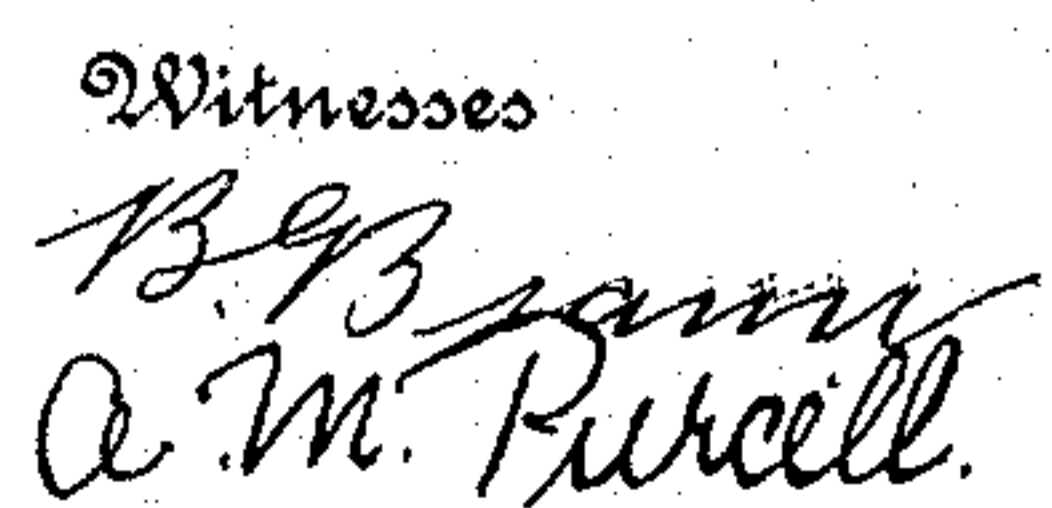


VAPOR BURNER.

945,305.

Patented Jan. 4, 1910.



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UNITED STATES PATENT OFFICE.

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VAPOR-BURNER.

945,305.

Specification of Letters Patent.

Patented Jan. 4, 1910.

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To all whom it may concern:

Be it known that I, HERSCHEL M. CONNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, but at present temporarily residing at Tampa, Florida, have invented certain new and useful Improvements in Vapor-Burners, of which the following is a specification.

My invention relates to hydrocarbon oil burners, and more especially to such a burner as will be especially adapted for, and capable of efficiently, burning kerosene, although it may be utilized in burning gasolene, or other hydrocarbons.

Heretofore there has been no satisfactory form of hydrocarbon burner adapted to use of kerosene as a fuel, because of objections due to the imperfect combustion of the oil resulting in disagreeable odor, and a deposit of residue from the partial combustion of the oil. I have found that such objections are due mainly to mechanical imperfections, which have prevented a proper vaporization of the oil and the proper mixture of the air with the vapor to insure substantially perfect combustion. By my invention I overcome these defects, and have produced a practical burner which satisfactorily utilizes kerosene as a fuel.

With the object indicated above in view, my invention consists in the novel construction and combination of parts, as hereinafter described, with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the drawings: Figure 1 is a bottom plan view of a burner embodying my invention; and Fig. 2 is a transverse section on the line 2—2, Fig. 1, with some of the parts in elevation.

Referring to the drawings, in which same reference characters designate the same or corresponding parts in both views, the numeral 1 indicates a part of the frame of the burner which is removably fitted in a hollow casting 7, provided with a number of threaded projections 2 affording means for attaching the other parts of the frame and the piping thereto. The frame portion 1 is shown broken, but it is to be understood that said part may be extended as desired for attachment to a suitable bracket or other support, when used as a fixed burner struc-

ture, or to a suitable standard forming part of a lamp structure when used as a portable lamp or burner.

Fitted in the threaded projections 2 are two pipes 3 extending laterally from the hollow casting 7, one of which is removably connected to a return bend 4, communicating with a chamber inclosed by a casing 6, interposed between which casing and return bend is a smaller chamber inclosed by a casing 5 having lateral openings 25 communicating with the atmosphere, through which the air is drawn for mixture with the vapor as the latter is discharged into said air mixing chamber from the vapor generator.

Extending downwardly from the burner casting are burner tubes 10, terminating in suitable burner tips, removably secured to corresponding threaded projections 2 on said burner casting, each of which burner tips is provided with a wire gauze netting 26 suitably secured in place by a clamping ring 28. Two burner tips are shown, but it is obvious that either one or any convenient number may be used as desired. Secured to each burner tip is a mantle 11 of ordinary type, but in the form shown it is a common form of inverted rag mantle, though any other suitable form may be used, according to conditions.

