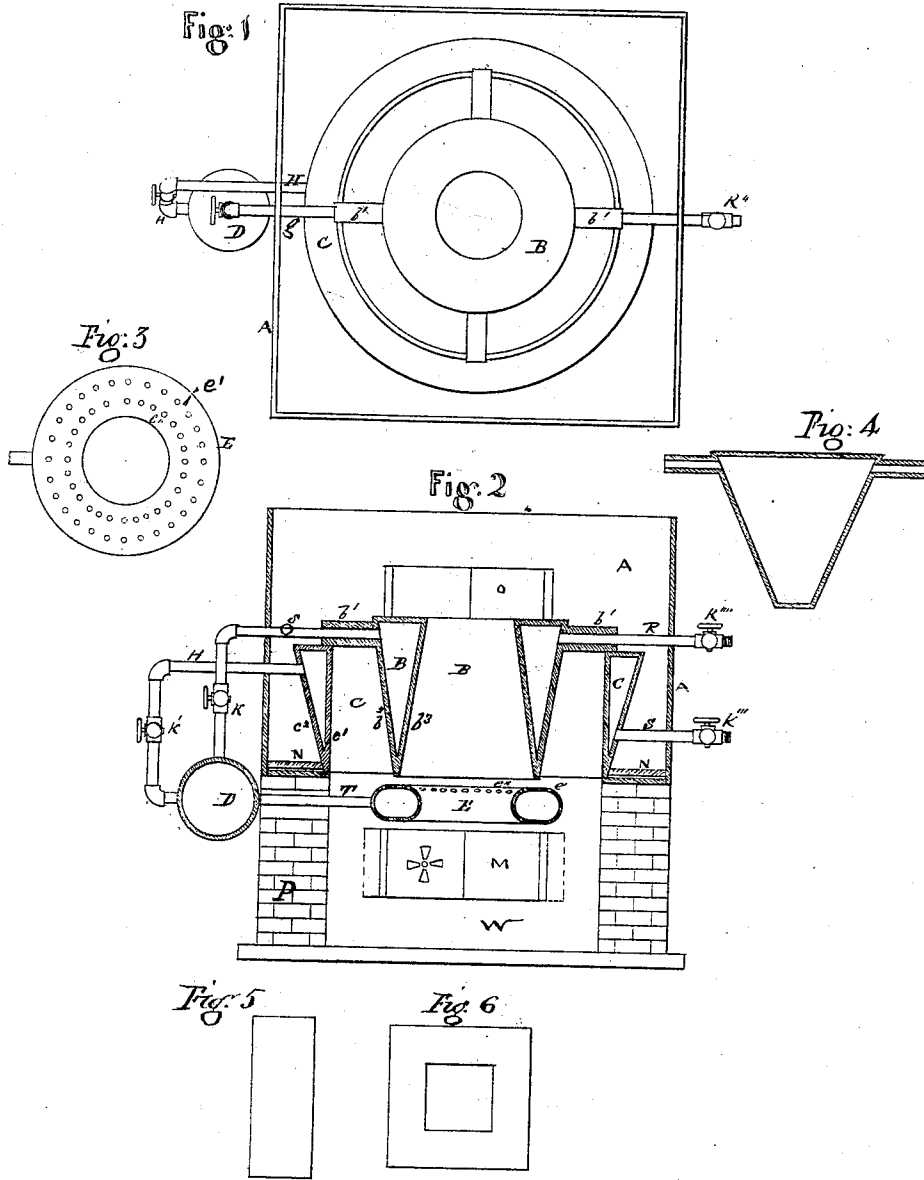


I. KENDRICK.
BURNING HYDROCARBON.

No. 109,131.

Patented Nov. 8, 1870.



Witnesses { Charles B. McLaughlin M.D.
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Isaac Kendrick

UNITED STATES PATENT OFFICE.

ISAAC KENDRICK, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN BURNING HYDROCARBONS.

Specification forming part of Letters Patent No. 109,131, dated November 8, 1870.

To all whom it may concern:

Be it known that I, ISAAC KENDRICK, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and Improved Mode of Burning Hydrocarbons as Fuel or for Illuminations; and the following is a full and exact description thereof.

The nature of my invention consists in the construction of the furnace for vaporizing the oils of creosote and shale, petroleum and its products, and other hydrocarbons, and burning the same in the form of gas or vapor as fuel or for illumination, either in combination with superheated steam or not, as may be desired.

Referring to the drawings making part of this specification, Figure 1 is a plan of my apparatus. Fig. 2 is a vertical section. Fig. 3 is a plan of the burner. Figs. 4, 5, and 6 are modified forms of generator B.

