(No Model.) 2 Sheets—Sheet 1.

C. H. LAND.

HYDROCARBON BURNER.

No. 423,432. Patented Mar. 18, 1890.

Fig. 1.

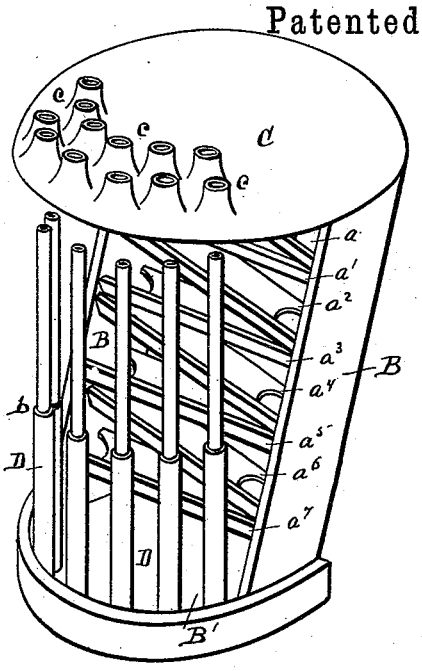
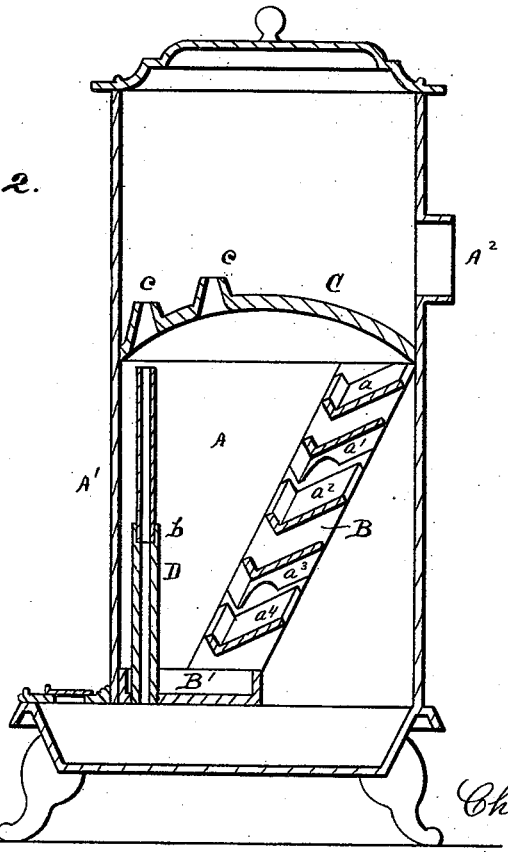


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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HYDROCARBON BURNER.

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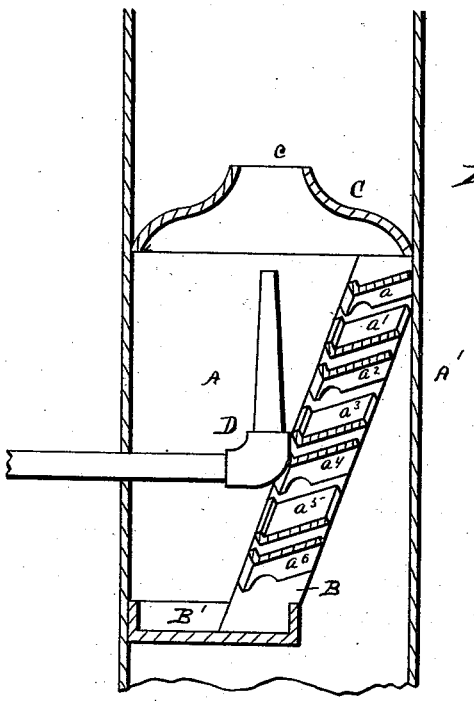

Fig. 3.

