J. O. ALWOOD.

HYDROCARBON BURNER.

APPLICATION FILED AUG. 15, 1918.

1,304,927. Patented May 27, 1919.

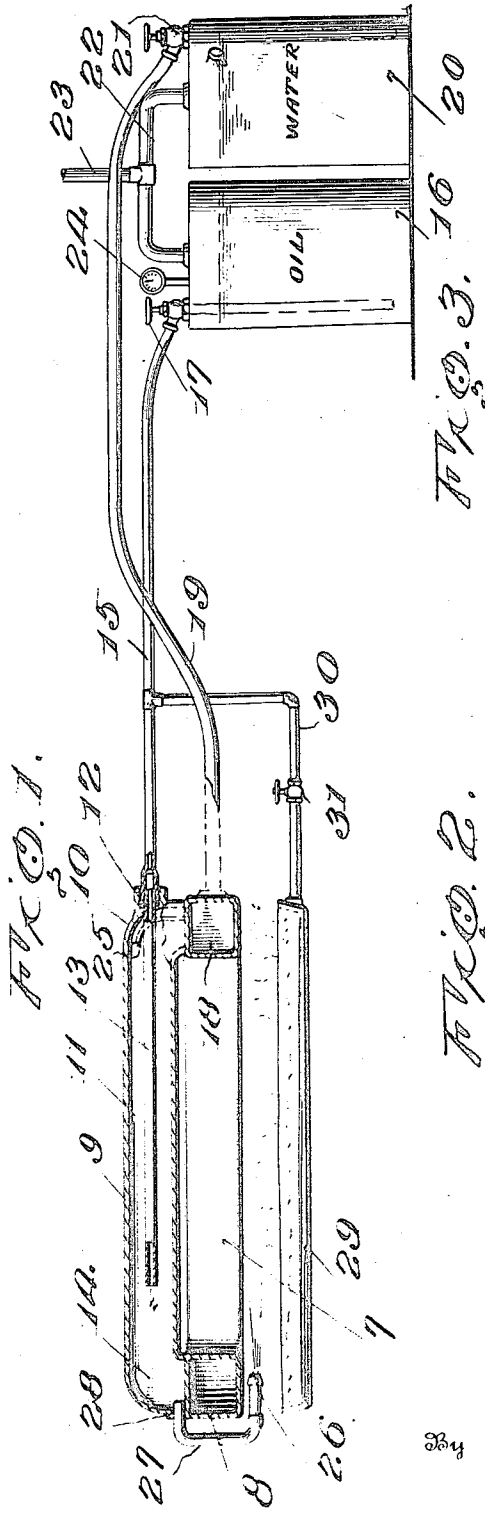

FIG. 1.

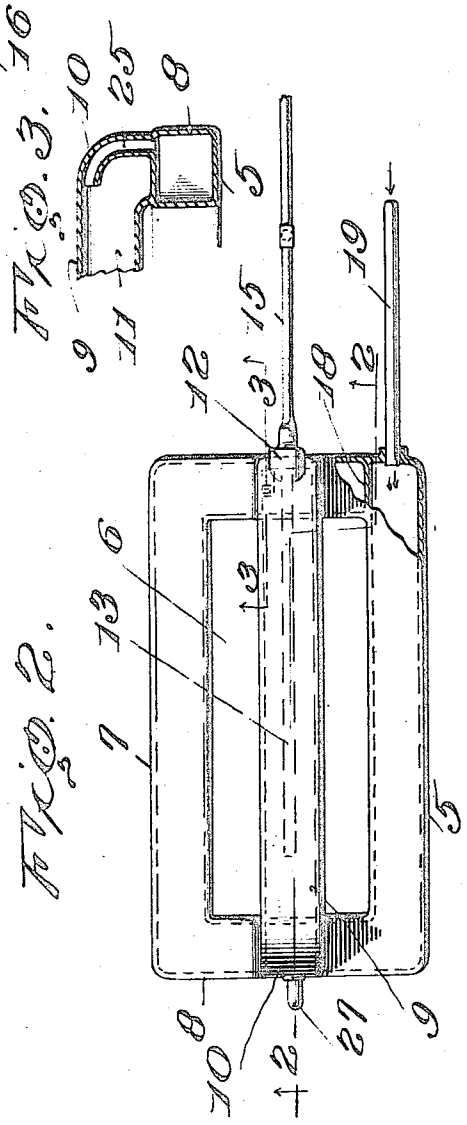

FIG. 2.

