

(No Model.)

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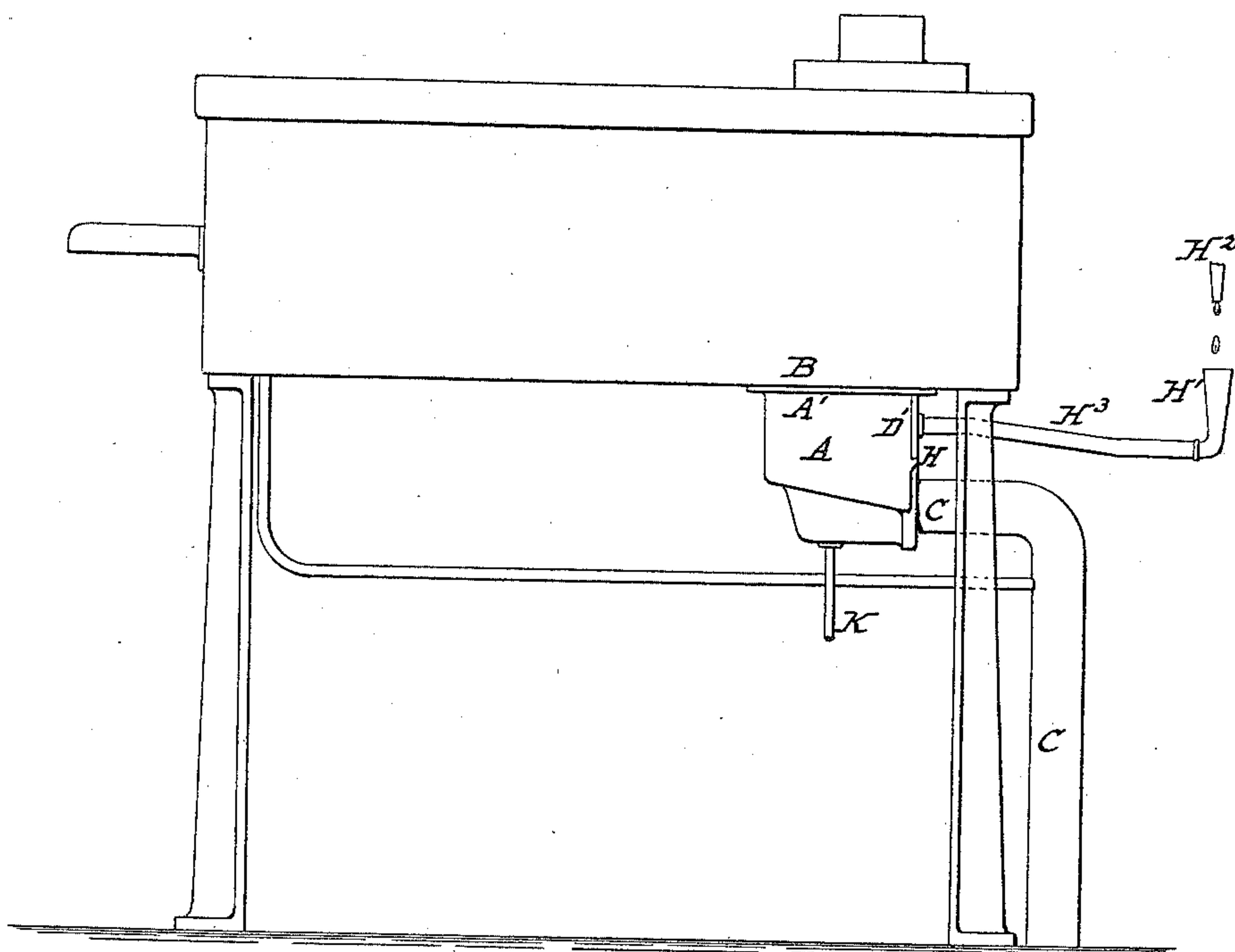
A. LENTZ.

HYDROCARBON BURNER FOR FURNACES.

No. 411,385.

Patented Sept. 17, 1889.

FIG. 1.



