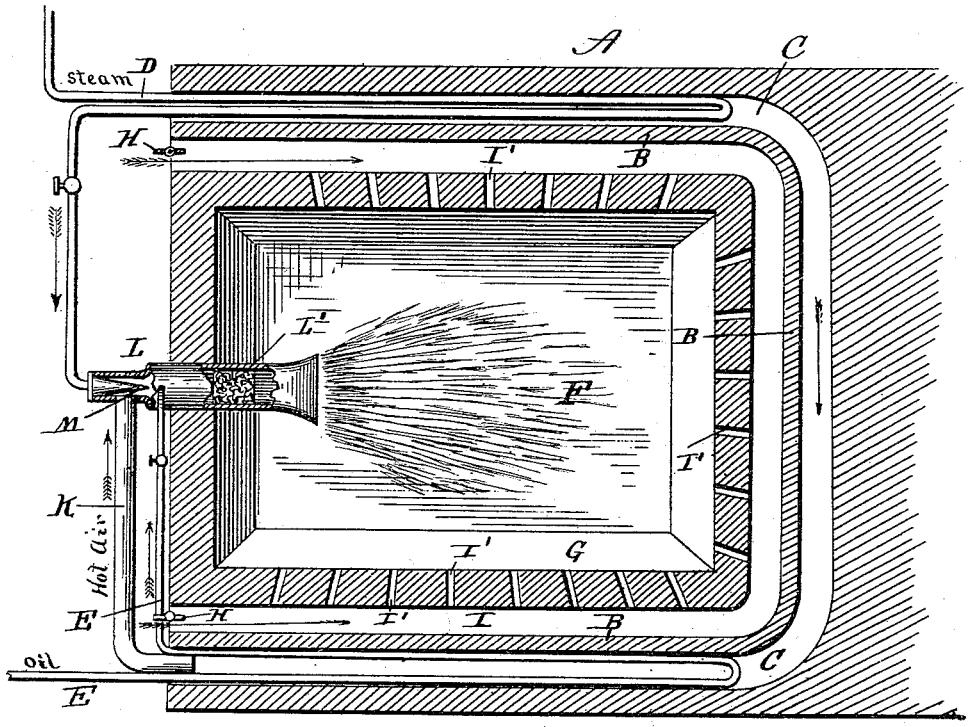
(No Model.)

C. M. GEARING.

HYDROCARBON FURNACE.

No. 458,390. Patented Aug. 25, 1891.



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HYDROCARBON-FURNACE.

SPECIFICATION forming part of Letters Patent No. 458,390, dated August 25, 1891.

Application filed November 13, 1890. Serial No. 371,323. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. GEARING, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hydrocarbon-Furnaces, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to certain improvements in that class of furnaces in which fluid hydrocarbon is employed as fuel; and it has for its objects to provide improved means whereby steam, air, and a fluid hydrocarbon in a heated condition may be supplied to the fire-chamber of a furnace in which the combustion of the fuel is effected, as more fully hereinafter specified.

The above-mentioned objects are attained by the means illustrated in the accompanying drawing, which represents a horizontal sectional view of a furnace constructed according to my invention.

Referring to the drawing, the letter A indicates the outer walls of a furnace of any description, a rectangular furnace constructed of brick-work being illustrated in the present instance. The furnace is provided with inner walls B, parallel with the outer walls A, built at a suitable distance therefrom, so as to leave an air-flue C between the side and rear walls, the flues being open in front for the admission of air. The letter D indicates a return-bend pipe, which extends into the flue at one side of the furnace, one end of the said pipe being connected with a steam-generator and the other with a hydrocarbon-burner, as more fully hereinafter explained.

Into the flue at the opposite side of the furnace extends a return-bend pipe E, one end of which is connected with a fluid hydrocarbon-reservoir or other source of fluid-fuel supply and the other end with the hydrocarbon-burner before mentioned. Within the furnace is located a fire-box and combustion-chamber F. The fire-box is formed with inclined walls G and an impervious bottom, so as to hold any fluid hydrocarbon that may be injected and not be consumed until consumed. The fire-box is built or located within the inner walls of the furnace, and is of such size as to leave an intervening air-space I at the sides and rear between its outer walls and the inner walls of the furnace. The said space forms an air-flue, which is open at the front ends, the said front ends being provided with dampers H, by means of which the amount of air entering the flues may be regulated. From the said air-flues and extending through the walls of the fire-box leads a series of air-passages I′, through which air may be supplied to the fire-box, the volume admitted being regulated by means of the dampers above mentioned.

From one end of one of the outer side flues extends a pipe K, which leads to the hydrocarbon-burner L, the said burner extending into the center of the front of the fire-box. The burner consists of an injector of the usual construction, except that the outer shell at the eduction end is flattened and turned downward, so as to eject the commingled hydrocarbon fluid, air, and steam downwardly toward the hearth or bottom of the furnace. The burner receives a current of steam from a nozzle M, which connects with the steam-pipe and the hydrocarbon fluid and hot air from the pipes E and K, the steam-injected jet inducing a current of the hydrocarbon and air, forcing the same into the furnace in a gaseous or highly-inflammable condition. These gaseous or inflammable elements meet with currents of air entering through the apertures at the sides of the fire-box, which supply the necessary oxygen to insure perfect combustion. The steam, oil, and air pipes are provided with suitable valves by which the quantity of fluid passing through them may be regulated.

The body or mixing-chamber of the burner may be packed with wire-gauze or foraminous plates, as indicated by L′, to insure the perfect mixture of the gaseous elements, if desired.

The operation of my invention is as follows: The hydrocarbon is first supplied in proper quantity to the furnace through the burner, then the currents of hot air and steam are admitted through their respective pipes to the said burner. The combined gases and vapors issue from the flattened nozzle of the burner, and the flame is directed to the bottom or hearth of the furnace, so as to insure thorough combustion of the fluid fuel.

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

The combination, in a furnace for burning fluid hydrocarbons, of the inner and outer walls having intervening air-spaces, the oil and steam pipes extending through the outer one of said spaces, the fire-box located within the furnace and provided with apertures communicating with the inner air-flue, whereby air in regulated quantities may be supplied to the fuel, and a burner extending into the fire-box and connected at its outer end to the said steam and oil pipes, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES M. GEARING.

Witnesses:
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J. M. TERRY.