(No Model.)

L. B. WHITE.

DEVICE FOR GENERATING HYDROCARBON VAPOR AND BURNING OR STORING IT.

No. 371,114. Patented Oct. 4, 1887.

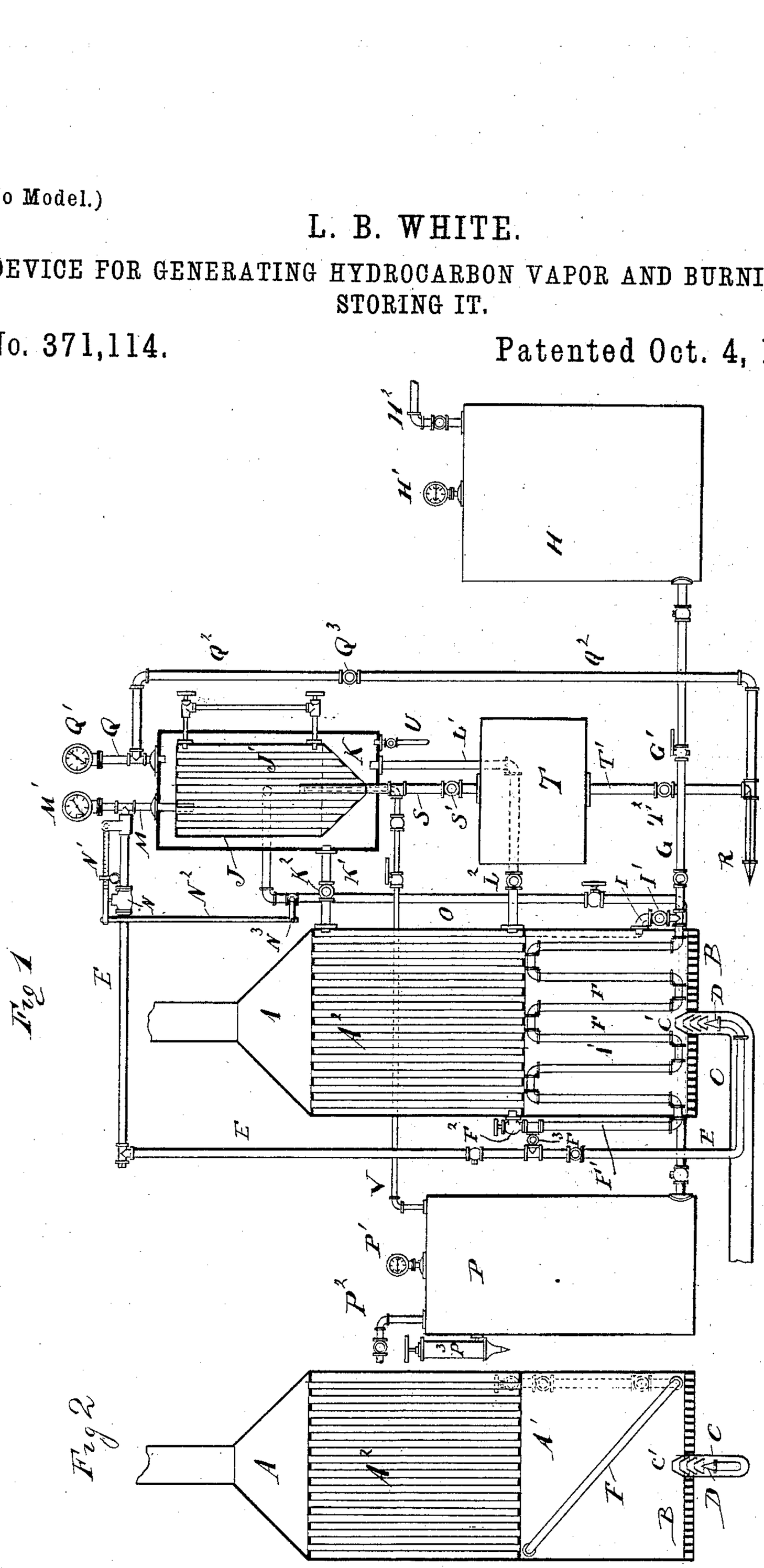

Fig 1

Fig 2

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DEVICE FOR GENERATING HYDROCARBON VAPOR AND BURNING OR STORING IT.