B is a double-walled cylinder, of iron or other metal, conical in shape, the largest end being at the top. The ends of the cylinder between the walls b^2 and b^3 , I close tightly, thereby forming a close chamber between the two walls, conical in shape, leaving the center of the cylinder open throughout. This chamber B has four hollow lugs, b' , cast on, by which it is supported upon a somewhat similar chambered cylinder, C, placed outside it, so as to leave a small annular space between the two. In this outside chambered cylinder the inside wall, c' , is perpendicular, the outside only being tapering. The chamber C rests upon the top of the brick-work P, which usually surrounds the ash-pit and fire-bars, now the draft-chamber. When applied to locomotives, &c., this chamber C is supported by lugs at about the level usually occupied by the fire-bars. The inside chamber, B, I term the "gas" or "vapor" generator of hydrocarbons. The outside cylinder, C, is the superheating steam-cylinder. A is the wall of the fire-place; or in case of a locomotive it is the inside plate of the fire-box.

R is a pipe entering the receiver B through lug b' , by which the petroleum or other hydrocarbon liquid enters the conical chamber B from a reservoir regulated by cock K'''' . Another pipe passes out at the opposite side, conveying the gas or vapor generated into the mixing-receiver D, which is a closed cylinder, hollow globe, or box, of metal.

A pipe, S, enters the chamber C, through

which is conveyed steam from a steam-boiler. This steam is here superheated, subjected to a high temperature, and then passes out at pipe H into the receiver D, where it mixes with the gas or vapors from the hydrocarbon and both together pass along pipe T to the burner E. This burner is a hollow ring with two rows of holes or nipples set therein on its top side. (Shown plainly in Fig. 3.) The inside row directs the jet of flame inside the cylinder B. The outside row directs the flame up the annular space between the cylinders B and C. This burner may be a hollow cylinder or tube conforming in shape to cylinders B and C. M shows the door of draft-chamber, (usually the ash-pit.)

I will now briefly describe the action and advantage of my apparatus, and in doing so it may not be improper to state here that the difficulties experienced heretofore in burning the hydrocarbon liquids successfully and economically result from the excess of carbon or rather the deficiency of hydrogen contained therein. This deficiency I supply in a large degree by the use of my superheating steam-chamber cylinder, the walls of which, being heated to a very high temperature, (red heat,) decompose the steam when brought in contact and set free the hydrogen, which I secure and use as herein set forth. A temporary fire is built within the draft-chamber to heat cylinder B. When sufficiently heated cock K^4 is opened for the oil or liquids to flow into the chamber B. Steam is also admitted by pipe S into chamber C. The gas or vapors of the hydrocarbons and superheated steam pass from their respective cylinders into receiver D, and from thence to the burner E, where they issue from holes $e'' e'$, where combustion takes place, the flame passing up through the central opening in the cylinder B, as also up between the walls of chambers B and C, and thence to a steam-boiler or other object for which heat may be required. In this arrangement the gas or vapor generator is surrounded by an intense heat, sufficient to burn up the residuum of the hydrocarbon introduced into chamber B, and the flame from the burner E is made to pass over the inside wall of the superheating steam-cylinder C, heating the same to a sufficiently high temperature, that when steam from the boiler is brought in contact its hydrogen is dis-

engaged, secured, and used as fuel, in combination with the vapors of the hydrocarbons, securing a more perfect combustion than otherwise obtained.

I am aware that steam in its ordinary form has been used to a considerable extent in connection with the vapor of petroleum, but not in the manner and form as hereinbefore described.

It is not essential that the gas-generator B should be circular. It may be square or polygonal in form, (see Fig. 6,) or circular without any central opening, as in Fig. 4, or rectangular, as in Fig. 5, the burner E being made to correspond.

When the apparatus is used for some special purposes chamber C may be dispensed with, and the perpendicular wall *c'* only retained to confine the flame against the outer wall of chamber B, as also for support of cylinder B.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The inverted cone-shaped chambered cylinder B, constructed and arranged in combination with the burner E, so that the flame

passes up both sides of the retort in the manner herein described.

2. The cone-shaped cylinder or jacket C for superheating steam for purposes as hereinbefore described, arranged in combination with a gas-generator, as herein set forth.

3. The box D, arranged, as shown, in combination with the retorts B and C, for the purpose of mixing the vapor of hydrocarbons and superheated steam preparatory to its introduction to the burner as fuel.

4. The burner E, so constructed and arranged that the flame is brought to bear upon the outer and inner walls of the gas generator B, as also upon the inner wall of the superheater C, as herein described.

5. The gas-generator B, the superheating steam-cylinder C, the mixing-receiver D, and burner E, combined and arranged and connected together, substantially in the manner and for the purpose herein described.

ISAAC KENDRICK.

Witnesses:

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