Extending transversely of the burner structure is a casting 15, having a suitable threaded projection 24, to which is removably attached the outer end of one of the pipes 3, and another threaded projection 31 in which is removably secured a coupling 18, likewise attached to one end of a vapor generator tube 19, the other end of which is preferably tapered and seated in a nozzle 30 having a contracted orifice 29 constituting the orifice tip, removably seated in the casing 6, which orifice is adapted to discharge vapor from said generator directly into the pipe or conduit 4 and into the current of incoming air, whereby a thorough mixture of the oxygen of said air and the kerosene vapor or other hydrocarbon vapor is effected. The coupling 18, it will be noted, is pierced with a small passage communicating with the passage 16 in the structure 15 and controlled by a needle valve 23 having a screw threaded stem 17 operated by a suitable handle. The passage 16, it will be observed, extends to the opposite end of the structure

15, and constitutes a feed passage for the oil to the burner. The supply of oil may be taken from a reservoir suitably located, from which it is fed through a wire tube 12 having its discharge end connected to the structure 15, in alinement with the feed passage 16, by means of a securing nipple 14, the flange of which is engaged by a collar 13 secured to the end of said structure 15.

10 Within the casing 6 is a ring or cylinder 20 preferably of brass, removably seated therein, provided with a plurality of lines or rows of perforations 21, through which vapor from the vapor tubes or passages travels by way of a connecting nipple 8, such vapor entering, in fine streams or jets, the interior of the cylinder 20 through the perforations 21, and are there ignited within said cylinder, thus constituting a sub-flame chamber or heater for vaporizing the main fluid supply and fixing the said vapor. It will be observed that such vapor passes through the generator tube 19, located in the heating zone of the burners, in which it is vaporized initially, when the device is in operation, by heat from the mantle or mantles 11, the devices having been first put in operation by the application of the usual torch to the generator, and thence said vapor passes to the orifice end of the generator, and is then subjected to a second heat from the sub-flame in the sub-flame chamber 22, thereby further heating the vapor and discharging it, in best condition for mixture, at the point of admission of the air, from which point the mixture passes through the pipes 4 and 3 into the casing 7, thence through the opening 9 and into the burner tubes 10, where it is again subjected to heat from the mantles, and finally said vapor is discharged through the ends of the burner tubes, where it will be substantially perfectly burned.

In its passage through the generator 19, the oil and vapor are caused to pass into contact with or through an asbestos cylinder 27 wrapped around a rod 32, thereby preventing pulsations in the light, and also through a wire screen 33 in one end of the generator, thus preventing any remaining precipitate in the oil from reaching the burner tip. The last heating of the vapor before it is discharged from the burner tips prevents any possible odor from the oil, while the series of heatings in the manner defined contribute to perfect combustion of the oil or vapor when finally discharged at the burner tip, because of the fact that the oil is first thoroughly vaporized and, in that state, intimately and uniformly associated with the oxygen of the air, in which condition it travels through conduits located in the heating zone of the burner at which it is ignited and burned. The wire gauze on

the ends of the burner tubes performs the usual function of preventing flare backs.

By arranging the heater about the generator, and preferably in proximity to the outlet end of said generator, I find that the main fluid supply is not only efficiently vaporized but the vapor is fixed, so that the odor and residue are eliminated, thus obviating two serious objections encountered in the operation of kerosene burners prior to my invention.

If desired, the cylinder 20 may be removed, thereby converting the apparatus into an efficient burner for gasoline or like hydrocarbon, without any other change in structure.

While I have shown the preferable form of my invention, it will be understood that I do not limit myself to this form, or to the details thereof, as changes may be made in the specific form and details, without departing from the spirit of my invention as hereinafter claimed; for example, the superheating chamber may be arranged differently with respect to the generator, and two or more of such chambers employed, while alcohol or other vaporizable fluid may be used, where desirable. It is furthermore to be clearly understood that, while I refer to "burner tips, mantles" etc., such use of the plural number is merely for convenience, and not intended as a limitation, for it is obvious that one or more burner tips and one or more mantles etc. may be used without departing from the legitimate scope of the invention.

I claim as my invention:

1. In a vapor burner adapted to use kerosene and other hydrocarbon fluid, the combination with a supporting structure and burner tips carried thereby, of a vapor generator passing through the heat zone of the burner and connected with a source of supply of fluid under pressure, said generator having a contracted orifice at its outlet end, a vapor conduit into which the vapor is discharged through said orifice and having ports or openings adjacent to said orifice for the admission of air into the conduit or pipe, and a heating chamber communicating with the vapor conduit of the device and arranged about the generator for vaporizing the main fluid supply, said conduit for the vapor passing through the heat zone of the burners and communicating with the tips, substantially as described.