SPECIFICATION forming part of Letters Patent No. 371,114, dated October 4, 1887.

Application filed August 7, 1886. Serial No. 210,278. (No model.)

To all whom it may concern:

Be it known that I, LEWIS B. WHITE, of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Devices for Generating Hydrocarbon Vapor and Burning or Storing the Same, of which the following is a specification.

The object of my invention is to provide a new and improved hydrocarbon-furnace for burning and utilizing to great advantage crude petroleum or other hydrocarbons.

The invention consists in the combination, with a vaporizing-retort having circulating-tubes, of a steam-jacket surrounding the vaporizing-retort, pipes connecting the jacket with the boiler, pipes connecting the vaporizing-retort with the burner, a vessel for receiving the residuum from the vaporizing-retort, a pipe provided with a jet for burning the residuum, a steam-pipe for conducting steam to said jet, and tanks for the vapor and hydrocarbon, all as will be fully described hereinafter, and finally be pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a boiler provided with my improved hydrocarbon-burner. Fig. 2 is a cross sectional view of the boiler.

Similar letters of reference indicate corresponding parts.

The boiler A is provided with the fire-box A′ and the water-tubes A^2 above the same, in the usual manner. A grate, B, is provided in the bottom of the boiler, and at the middle of said grate I provide the upwardly-bent end of an air-conducting tube, C, containing a series of cone-shaped rings, C′, below the middle of which the burner-nozzle D is provided, which is connected with the pipe E. In the fire-box A′ are also provided the pipes F, which are inclined at about an angle of forty-five degrees, and extend diagonally across the fire-box from the front at the bottom to the top at the rear on a zigzag or meandering line, so that the flames, passing upward from the burner or through the grate, strike said pipe F before they pass up between the water-tubes. The pipes F are connected at one end with the pipe F′, having its upper end connected with one of the water-tubes A^2, which pipe F′ is provided with a cock, F^2, said pipe F′ being also connected at its upper end by a cock, F^3, with the pipe E. The other end of the pipe F is connected with a pipe, G, having a valve or cock, G′, and connected with the vapor-tank H, provided with a pressure-gage, H′, and the outlet-pipe H^2.

The pipe G is connected by a short pipe, I, having a cock, I′, with a pipe (shown in dotted lines) connected with one of the water-tubes A^2.

The vaporizing-retort J has an inverted conical bottom, and is provided with the tubes J′, passing through said vaporizing-retort from top to bottom. The vaporizing-retort is surrounded by a steam-jacket, K, connected by a pipe, K′, having the cock K^2, and the pipe L′, having the cock L^2, with the water or steam space of the boiler.

The above-mentioned pipe E, on the end of which the burner D is provided, is connected with a pipe, M, passed through the steam-jacket in the top of the vaporizing-retort and provided at its upper end with a pressure-gage, M′. In said pipe E a pressure-valve, N, is provided, which acts on a graduated pivoted lever, N′, which has an adjustable weight, said lever being connected by a rod, M^2, with the handle of a cock, N^3, of a pipe, O, passing through the steam-jacket into the vaporizing-retort J, and connected with the hydrocarbon-tank P, provided with a pressure-gage, P′, and inlet-pipe P^2, and an air-pump, P^3, for producing the required pressure for forcing the hydrocarbon out of said tank. The lower horizontal part of the pipe O is shown in dotted lines behind the boiler.

A pipe, Q, projecting upward from the steam-jacket K, has a pressure-gage, Q′, and is connected by a pipe, Q^2, having a cock, Q^3, with a nozzle, R.

