

(No Model.)

C. M. GEARING.
HYDROCARBON BURNER.

No. 441,062.

Patented Nov. 18, 1890.

Fig. 1.

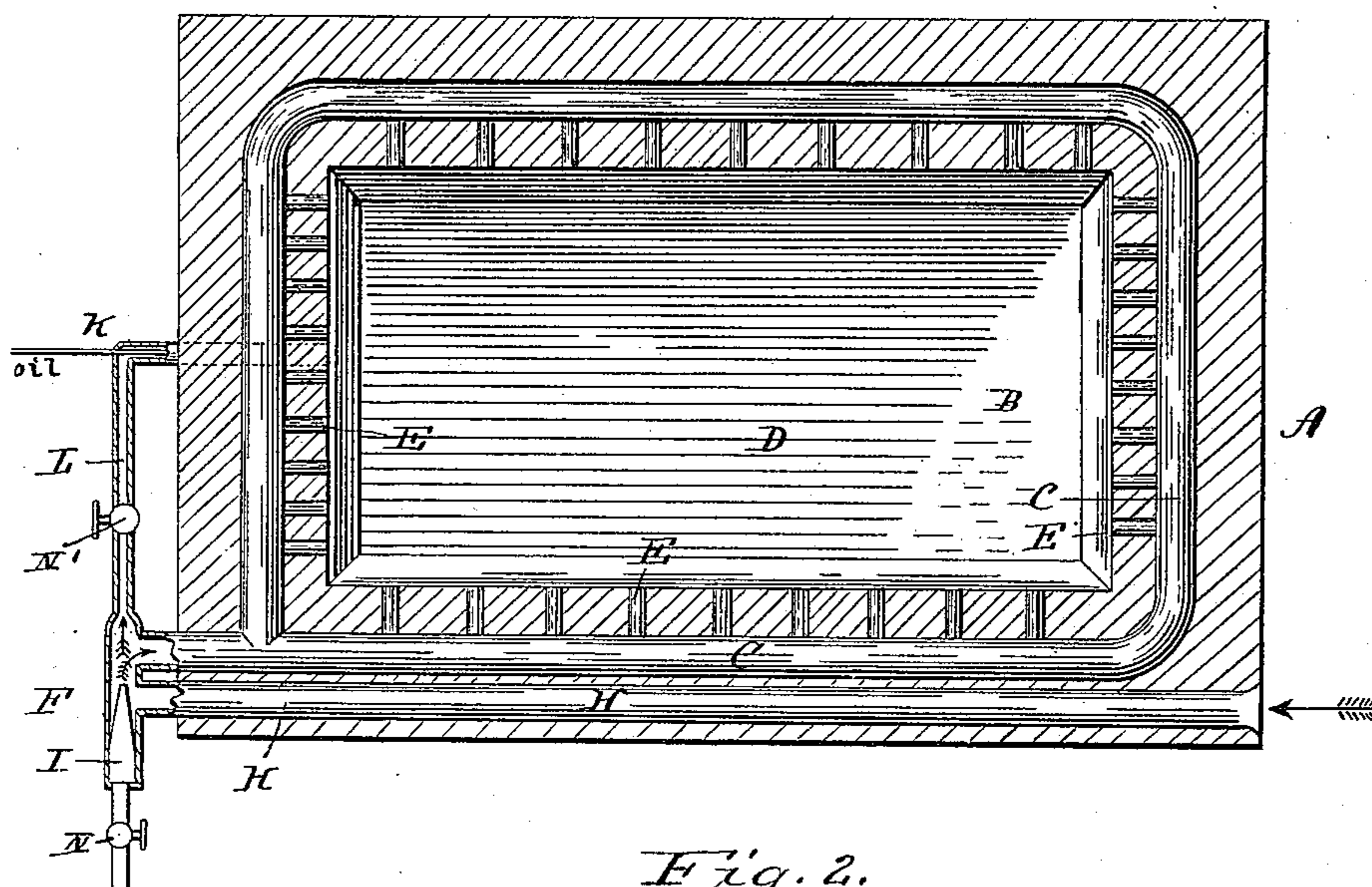
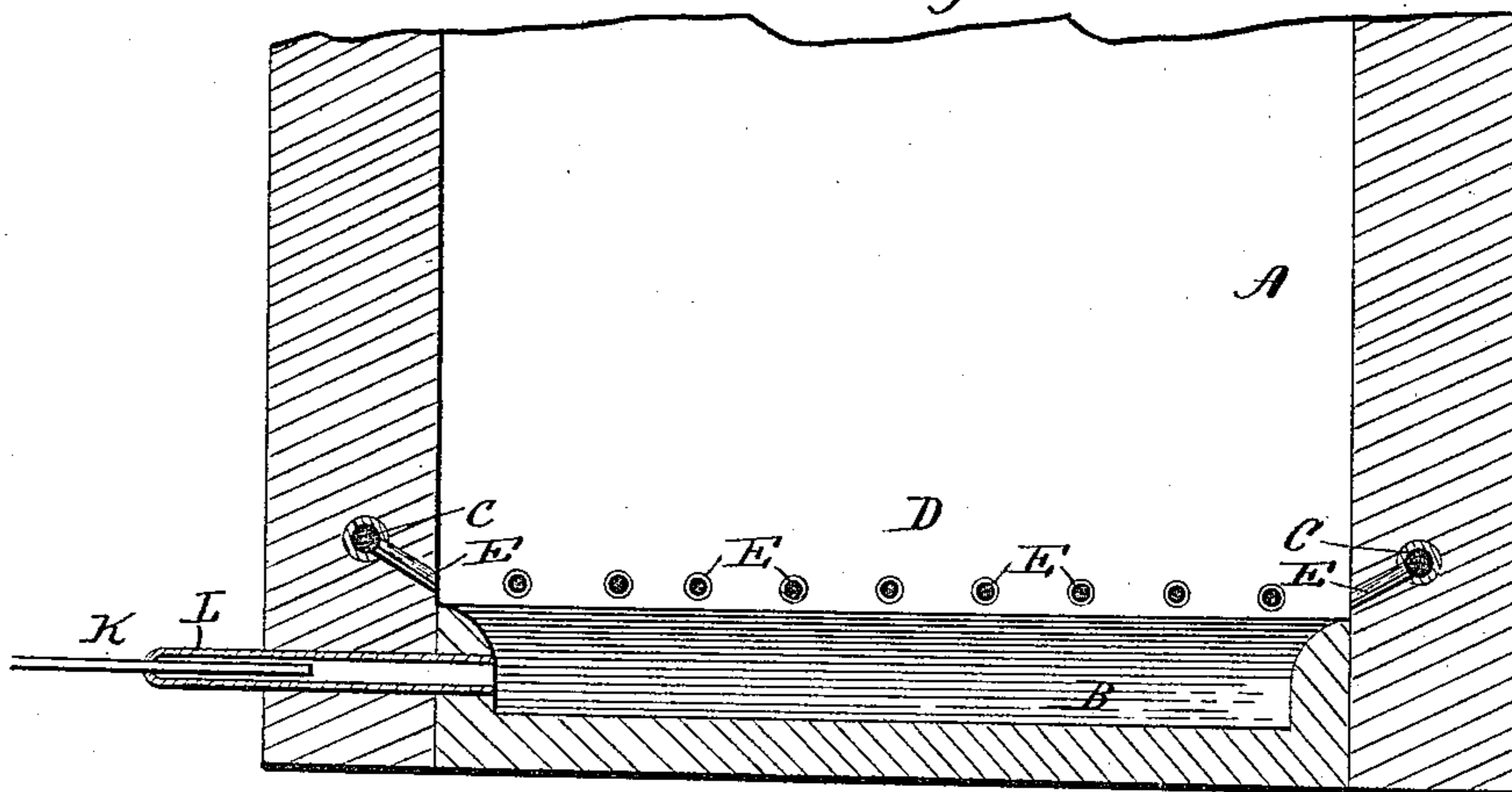


