(No Model.)

C. F. BONHACK & O. HOPPE.

HYDROCARBON BURNER.

No. 421,543. Patented Feb. 18, 1890.

Fig. 3.

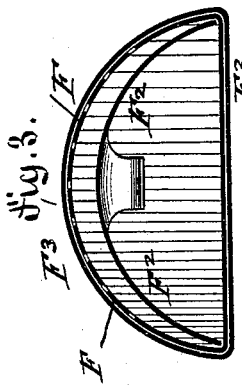


Fig. 2.

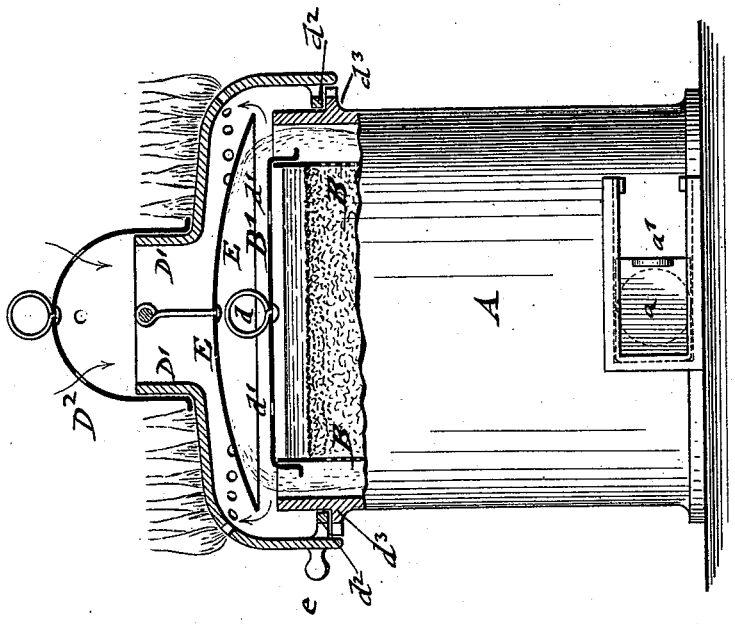
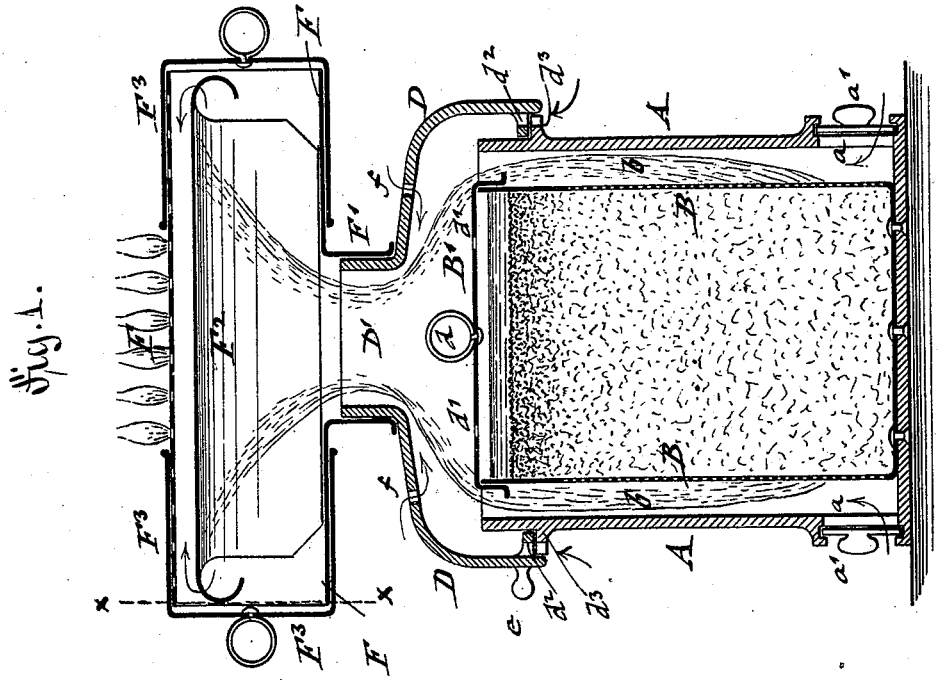


Fig. 1.



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HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 421,543, dated February 18, 1890.

Application filed April 5, 1888. Serial No. 269,752. (No model.)

To all whom it may concern:

Be it known that we, CHARLES F. BONHACK and OTTO HOPPE, both of the city, county, and State of New York, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a specification.

This invention has reference to an improved hydrocarbon-burner of that class which when in use is placed on the grate of a cooking-stove, and so constructed as to produce the more perfect combustion of the hydrocarbon charged in the same.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of our improved hydrocarbon-burner. Fig. 2 is a side elevation, partly in section, of the upper part of a modified form of the burner; and Fig. 3 is a vertical transverse section of the burner-head on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a cylindrical vessel, which is preferably made of cast-iron and provided at its lower part at diametrically-opposite points with air-supply openings *a*, and slide-doors *a'*, which latter can be partly or entirely opened or closed, so as to start or interrupt the working of the heater. At the interior of the vessel A is arranged a perforated cylinder B, between which and the vessel A is formed an annular space *b*. The interior perforated cylinder B is filled with a suitable non-combustible absorbent material—such as asbestus, mineral wool, or other suitable material—which is charged with petroleum or other liquid hydrocarbon preparatory to using the burner. The top of the interior cylinder is closed by a detachable cover B', provided with a ring *d* and with openings *d'* for the escape of vapors formed in the upper part of the cylinder B. A metallic cap D rests by an interior flange d^2 on an exterior annular flange or seat d^3 of the vessel A, said flanges d^2 and d^3 being provided with a number of registering openings or recesses, so that the air can be drawn from the outside to the interior of the cap D through the openings formed in the flanges d^2 d^3 when the recesses or openings are placed in register with each other. The cap D is provided with an exterior handle *e*, by which it can be shifted on the flange d^2, so as to place the recesses or openings in or out of register. The air is thus either permitted to enter or prevented from entering to the interior of the cap D. The cap D is provided at its upper part with openings *f*, which serve as jet-openings when the cap D is used as the burner, in which case the contracted neck D' of the same is closed by a detachable sheet-metal cap D^2, as shown in Fig. 2.