FIG. 3.

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HYDROCARBON-BURNER.

1,304,927. Specification of Letters Patent. Patented May 27, 1919.

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To all whom it may concern:

Be it known that I, JAMES O. ALWOOD, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

This invention relates to hydrocarbon burners and has for its object to provide a comparatively simple and thoroughly efficient device of this character in which the oil from a supply reservoir is fed under pressure into a steam chamber and converted into hydrocarbon gas for delivery to the burner.

A further object of the invention is to provide a hydrocarbon burner including a boiler, operatively connected with a source of water supply, and having a steam chamber supported thereon and disposed in the path of the flame from the burner, the steam from the boiler being discharged into said chamber at a point above the intake of the fuel pipe whereby to volatilize the oil and prevent the surplus oil or drippings from entering the boiler.

A further object is to provide an oil pan disposed beneath the burner and fed from the fuel supply pipe, said pan forming, in effect, a pilot burner and serving to automatically light the main burner in case the supply of gas to the main burner is interrupted or suddenly cut-off and then permitting to flow again.

A further object is to provide a burner which will produce a maximum amount of heat with little if any smoke or objectionable odor.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Other and incidental objects will appear as the description proceeds. In the drawings wherein I have illustrated the preferred embodiment of the invention, and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a side elevation, partly in section, of a hydrocarbon burner constructed in accordance with the present invention;

Fig. 2 is a top plan view thereof, a portion of one corner of the boiler being broken away to show the point of attachment of the water supply pipe;

Fig. 3 is a detail sectional view, showing the connection between the boiler and steam chamber.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The improved hydrocarbon burner forming the subject-matter of the present invention comprises a flat substantially rectangular boiler 5, hollow in the center, as indicated at 6, and including side members 7 and end members 8, said members being preferably square in cross-section, as best shown in Fig. 1 of the drawings. Disposed above the boiler 5 and preferably formed integral therewith is a tubular member 9 which extends longitudinally of the boiler directly above the opening 6 and is preferably centered with respect thereto, said tubular member having its opposite ends curved or rounded at 10 and its interior unobstructed to form a steam chamber 11. One end of the tubular member 9 is provided with a nipple 12 in which is seated the adjacent end of a fuel pipe 13, the opposite end of the fuel pipe 13 being spaced longitudinally from the adjacent wall of the steam chamber to form a mixing chamber 14. Connected with the outer end of the pipe 13 at the nipple 12 is a fuel supply pipe 15 which extends within an oil tank or reservoir 16, the quantity of oil fed into the steam generator being controlled by a valve 17. Extending transversely across one of the end members 8 of the boiler is a partition 18 and communicating with the interior of the boiler on one side of the partition is a water supply pipe 19 extending to a supply tank or reservoir 20, there being a valve 21, similar in construction to the valve 17, disposed above the tank 20 and by means of which the quantity of water fed to the boiler may be controlled at will. The tanks 16 and 20 are connected by a pipe 22 from which extends a central pipe 23 leading to an air pump, not shown, whereby the fuel and water may be fed to the boiler at all times under pressure. A suitable gage 24 is inserted in one of the tanks, preferably the oil tank 16 for determining the exact pressure of the air within said tanks.