The vaporizing-retort J is connected by a pipe, S, having a cock, S′, with the tank T for receiving the residuum, and said tank T is connected by a pipe, T′, having a cock, T^2, with the nozzle R.

The pipe U is provided for drawing off the sediment, &c., from the steam-jacket, and the pipe V is provided for conducting the residuum back into the oil-tank P when desired.

The operation is as follows: The steam in the steam-jacket evaporates the hydrocarbon

in the vaporizing-retort and converts it into vapor, which passes through pipes M and E to the nozzle or burner D, where it is ignited; or, if the cock provided in the pipe E a short distance below the cock F^3 is closed, and the cock F^2 is closed and the cock F^3 opened, the vapor passes through the pipes F in the fire-box, where it is superheated, and then passes through a pipe, G, into the tank H, for storing. It can then be used for illuminating or other purposes. In case the vapor is not consumed as rapidly as it is produced, the pressure of the vapor in the vaporizing-retort increases and is sufficient to raise the valve N, whereby the cock N^3 is closed and the supply of hydrocarbon to the vaporizing-retort cut off. As soon as the vapor-pressure in the vaporizing-retort is reduced, the weight closes the valve N, whereby the valve N^3 is opened and hydrocarbon is admitted into the vaporizing-retort. The residuum from the hydrocarbon collects in the bottom of the vaporizing-retort and passes through the pipe in the residuum collector or tank T. When there is a sufficient quantity of such residuum in the tank, the cock T^2 in the pipe T is opened, as is also the cock Q^3 in the pipe Q^2, thus permitting steam to pass from the jacket through the pipe Q^2 to the nozzle R, the steam acting in the same way as it does in an injector, thus throwing a jet or sprays of hydrocarbon residuum under the boiler, where said residuum is consumed and utilized to produce steam, which steam is then used in the jacket for converting the hydrocarbon into vapor.

The vapor produced may pass directly from the vaporizing-retort to the pipe E to the burner, and in this case the pipes F′ are coupled with the water-tubes in such a manner that the water circulates through the pipes F, and is heated by the flame passing up between said pipes.

It is evident that in place of using steam any other fluid or hot air may be used for generating the vapor from the oil.

I am aware that numerous hydrocarbon burners and furnaces have been constructed in which steam and hydrocarbon were burned. I am also aware that coil-pipes have been used in furnaces; that vapor has been produced in generators; that vapor has been produced in a retort frequently formed of coil-pipes in the fire-box or furnace. All this I do not claim, broadly, for the reason that I provide pipes in the fire-box for superheating the hydrocarbon vapor, which pipes are also connected with the water-space of the boiler for assisting in generating steam. The hydrocarbon vapor, which is heated in said pipes when the same are not connected with the water-space of the boiler, is conducted in a suitable storage-tank. The advantages of my system are that I can produce any quantity of vapor, and can use such vapor immediately in the fire-box; or I can superheat the same in the piping of the fire-box and store it, and I can discontinue the superheating of the vapor and use the piping in the fire-box for generating steam.

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

1. The combination, with a steam-boiler having pipes passed through its fire-box, of a hydrocarbon-vapor-producing retort outside of the furnace or fire-box, a pipe connecting the retort with the pipes in the fire-box, a burner in the bottom of the fire-box, a pipe connecting the retort with said burner, and a gas-tank connected with the pipes in the fire-box, and a pipe for conducting steam from the boiler to the hydrocarbon-vapor generator, substantially as shown and described.

2. The combination, with a boiler, of pipes in the fire-box of the same, a retort for producing hydrocarbon vapor, a burner in the bottom of the fire-box, a pipe connecting the retort with said burner, which pipe, connecting the retort with the burner, is also connected with the pipes passed through the fire-box, said pipes being connected at their opposite ends with the water-space of the boiler, and a gas-tank connected with the pipes in the fire-box, and cocks in the several pipes, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LEWIS B. WHITE.

Witnesses:

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