2. In a vapor burner adapted to use kerosene and other hydrocarbon fluid, the combination with a supporting structure and burner tips carried thereby, of a vapor generator passing through the heat zone of the burner and connected with a source of supply of fluid under pressure, a heating chamber arranged about the outlet end of the

vapor generator and communicating with the vapor conduit for vaporizing the main supply of fluid to the burner and fixing the vapor, said generator having a contracted orifice at its outlet end, a vapor conduit into which the vapor is discharged through said orifice and having ports adjacent to said orifice for the admission of air into the conduit or pipe, said conduit for the vapor passing through the heat zone of the burner and communicating with the burner tubes, substantially as described.

3. In a vapor burner adapted to use kerosene or other hydrocarbon fluid, the combination with a supporting structure and burner tips carried thereby, of a vapor generator receiving fluid under pressure from a suitable source of supply, a mixing chamber communicating with the atmosphere into which the vapor is discharged from said generator, an auxiliary heating chamber arranged about the outlet end of said generator for vaporizing the main supply and fixing the vapor of said fluid, substantially as described.

4. In a vapor burner adapted to use kerosene or other hydrocarbon fluid, the combination with a supporting structure and burner tips carried thereby, of a vapor generator receiving fluid under pressure from a suitable source of supply, a mixing chamber communicating with the atmosphere and into which the vapor is discharged from said generator, an auxiliary heating chamber surrounding the outlet end of said generator, comprising a casing and a removable cylinder having a plurality of holes or perforations through which the vapor may pass and a vapor conduit communicating with said casing, substantially as described.

5. In a vapor burner adapted to use kerosene or other hydrocarbon fluid, the combination with a supporting structure, and burner tips carried thereby, of a vapor generator passing through the heat zone of the burner for initially vaporizing the oil passing through the same, a sub-flame chamber communicating with the vapor conduit leading to the burner tips and surrounding the outlet end of the generator for vaporizing the fluid and fixing the vapor of the main supply, a mixing chamber communicating with the atmosphere and into which the vapor generator discharges, and a vapor conduit communicating with the burner tips and passing through the heat zone of the same, substantially as described.

6. In a vapor burner adapted to use kerosene or other hydrocarbon fluid, the combination with a hollow supporting structure and burner tubes carried thereby provided with burner tips, a vapor generator passing through the heat zone of the burners and communicating with a feed passage con-

nected to a source of supply of oil under pressure and controlled by a suitable valve, a nozzle having a contracted orifice secured to the outlet end of the generator, a mixing chamber into which said orifice discharges the vapor having openings adjacent to the discharge end of the said orifice adapted to admit air from the atmosphere, a vapor conduit for receiving the mixture from said mixing chamber and passing through the heat zone of said burners, a heating chamber surrounding the outlet end of the vapor generator and communicating with the vapor conduit in the heat zone of the burner, and a removable cylinder having a plurality of fine perforations within said chamber and surrounding the outlet end of the generator constituting a sub-flame chamber for imparting additional heat to the main supply of the vapor in proximity to the discharge end of said vapor generator to fix the said vapor, substantially as described.

7. In a vapor burner adapted to use kerosene or other hydrocarbon fluid, the combination with a supporting structure, and burner tips depending therefrom, each of said burner tips being provided with a suitable mantle, a vapor generator consisting of a tube extending transversely of the heat zone of the burner above the mantles communicating with a feed passage leading to a source of supply of fluid under pressure and provided with a suitable valve for controlling the same, a chamber surrounding the outlet end of the vapor generator having a branch conduit connecting the same with the main vapor conduit, a nozzle having a contracted discharge orifice seated in said chamber and surrounding the outlet end of the vapor generator, an air mixing chamber into which said orifice directly discharges the vapor having air ports adapted to admit the air thereinto, and a main vapor conduit into which the mixture passes from said mixing chamber and through which the same passes to the burner tips, said conduit or tube having a portion thereof extending through the heat zone of the burner above the vapor generator, substantially as described.

8. In a vapor burner the combination with a hollow supporting structure having a plurality of threaded projections thereon, pipes removably secured to said projections and provided with suitable burner tips, a vapor generator extending through the heat zone above said burner tips, a casting having projections on one side thereof, one for affording a means of support for part of the burner structure, and the other having a perforation therein, communicating with a feed passage for the fluid, a valve controlling the same, a coupling removably seated in the other projection of the casting and

receiving the inlet end of the vapor generator, a sub-flame chamber surrounding the outlet end of the said generator, an air mixing chamber into which the vapor is discharged from the generator, and piping constituting the vapor conduits communicating with the burner tubes, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of 10 two subscribing witnesses.

HERSCHEL M. CONNER.

Witnesses:

ARTHUR PURVIS,
T. F. COOK.