The steam from the boiler 5 is fed into the chamber 11 through a short pipe or conductor 25 which is curved to conform to the curvature of the adjacent end wall 10 of the tubular member 9 and discharges at the top of the steam chamber directly above the fuel pipe 13 whereby the fuel passing through said pipe to the mixing chamber will be volatilized and converted into hydrocarbon gas for delivery to the burner, indicated at 26. By having the mouth of the conductor 25 arranged above the pipe 13 liability of any surplus oil or drippings from the pipe 13 flowing back into the boiler is effectually eliminated. The burner 26 is disposed in a horizontal plane and is connected with the steam chamber 11 at a point spaced from and directly in advance of the adjacent end of the fuel pipe 13 through the medium of a pipe section 27 threaded into an opening 28 in the tubular member 9, as shown. Disposed beneath the boiler and preferably extending the entire length thereof is an oil pan 29 adapted to contain cinders, slag, broken fire-brick or other refractory material and into which oil is fed through a branch pipe 30 connected with the main fuel supply pipe 15, there being a valve 31 in the branch pipe 30 for controlling the quantity of oil delivered to the pan 29 at will. The flame from the oil pan 29 not only serves as an additional means for heating the boiler but also forms, in effect, a pilot burner for automatically lighting the gas at the main burner 26 should the flow of gas to the main burner 26 be suddenly interrupted or cut-off and then permitted to flow again. The tubular member 9 being disposed above the opening 6 in the boiler is directly in the path of the flame from the burner so that the steam chamber is maintained at the desired temperature at all times and inasmuch as the oil pipe 13 is disposed within the steam chamber, the tubular member 9 acts as a housing therefor and prevents the flame from coming in direct contact therewith.

In operation the valve 31 is partially opened so as to permit a small quantity of oil to drip into the pan 29 which oil is then lighted, after which the valve 21 is opened and the water permitted to circulate within the boiler. The heat from the oil pan will generate steam in the boiler 5 which steam flows upwardly through the conductor 25 and is discharged into the chamber 11 around the fuel pipe 13. The valve 17 is then adjusted to permit the desired quantity of oil to flow through the pipe 15 into the steam chamber 11. As the oil passes through the pipe 13 it becomes heated and is volatilized and as the gas issues from the end of the pipe 13 it commingles with the steam in the mixing chamber and is converted into hydrocarbon gas, which gas passes through the pipe 27 to the burner 26 and is ignited by the flame from the pan 29. As the burner 26 is disposed in a horizontal plane the flame from said burner will be directly longitudinal of the boiler and not only heat the side and end members of the boiler, but the heat from the flame will pass upwardly through the central opening 6 and superheat the steam in the tubular member 9.

If desired the pilot flame from the pan 29 may be used alone or entirely for heating the boiler, thus obviating the necessity of admitting any oil through the pipe 13 until after sufficient steam has been generated to thoroughly vaporize the oil in said pipe as fast as it enters the mixing chamber and cause the steam to sweep the oil vapor through the pipe 27 to the flame. By avoiding the use of the pipe 13 and burner 26 to generate steam in the boiler, the danger of oil carbonizing or caking in the pipe 13 before being surrounded and heated by steam is reduced to a minimum and there is no danger of any sediment or deposits forming in said pipe or in the mixing chamber 14 that will have to be removed by the steam when it is finally generated and becomes active.

While the boiler 7 is shown substantially rectangular in shape it will, of course, be understood that the boiler may be of any other desired shape and that the tubular member 9 instead of being formed integral with the boiler may be made separately and subsequently bolted or otherwise attached to the boiler if found desirable or necessary in the actual practice of the invention. Inasmuch as the oil passing through the pipe 13 is constantly heated by the steam in the chamber 11, said oil will not have a tendency to cake or stick within the pipe 13 so as to leave deposits of carbon therein and thus cause the burner to smoke and give off a disagreeable odor. It will here be noted that owing to the curvature of the conductor 25, the steam passing therethrough will strike the upper wall of the tubular member 9 and thence be deflected downwardly around the fuel pipe 13 and forwardly in the direction of the mixing chamber 14 so that not only is the fuel in the pipe 13 maintained at the proper temperature, but a thorough intermixing of the steam and oil gas is effected in the mixing chamber 14 prior to its delivery to the main burner. The device is extremely simple in construction and may be manufactured and placed on the market at comparatively small cost.

