and superheater 9 and connected by a valved tube 14 with the reservoir 1.

The construction and operation of the various parts of my device so far mentioned

have been so fully set forth in my pending applications, above named, and in another pending application dated April 30th, 1903, Serial No. 154,960, that no further description is here required, these elements forming no part of my present invention.

Above the casing 6 is an extension 15 within which is mounted a diaphragm chamber 16 the stem 17 of which passes freely through a neck 18 into the casing 6. Near the lower end of the stem 17 are two laterally projecting arms 19, 20. The apertured outer end of the arm 19 rides over the stem 21 of a valve 22 by which the flow of the vapor from the vaporizer 4 to the casing 6 is controlled. A collar 23 is secured on the valve stem 21 below the arm 19. A thrust spring 24 bears against the collar 23 and tends to close the valve 22. The outer end of the other arm 20 is secured to a valve stem 25 whose valve 26 closes the outlet from the casing 6 to the tube 8 leading to the superheater 9. A spring 27 normally depresses the arm 20 and holds the valve 26 from its seat. Above the diaphragm chamber 16 is a thrust spring 28 operative to reduce the size of the chamber 16 and hence to depress the stem 17. The action of the spring 28 is regulatable by an adjusting screw 29, by which the desired pressure is secured.

The operation of the governor or vapor controlling device is as follows:—The vapor generated in the vaporizer 4 by reason of the heat developed either in the pre-heater 13 or the burners 12 normally rises through the tube 5 to the chamber 6 the valve 22 being kept open by the force of the spring 28, which is set to overbalance the valve spring 24. This vapor passes freely through the tube 8 to the superheater 9 whence it is mixed with air in the tube 11 and fed to the burners 12. It will be noted that the liquid hydro-carbon flows to the vaporizer 4 from the reservoir 1 through the tube 2. Should too much heat at any time be generated by the burners 12 whereby an excess vapor pressure would be produced in the casing 6, it is evident that this pressure, being admitted to the interior of the diaphragm chamber 16, will expand the diaphragm chamber and raise the stem 17. This permits the spring 24 to seat the valve 22 and reduces or cuts off the flow of vapor into the casing 6. The vapor already in the casing and in the upper part of the reservoir 1 will be fed to the superheater 9 until

the excess pressure is exhausted. When the pressure returns to the normal, the diaphragm 16 will contract and the valve 22 will re-open. This releases the vapor cushion in the vaporizer 4 and tube 5 which permits the hydro-carbon to flow into the vaporizer 4 when the generation of vapor is resumed. It will be noted that the vapor retained in the tube 5 and vaporizer 4 forms an effective cushion to prevent any further flow of liquid hydro-carbon through the tube 2 while the valve 22 is closed. If the valve 22 at any time fails to operate properly or if a great excess of pressure should be generated a further expansion of the diaphragm 16 will close the exit valve 26 and immediately extinguish the flame whereby further generation of vapor is, of course, prevented.

It will be seen that my device differs from those shown in the prior applications referred to and from that of my prior United States Patent, No. 687,075, dated November 19th, 1901, in that the governor in the present device is operative to control the flow of vaporized hydro-carbon alone. The feed of the liquid from the reservoir to the vaporizer through the tube 2 is normally free and unobstructed, though for convenience a manually operated valve 3 may be inserted in the tube. On the other hand, the flow of vapor from the generator to the point of combustion, in this case to the lighting burners through the superheating and mixing devices, is automatically controlled by means operative by the heat of combustion itself.

It will be seen that in the present construction the governor casing is attached to the reservoir above the oil level and that this casing and the diaphragm chamber are so located that any liquid produced by condensation which may occur therein, will drip into the reservoir. It will also be noted that the inlet and outlet tubes 5 and 8 are connected to the casing adjacent its top. This construction insures the passage of dry vapor to the superheating device. It will also be seen that the reservoir, vaporizer, valve casing, superheater and the tubes connected with these, together form a fluid tight system open only at the gas exit orifice 10.

It is evident that various changes may be made by those skilled in the art, which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction herein shown and described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a vapor burning device a reservoir, a burner, a vaporizer located within the heat zone of said burner, means for conveying a liquid from said reservoir to said vaporizer, manually operated means for cutting off the

flow of said liquid, means for conveying the generated vapor from said vaporizer to said burner said vaporizer being fluid tight except for said conveying means, and means intermediate the vaporizer and burner actuated solely by the pressure of such generated vapor and operative as such pressure increases for reducing the flow through said vapor conveying means.

2. In a vapor burning device, a reservoir, a vaporizer, a burner and a governor interposed between said vaporizer and said burner and controlling the flow of vapor to said burner, said governor comprising a casing, valves controlling the inlet to and outlet from said casing and automatic means for successively closing said valves when the vapor pressure rises beyond a predetermined point.

3. In a vapor burning device, a reservoir, a vaporizer, a burner and a governor interposed between said vaporizer and said burner and controlling the flow of vapor to said burner, said governor comprising a casing, valves controlling the inlet to and outlet from said casing and a vapor controlled diaphragm operatively connected to said valves for closing them successively in the order named when the vapor pressure rises beyond a predetermined point.

4. In a vapor burning device, a reservoir, a vaporizer, a burner and a governor interposed between said vaporizer and said burner and controlling the flow of vapor to said burner, said governor comprising a casing, a valve controlling the inlet of vapor to said casing, a spring operative to close said valve, a second valve controlling the outlet of vapor from said casing, a spring operative to open said valve and a vapor controlled diaphragm connected to both said valves and operative by an increase of vapor pressure to permit the closure of said inlet valve and by a further increase of such pressure to close said outlet valve.

5. In a vapor burning device, a reservoir, a vaporizer, a burner, means providing a passage from said reservoir to said vaporizer and from said vaporizer to said burner, a vapor chamber interposed in said passages and means actuated by the pressure of the generated vapor for cutting off successively the flow of vapor into and out of said vapor chamber.

6. In a vapor burning device, a reservoir, a vaporizer, a burner, means providing passages from said reservoir to said vaporizer and from said vaporizer to said burner, a vapor chamber interposed in said passages and means actuated by the heat of combustion for cutting off successively the flow of vapor into and out of said vapor chamber, said reservoir, vaporizer, vapor chamber and passages forming a fluid tight system open only at the point of gas emission.

7. In a lamp of the class described, in combination with its burner, a fuel reservoir and a vaporizer within the heat zone of the burner, conduits connecting the reservoir with the vaporizer and the vaporizer with the burner, means intermediate the vaporizer and burner actuated solely by the pressure of the vapor in said vaporizer adapted to regulate the flow of vapor to the burner, and means permitting such vapor pressure to regulate the flow of fuel to said vaporizer.

HARPER F. SMITH.

Witnesses:

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