ATTEST:

*Marchand*

*W. H. Holmes*

INVENTOR:

*August Lentz*

by

*Robert Burns*

ATTORNEY

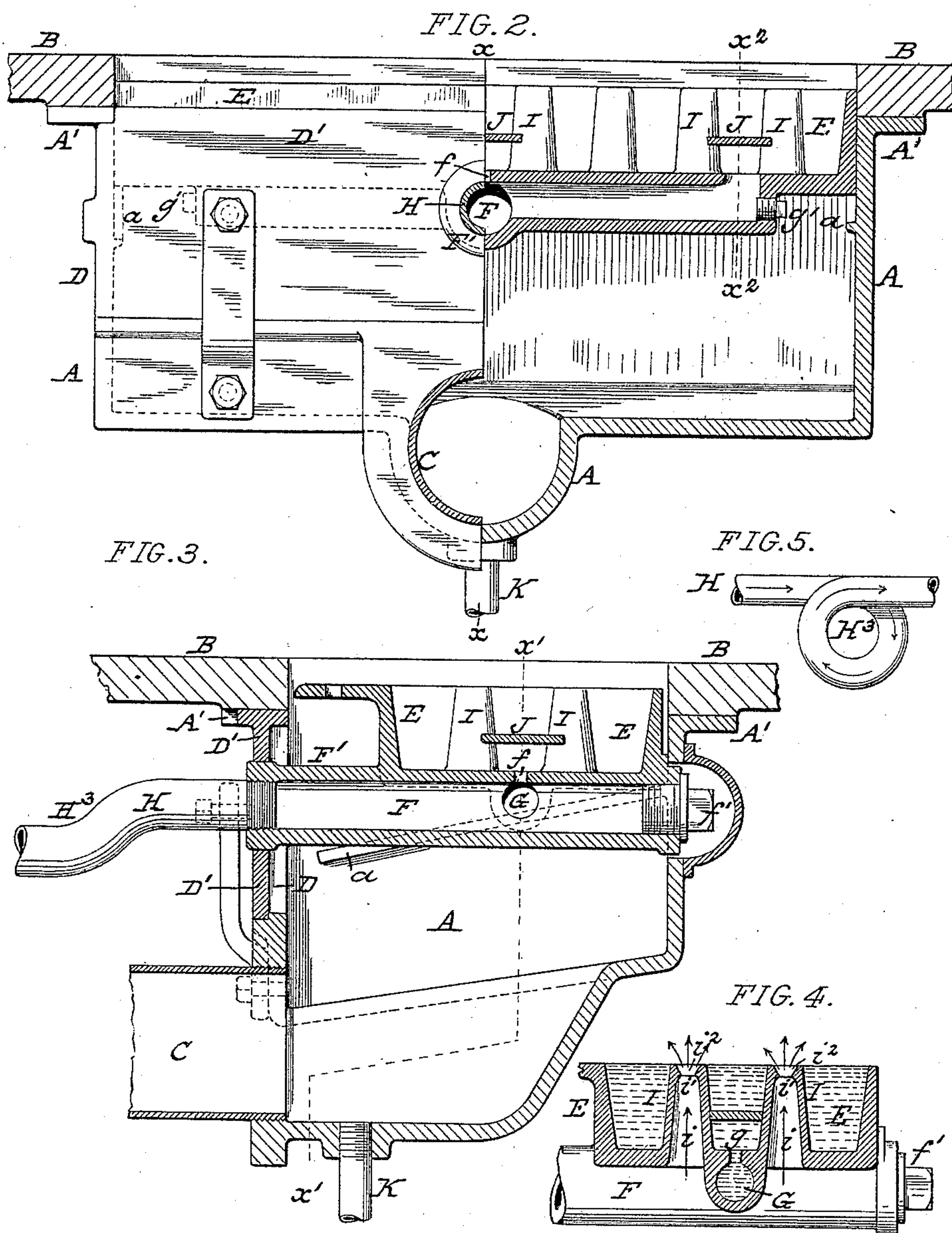
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# UNITED STATES PATENT OFFICE.