Having thus described my invention, what is claimed as new is:

1. A hydrocarbon burner including a boiler, a steam chamber operatively connected with the boiler, a fuel supply pipe extending within the steam chamber and terminating short of one end thereof, a steam con-

ductor communicating with the boiler and discharging into the steam chamber at a point above the intake end of the fuel supply pipe, and a burner connected with the steam chamber at a point in advance of the discharge end of the fuel pipe and discharging beneath the boiler.

2. A hydrocarbon burner including a boiler, a steam chamber operatively connected with the boiler, a partition extending across the boiler, a fuel supply pipe extending within the steam chamber, a steam conductor having one end thereof connected with the interior of the boiler on one side of the partition and its other end curved laterally and discharging to the steam chamber at a point above the fuel pipe, means for supplying water into the boiler on the other side of the partition, and a burner connected with the steam chamber at a point in advance of the discharge end of the fuel pipe and extending beneath the boiler.

3. A hydrocarbon burner including a boiler, a steam chamber disposed above the boiler, a fuel supply pipe extending within the steam chamber and terminating short of one end thereof, a conductor forming a source of communication between the boiler and steam chamber and having its end discharging at a point above the fuel pipe, and a burner communicating with the interior of the steam chamber and discharging beneath the boiler.

4. A hydrocarbon burner including a boiler having its central portion hollow, a tubular member extending across the hollow portion of the boiler and providing a steam chamber, a fuel pipe extending within the steam chamber, a steam conductor leading from the boiler into the steam chamber and discharging at a point above the fuel pipe, an oil pan arranged beneath the boiler, and a nozzle connected with the steam chamber and discharging between the boiler and oil pan.

5. A hydrocarbon burner including a boiler having its central portion hollow, a tubular member connected with the boiler and forming a steam chamber, a fuel pipe extending within the steam chamber and terminating short of one end thereof, means for feeding oil under pressure to said pipe, means for feeding water under pressure into the boiler, a pipe leading from the boiler and discharging into the steam chamber at a point above the fuel pipe, an oil pan disposed beneath the boiler, a nozzle connected with the steam chamber and extending between the oil pan and boiler, and means for supplying oil to the oil pan.

6. A hydrocarbon burner including a boiler in the form of a rectangular tube, a tubular member disposed above the upper surface of the boiler and forming a steam chamber, a partition extending across the boiler, means for admitting water into the boiler at one side of the partition, a steam conductor connected with the interior of the boiler on the other side of the partition and extending within the steam chamber, a fuel supply pipe extending within the steam chamber and having its inner end spaced from the inner end of the steam chamber, a burner having one end thereof communicating with the interior of the steam chamber and its other end extending in a substantially horizontal plane beneath the boiler, an oil pan arranged beneath the boiler, means for supplying oil under pressure to the fuel pipe, and means for supplying oil from the supply means to the oil pan.

7. A hydrocarbon burner including a boiler having hollow side and end members, a partition extending across one of the end members, a tubular member secured to the upper surface of the boiler and forming a steam chamber, the opposite ends of which are curved, a conductor curved to conform to one end of the steam chamber and communicating with the interior of the boiler on one side of the partition, means for supplying water under pressure into the boiler on the other side of the partition, a fuel pipe extending within the steam chamber and disposed in a plane below the plane of the discharge end of the steam conductor, a burner communicating with the interior of the steam chamber and discharging beneath the boiler, an oil pan, and means for supplying oil under pressure to the fuel pipe and oil pan, respectively.

In testimony whereof I affix my signature.

JAMES O. ALWOOD. [L. S.]