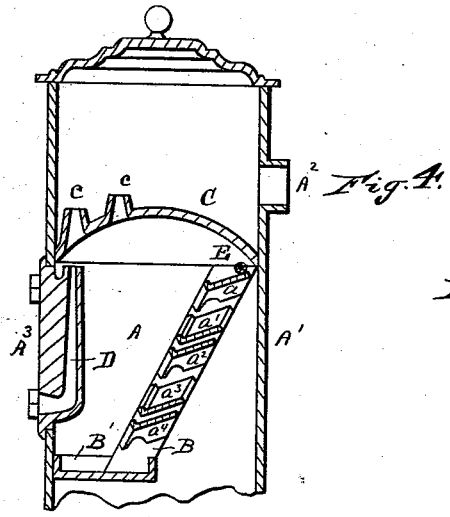

Fig. 4.

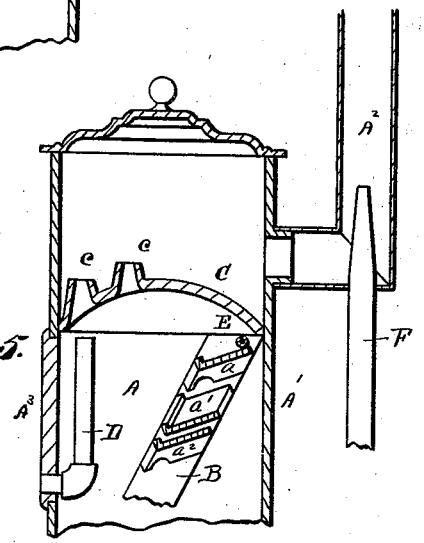

Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES H. LAND, OF DETROIT, MICHIGAN.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 423,432, dated March 18, 1890.

Application filed November 5, 1888. Serial No. 290,001. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. LAND, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Hydrocarbon-Burners; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to new and useful improvements in a hydrocarbon-burner, the same being more particularly designed as an improvement upon a burner embodied in a pending application filed by me October 10, 1888, Serial No. 287,733.

The object of my invention is to provide novel means for conducting an independent air-supply to the lower and the upper regions of combustion in a combustion-chamber to produce a partial combustion in the lower region, thereby effecting a decomposition of the hydrocarbon fuel in a lower or partial stage of combustion, whereby the carbon is set free and in a highly-heated condition, the carbon being carried in a highly-heated condition into the upper region, where an additional supply of air is discharged to the red-hot flame containing an excess of carbon, in order that a sufficient quantity of oxygen may be provided to unite with the carbon to support and effect a perfect combustion of the same.

Various means have hitherto been employed to supply an adequate quantity of oxygen to consume the products of combustion; but where a blast has been introduced into the higher regions of combustion in various ways the increased pressure has resulted in forcing the combustible matter in the flame away from the region of combustion and out of the combustion-chamber in the form of smoke unconsumed. My invention is designed to remedy this difficulty. Moreover, my invention contemplates a concentration or partial confinement of the flame within the combustion-chamber, in order that the carbon may be superheated and mingled with an adequate supply of oxygen without any liability of the combustible material being forced out of said chamber without perfect combustion of the same. My invention is therefore designed to provide means for such a concentration of the flame in the combustion-chamber, independent supplies of air into the base and upper region of said chamber, and also I contemplate means for producing an exhaust into the smoke-flue, so as to effect a suitable current to support combustion. In this connection I contemplate the employment of a diffusing-burner of any suitable construction by which the hydrocarbon may be thoroughly disseminated in the presence of a free current of air.

My invention therefore consists of the devices and appliances, their combinations and arrangements, as more fully illustrated in the drawings, and more particularly hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a separate view of my improved burner. Fig. 2 is a vertical section illustrating said burner located within a cylindrical stove. Fig. 3 is a modification wherein the hood is provided with a single orifice and a single air-flue is led to discharge air at the base of said orifice. Fig. 4 is a modification wherein the air-flues are made integral with the door to the combustion-chamber; and Fig. 5, a similar view in which said air-flue is located in the door, so as to be swung outward therewith to afford ready access to the diffusing device.

I carry out my invention as follows:

A represents a combustion-chamber, shown in this connection located within a stove A′; and I would have it understood that I contemplate the employment of my device in any combustion-chamber, whether in a stove or furnace, &c.

A^2 is a smoke-flue.