AUGUST LENTZ, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE LENTZ IRON SMELTING COMPANY, OF SAME PLACE.

## HYDROCARBON-BURNER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 411,385, dated September 17, 1889.

Application filed July 21, 1888. Serial No. 280,681. (No model.)

### *To all whom it may concern:*

Be it known that I, AUGUST LENTZ, a subject of the King of Sweden and Norway, who have declared my intention of becoming a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Hydrocarbon-Burners for Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to that class of hydrocarbon or liquid fuel burners in which the oil is constantly fed in regulated quantity to an open-topped containing-tray to constitute a constant stratum of liquid fuel in such tray, jets of air being discharged at the surface of such stratum of liquid fuel to carry the same in an atomized form up into the combustion-chamber of the furnace to which the burner is connected; and the present improvement has for its object to provide a simple, efficient, and durable burner for liquid fuel, in which are embodied the features of an even and uniform distribution of the process of combustion, and the heat consequent thereof throughout the combustion-chamber; the perfect atomizing of the liquid fuel as it flows into the mouth of the air-discharging nozzle, without unduly retarding the force of the air-currents through the burner, and by which such atomizing is accomplished; the ready and easy detachment and removal of the liquid-fuel portion of the burner from the other portions of the same; the prevention of the splashing up of the liquid fuel into the combustion-chamber, due to sudden fluctuations in the pressure within such chamber, as well as the backflow or escape of gases, &c., through the liquid-fuel supply-pipe from the same cause. I attain such object by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a forge-furnace to which my improvements are applied; Fig. 2, a view, one half in end view and one half in section at line  $x\ x$ , of my

improved burner; Fig. 3, a longitudinal section of the same at line  $x' x'$ , Fig. 2; and Fig. 4, a detail longitudinal section at line  $x^2 x^2$ , Fig. 2.

Similar letters of reference indicate like parts in the several views.

Referring to the drawings, A represents the housing or casing of the burner, which in the present improvement is cast in the form of a box having closed sides and bottom, as shown, and a marginal flange A', by which it is secured to the bottom plate B'' of the combustion-chamber of a forge-furnace, and constituting the air-trunk of the burner, the supply of compressed air to which is supplied through the blast-pipe C, D being a doorway or passage at one side of the casing to admit of the introduction of the liquid-fuel containing portion of the burner into place within such casing.

The liquid-fuel portion of the burner consists of an open-topped tray E, to which the liquid fuel is supplied through the main longitudinal passage F, and transverse branch passages G, arranged beneath the bottom of such tray and having communication therewith through orifices  $f\ g$  in the tray-bottom, as shown. The main passage F has a longitudinal neck-extension F', that passes through the door or head D', that closes the doorway D of the casing A, as shown, and to the outer end of such extension the end of the liquid-fuel-supply pipe H is attached.

The tray E is supported within the casing A by means of inclined ledges  $a$  upon the sides of the same, and upon which the rear edge of the fuel-tray E rests. The purpose of the inclined direction of such ledges is to raise the tray vertically into its proper position in the casing as it is pushed back into place, the outer or forward end of the tray being supported by its extension-neck F' engaging in the door or head D' of the casing A, as represented in Fig. 3.

The walls of the passages F and G are preferably cast integral with the tray-bottom, as shown, and their ends are provided with screw-plugs  $f' g'$  for easy access to the interior of such passages in cleaning the same.