A soot collector or shield E is suspended in the top cap below the jet-openings of the same, said collector serving to deflect the vapors formed by the heating up of the interior of the vessel A and cylinder B, so that the vapors pass around the circumference of the collector and are properly mixed with the air drawn in through the supply-openings at the base of the cap and burned with the same, the flame passing in jets through the openings *f* to the outside, so as to produce the required heating action.

If it be desired to produce a still more perfect combustion of the hydrocarbon liquid charged into the absorbent filling of the interior cylinder B, a sheet-metal burner is applied to the neck D' of the cap D, said burner consisting of an enlarged head F, of semicircular or other cross-section, and of a neck F' at the base, which fits on the neck D' of the cap D, as shown in Fig. 2. The burner F is provided with a number of jet-holes and at the interior with a soot collector or shield F^2, that corresponds in its general shape to the shape of the burner-head.

The burner F is either permanently closed at both ends or preferably provided with detachable covers F^3, that are provided with ring-shaped handles *g*, said covers sliding over the ends of the burner-head and serving for the double purpose of giving access to the interior of the burner-head, so as to remove and clean the soot-collector, and also of reducing the jet-surface of the same whenever the quantity of vapors supplied to the same is decreased—as, for instance, when the quantity of hydrocarbon charged into the absorbent material is nearly consumed. In this case the covers are pushed over the burner-head, whereby the number of jets is reduced and the size of the heating-flame pro-

portioned to the diminished quantity of oil in the vessel and the smaller quantity of vapors supplied to the burner-head.

Our improved hydrocarbon-burner is operated as follows: The cap of the burner and the inside cover are removed and the absorbent material charged with as much oil as the same can hold. The inner cover is replaced in position and a burning match applied to the latter through one of the air-openings, whereby the vapor of the hydrocarbon oil is ignited. The cap is replaced in position without the burner-head, the bottom openings being opened to their full extent, so as to permit a sufficient supply of air to the interior of the vessel. When the entire surface of the interior cylinder is ablaze and all the parts thoroughly heated, the burner-head is applied to the cap, whereby oil-vapors are generated, which form a number of jets, that are used for heating cooking-vessels in the usual manner. Before the burner-head is placed in position on the cap the air-supply through the registering openings at the base of the cap is interrupted by moving the same in closed position. The regulating of the flame is accomplished by setting the slide-doors of the air-openings at the lower part of the vessel A.

When it is desired to extinguish the burner, the air-supply openings are closed entirely. If the burner is to be used without the enlarged burner-head, the soot-collector is suspended from a transverse pin in the neck of the cap D, as shown in Fig. 2. In this case the openings at the base of the cap are also closed when the flame of the burner is fully started, so that the jets pass to the outside of the jet-openings of the cap and form an effective burner for heating purposes. The air-supply openings at the base of the cap F are only opened when the burner is to be started, so as to form a plentiful supply of air to the flame. This is not required after the burner is once started, as all the supply of air required for combustion is then drawn through the bottom air-openings by which the combustion is kept up.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination of an outer vertical cylinder provided with valved openings in its lower part and a recessed exterior flange near its top, a smaller vertical cylinder within the outer cylinder, provided with perforations in its circumference, an incombustible absorbent within the inner cylinder, and a cap having a contracted neck at its upper end and provided at its lower end with an internal perforated flange resting on the recessed flange of the outer cylinder.

2. The combination of an outer vertical cylinder provided with valved openings in its lower part, a smaller vertical cylinder within the outer cylinder, an incombustible absorbent within the inner cylinder, and a cap having a contracted neck at its upper end and perforations in its top.

3. The combination, with a hydrocarbon-heater having a cap and a contracted neck, of an enlarged burner-head having a neck fitting over the neck of the cap, jet-holes, and an interior soot-collector, substantially as set forth.

4. The combination, with a hydrocarbon-burner having a top cap and a contracted neck, of an enlarged burner-head having a neck fitting over the neck of the cap, jet-holes, an interior soot-collector, and sliding and detachable end covers, substantially as set forth.

5. The combination of a main vessel having air-supply openings, an interior perforated cylinder, an absorbent non-combustible filling in said cylinder, an interior cover for said cylinder, a detachable cap supported by the main vessel and provided with a contracted neck and jet-openings, and an enlarged burner-head applied to the neck of the cap and provided with jet-holes and an interior soot-collector, substantially as set forth.

6. The combination of an outer vertical cylinder provided with valved openings in its lower part and a recessed exterior flange near its top, a smaller vertical cylinder within the outer cylinder, provided with perforations in its circumference, an incombustible absorbent within the inner cylinder, and a cap having a contracted neck at its upper end and perforations in its top.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

CHAS. F. BONHACK.
OTTO HOPPE.

Witnesses:
PAUL GOEPEL,
JOHN A. STRALEY.