My diffusing-burner, herewith illustrated, forms the subject-matter of a separate application, and is shown as consisting of plates *a* *a′*, &c., arranged in zigzag order, said plates being removably engaged upon any suitable support B, said support provided with a base B′, so constructed as to carry the current of air entering beneath the plates and permit its passage over and between the plates from the rear to the front thereof.

C represents a hood or dome, engaged upon the supports B and preferably projecting forward from their upper ends, said supports

extending in an angular direction upward, as shown. The hood is constructed with one or more orifices, preferably cone-shaped, whereby the flame may be permitted to pass upward in jets through said orifice or orifices.

To afford an independent supply of air to the upper region of combustion, I provide one or more air-flues D D, &c., arranged to discharge the air adjacent to the base of said orifices. These pipes D D, &c., may be variously located. As shown in Fig. 1, they lead upward through the base B′, their upper ends terminating at the base of the conical orifices in the hood, so as to mingle the air discharged therefrom with the flame carried through said orifices.

As shown in Figs. 1 and 2, I prefer to construct the base of the pipes of metal and their upper ends made separable therefrom, as indicated at *b*, said upper ends preferably constructed of fire-clay, although I do not limit myself to the matter used for said flues. By leading the flues upward thus in front of the diffusing-burner they become heated and discharge the air in a heated condition into the flame. As shown in Figs. 4 and 5, these air-flues are led through the door A^3 to the combustion-chamber. In Fig. 4 the flues are made integral with the door, and in Fig. 5 they are simply engaged therewith. As so located they may be swung outward in opening the door, so as to leave free access to the diffusing-plates, enabling said plates to be readily cleaned whenever desired.

In Fig. 3 the hood or dome is constructed with a single orifice, a single flue being led to the base thereof. It will be seen that the flame discharged through said orifice will be drawn to a point, and that when air is injected into said flame in the manner already described a flame on the principle of the blow-pipe flame is produced, especially where a blast of air is introduced through the flue beneath, and my invention contemplates either a natural draft or a forced blast, as may be preferred, through these flues communicating with the upper region of combustion. It will be observed that the plates may be readily removed for repair, if needful, while at the same time they are readily accessible.

E represents a fuel-supply pipe.

F represents a pipe for communicating a blast to the smoke-flue to effect an exhaust of air from the combustion-chamber, and thereby secure a more intense current. This may be very desirable where the draft is poor, and may or may not be employed.

It will readily be seen that the hood confines the flame, so that the carbon is not too speedily driven off, while at the same time it is being superheated, in which condition combustion takes place more perfectly. This mode of drawing together a flame into one or more points and the discharge of an independent air-supply into said flame at said points secure a very high degree of temperature with the most complete combustion of the fuel. In this manner the partial combustion of fuel below and the complete combustion of the remaining products are secured in the upper regions, the flame being held in the upper region in such a solid body that an adequate supply of air may be distributed and mingled therewith, whether in a single jet or in a series of jets.

I prefer to use for the dome and surrounding parts fire brick or clay for the specific purpose of maintaining the highest possible degree of heated carbon, so that the free carbon may be held at the highest possible degree of temperature simultaneous with the union of a bountiful supply of oxygen to unite therewith.

What I claim is—

1. The combination, with a stove-casing, of a burner arranged therein and provided with inclined and overlapping diffusing-surfaces, a hood secured within said casing above the burner and provided with orifices, and a pipe for supplying air to the upper regions of combustion, substantially as set forth.

2. The combination, with a stove-casing, of a burner located therein and provided with inclined and communicating diffusing-channels, a hood provided with one or more conical orifices and arranged above said burner, and a pipe to discharge a current of air beneath said hood and in proximity to the base of said orifices, substantially as set forth.

3. The combination, with a stove-casing, of a burner consisting of a series of inclined and overlapping diffusing-surfaces, a hood secured within said casing above the burner and provided with orifices, a pipe for supplying air to the upper regions of combustion, and an air-blast pipe to produce an exhaust, substantially as set forth.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES H. LAND.

Witnesses:
N. S. WRIGHT,
CHARLES F. SALOW.