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES M. GEARING, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE
UNITED STATES FUEL GAS COMPANY, LIMITED, OF SAME PLACE.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 441,062, dated November 18, 1890.

Application filed February 14, 1890. Serial No. 340,428. (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-Burners, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has for its objects to provide for thoroughly consuming oil or liquid hydrocarbon fuel in heaters and furnaces of various descriptions for the generation of heat and for various industrial operations where a high temperature is required. Here-
15 tofore in burning such fuel the oil or hydrocarbon has been distributed over surfaces of absorbent or divided refractory material—such as broken brick, stone, or equivalent
20 substance—located in the fire-chamber of the furnace, the oil or fuel being injected into or upon the refractory surfaces by means of suitable perforated pipes located or projecting into the fire-chamber in connection with
25 steam and air. The intense heat in the furnace in connection with the oil or liquid fuel soon clogs the pipes and cements the mass of broken brick or refractory material together, interrupting the operation of the furnace ef-
30 fectually.

My invention is designed to remedy this evil and to so construct the burner and the oil-supply devices in connection with the furnace or fire-chamber of a heater that the oil
35 or liquid fuel may be injected into and burned directly in a fire-chamber free from all absorbent or divided material by means of a series of pipes, which are protected by the walls of fire-chamber, as more fully herein-
40 after explained.

To this end my invention consists, first, in a burner consisting of a tube or conduit extending entirely around the fire-chamber of the furnace or heater and built or embedded
45 in the walls thereof, the said burner being provided with a series of inclined nozzles extending toward the interior of the fire-chamber and terminating flush with or slightly back of the inner surface of the walls, the
50 tube passing out of the furnace at one end, where it is connected with an air-injector or an injector for supplying steam and air, or

with a pipe leading from a suitable generator for supplying air under pressure; and the invention further consists in the combination, 55 with the fire-chamber and the burner constructed as described and the air-supplying device, of an oil-supply pipe leading from any convenient source into the fire-chamber of the furnace, as more fully hereinafter ex- 60-
plained.

In the accompanying drawings, making part of this specification, Figure 1 represents a horizontal sectional view of a furnace embodying my invention; and Fig. 2 represents 65 a vertical sectional view of the lower part of such furnace, showing my invention applied thereto.

Referring to the drawings, the letter A indicates the walls of the furnace, which may 70 be of brick-work, masonry, or other suitable material.

The furnace may be of any shape or description; but in the present instance I have illustrated a furnace which is rectangular in 75 horizontal section. The bottom of the furnace or fire-chamber is dished or formed with a rectangular receptacle, or it may be provided with a pan or tray B of iron, fire-clay, or any other material which will withstand 70 the heat to which it is to be subjected.

The letter C indicates a tube or flue, which extends entirely around the fire-chamber D of the furnace, and which is built or embedded in the walls of the furnace, as shown. 85 From said tube extend at suitable intervals the downwardly-projecting passages or nozzles E, which open but do not extend into the fire-chamber, terminating flush with its walls to prevent them from being melted by 90 the intense heat when the furnace is in operation. The tube or flue C is extended beyond the walls of the furnace to the outside thereof at one end and connects with a cross-pipe F, which connects with the projecting end of a 95 pipe or flue H, the said flue extending through the wall of the furnace and terminating in a suitable opening for the admission of air. This flue H heats the air previous to its being introduced into the pipe C. Into the 100 cross-pipe also extends an injector-nozzle I, through which air or steam may be injected under pressure, so as to be forced through the nozzles E directly into the pan or tray on the

dished bottom of the fire-chamber or furnace, where it is concentrated and supports the combustion of the oil or liquid fuel, creating an intense heat.

5 The letter K indicates an oil or liquid hydrocarbon supply-pipe, which enters the fire-chamber at one side, passing through the wall of the furnace and connecting with any suitable source of supply. The said pipe K
10 may extend into a pipe L, leading from the cross-pipe F, by means of which a current of air or steam, or air and steam mixed, may be injected into the said pipe L to force the oil into the fire-chamber.
15 The operation of my invention is as follows: The oil or liquid fuel is supplied through the pipe K to the pan or tray, the supply being regulated by means of a suitable cock or valve. The oil being ignited in the pan, air,
20 or air and steam, is forcibly injected into the fire-chamber through the nozzles of the burner, being forced into said chamber by the injecting devices and controlled by a suitable cock or valve N. By means of a valve
25 N' a regulated amount of air or steam may also be forced through the pipe L to inject the oil into the pan. The air, or air and steam, in its passage through the burner around the walls of the furnace is heated and concentrated in this condition by the inclined noz-
30 zles in the pan, where it meets the oil, causing its perfect combustion and creating an

intense heat. As there are no absorbent materials or other obstructions in the pan or fire-chamber, the oil is free to burn completely 35 without clogging or cementing, and as the nozzles are flush with the internal surface of the furnace or fire-chamber walls they will not be melted, but will always remain open and free for the injection of the air. 40

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

The combination of a furnace, a pipe C, extending entirely around the furnace and embedded in the walls of the same, this pipe being provided at intervals with nozzles extending inwardly and terminating approximately flush with the interior walls of the furnace, an air-heating pipe H, embedded in one wall 45 of the furnace, a pipe F, connecting the projecting ends of the pipes C and H and provided with an injector, a pipe L, extending from the end of the pipe F into the furnace, a valve in the pipe L, and an oil-pipe empty- 55 ing into the pipe L, as and for the purposes described.

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

CHARLES M. GEARING.

Witnesses:

C. D. DAVIS,

C. M. ALEXANDER.