

HYDROCARBON-FURNACE.

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Inventor
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by Munson & Philipp
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UNITED STATES PATENT OFFICE.

ANANIAS SMITH, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO EDWIN A. HOLBROOK, OF SAME PLACE.

IMPROVEMENT IN HYDROCARBON-FURNACES.

Specification forming part of Letters Patent No. 178,477, dated June 6, 1876; application filed January 24, 1876.

To all whom it may concern:

Be it known that I, ANANIAS SMITH, of the city of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Apparatus for Burning Fluid Fuel; and I do hereby declare the following to be a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

The object of my invention is to produce an apparatus in which fluid fuel, such as petroleum and other hydrocarbons or vapor produced therefrom, can be safely and effectually burned, and the heat arising therefrom controlled and applied to the raising of steam, smelting of ores, boiling of salt, &c.; and it consists in the means hereinafter fully described and claimed.

Figure 1 of the drawings illustrates a longitudinal vertical section, taken on the line *yy*, Fig. 2, of a portion of the apparatus embodying my invention. Fig. 2 is a horizontal section, partly in plan, showing the apparatus, taken on line *xx*, Fig. 1. Fig. 3 is a transverse vertical section through the line *zz*, Fig. 1.

A is a chamber, formed by the walls B, C, D, and E, in which active combustion of fluid fuel takes place. F are chambers, one on each side of the chamber A, formed by the walls B D, the outer walls G, and walls H, extending from the wall D to the brick or other foundation I. Beneath the wall D a second chamber, K, is formed by the said wall, the foundation I, and walls G H. The chambers A and K are in communication through apertures *a* in the wall D, the chambers K and F by apertures *b* in the walls H, and the apertures *a*, and the chambers A F by the apertures *c* in the walls B. L is a pipe for supplying a blast of air to the chamber K and the chambers F and A, communicating therewith.

The fluid fuel is fed to the chamber A by a pipe, M, leading from a fuel-tank, N, proper pressure being obtained to propel the same either by connecting said tank, through a pipe, O, with a steam-boiler, P, the pressure being controlled by a cock, *d*, or by elevating the tank to a proper height, so that gravity alone may be sufficient. To assist the combustion of the fluid fuel I supply the chamber A with steam through a pipe, R, which surrounds the fuel-pipe M, and is connected to the boiler P.

This pipe is provided with an auxiliary pipe, S, which passes through a superheater, T, and rejoins the pipe R at U. By shutting off the cock *e*, with which the pipe R is provided, and opening the cocks *f* in the pipe S, the steam is caused to pass through the superheater and enter the chamber A. The reverse of this operation compels the steam to pass directly from the boiler to said chamber A. The pipes R and M are each provided with cocks to regulate the supply of steam and fuel.

To control the blast of air when it is employed, and thus the combustion of fuel in the chamber A, I employ a valve or damper, V, which is just the width and height of the chamber K. This is moved backward and forward in the latter by means of rods passing through apertures in the wall E. By adjusting this valve the force of the blast can be increased in one portion of the chamber A over that in another, and the quantity of air supplied thereto regulated, and the completeness or incompleteness of the combustion thereby controlled. Openings in the wall E, provided with glass, enable the attendant to examine the fire and change its character without shutting off the supply of fuel and air.

The walls B, C, D, E, G, and H may be of any suitable material, and should be strong enough to resist the pressure of the blast. The heat arising from the active combustion of the fuel and the gases partially or wholly consumed escape through an opening in throat X in the chamber A, either under a steam-boiler, into a puddling or smelting furnace, or wherever it is desirable to employ heat the degree of which is controllable.

In the drawing, I have shown the apparatus applied to the boiling of salt. Y are salt-kettles, formed in the ordinary blocks of two. Beneath these are arches of refractory material, with apertures opposite the point of contact of contiguous kettles, through which the heat may pass, a floor of brick or tile beneath forming a chamber into and through which the heat from the chamber A passes, and in which the gases which have been unconsumed in the chamber A are burned, the products of combustion passing off through a chimney at the end of the block of kettles.

The air blast and valve may in some cases be

dispensed with, where the supply of air without the blast is sufficient to produce the degree of heat desired.

In operating the apparatus, after a fire has been started, steam is first let on, and then fluid fuel. The heat is then regulated by the amount of fuel, steam, and air supplied to the chamber A.

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

1. The combination of the chambers A, F,

and K, constructed and communicating, as described, with steam and fluid-fuel pipes, substantially as set forth and shown.

2. The combination of the chambers A, F, and K with steam and fluid-fuel pipes, an air-blast pipe, and a valve, V, substantially as shown and described.

ANANIAS SMITH.

Witnesses:

WILLIAM A. SMITH,
EDWIN A. HOLBROOK.