I are a series of hollow nipples or nozzles



projecting upward from the bottom of the tray to or near a level with the top of the same. Through the bore of such nipples the compressed air passes up into the combustion-  
 5 chamber, and in order to cause such jets of compressed air to properly atomize the liquid fuel as it flows over the top of such nipples and seeks a passage down the bore of the same, and carry the fuel in such condition  
 10 into the combustion-chamber, the bore  $i$  of such nipples is formed with an annularly-contracted portion  $i'$  near its upper end, and an annularly-flaring portion  $i''$  above such contracted portion, as indicated in Fig. 4.  
 15 With such construction the blasts or jets of air spread out laterally, and as I find by practical use, properly atomize the liquid fuel without any material check to the force or intensity of the draft.  
 20 J are horizontal deflector-plates arranged a short distance above the orifices  $fg$  to prevent the liquid fuel, within the supply-pipe II, from splashing up into the combustion-chamber, due to sudden changes of the pressure within the combustion-chamber. These  
 25 plates are adapted to fit between adjacent nipples I and be supported by the tapering sides of the same, as shown.  
 K is a drain-pipe communicating with the  
 30 bottom of the air-trunk for removing from the same any liquid fuel that may overflow from the tray E.  
 The fuel-supply pipe II extends out the required distance horizontally and at its outer  
 35 end has a vertical extension in the form of a receiving-funnel II', into which a regulated stream of the liquid fuel flows or drops from a suitable disconnected supply-pipe II<sup>2</sup> or reservoir, as illustrated in Fig. 1.  
 40 A feature vital to the proper working of the above arrangement of parts consists in forming the horizontal part of such pipe with a depressed part or portion H<sup>3</sup>, that extends some distance below the point of  
 45 outlet from the pipe II, and this depression may be effected in any well-known manner—such, for instance, as an inclination downward of such pipes—as indicated in Fig. 1, a reverse bend in the pipe, as  
 50 shown in Fig. 3, or a circle bend, as indicated in Fig. 5. By this construction any liability of a backflow or escape of the furnace-gases through the pipe II, due to sudden changes of the pressure within the combustion-chamber, is in a great measure avoided. Without  
 55 such provision, and with the pipe II made level with its point of outlet, the frequent occurrence of such difficulties could not be avoided. A more important result is, however, attained by such construction—to wit:  
 60 a more constant level of the oil in the fuel-tray and an avoidance of fluctuations of the

oil in the tray, and the consequent variations in the flame that would arise therefrom.

While it is preferred to use a blast of air 65 for feeding the furnace and promoting the combustion, the natural draft of the furnace-chimney or a suction-draft through the furnace may be depended upon instead without departing from the spirit of my invention. 70 In either case the action of the air passing up through the nozzles to atomize the liquid fuel as it seeks a downward outlet through the bore of the nozzles, as the natural draft in the type of furnaces to which my invention is applicable, will be amply sufficient to cause the air-supply to pass up through the nozzles with the requisite force and velocity. 75

Having thus fully described my said invention, what I claim as new, and desire to secure 80 by Letters Patent, is—

1. A hydrocarbon-burner for furnaces, comprising, in combination, an open-topped cast-metal air trunk or casing formed with closed sides, bottom, and a marginal top flange, 85 by which it is adapted to form the bottom of the combustion-chamber, an entrance-door in one of its sides, a liquid-fuel tray arranged within the same and formed with a series of blast-nipples extending from the bottom to 90 or near the top of the tray, and an underlying supply-passage F and the supply-pipe II, essentially as set forth.

2. A hydrocarbon-burner for furnaces, comprising, in combination, an open-topped cast-metal air trunk or casing formed with closed 95 sides and bottom, inclined ledges upon the interior surface of its sides, and an entrance-door in one of its sides, a liquid-fuel tray supported within the casing by means of said inclined ledges, and formed with a series of 100 blast-nipples extending from the bottom to or near the top of the tray, and an underlying supply-passage F and the supply-pipe II, essentially as set forth. 105

3. A hydrocarbon-burner for furnaces, comprising, in combination, an open-topped cast-metal air trunk or casing formed with closed sides and bottom, an entrance-door in one of 110 its sides, and an attaching marginal flange at its top, a liquid-fuel-containing tray arranged within said casing and provided with a series of air-conducting nozzles for discharging volumes of air at the surface of the liquid fuel, the fuel-supply H and passage F, for conducting 115 oil to the tray or burner, and the drain-pipe K, connected to the bottom of the air trunk or casing, essentially as set forth.

In testimony whereof witness my hand this 19th day of July, 1888.

AUGUST LENTZ.

In presence of—  
 ROBERT BURNS,  
 C. MARCHAND.