(No Model.)

W. B. YATES.

APPARATUS FOR BURNING PETROLEUM AS FUEL.

No. 303,199. Patented Aug. 5, 1884.

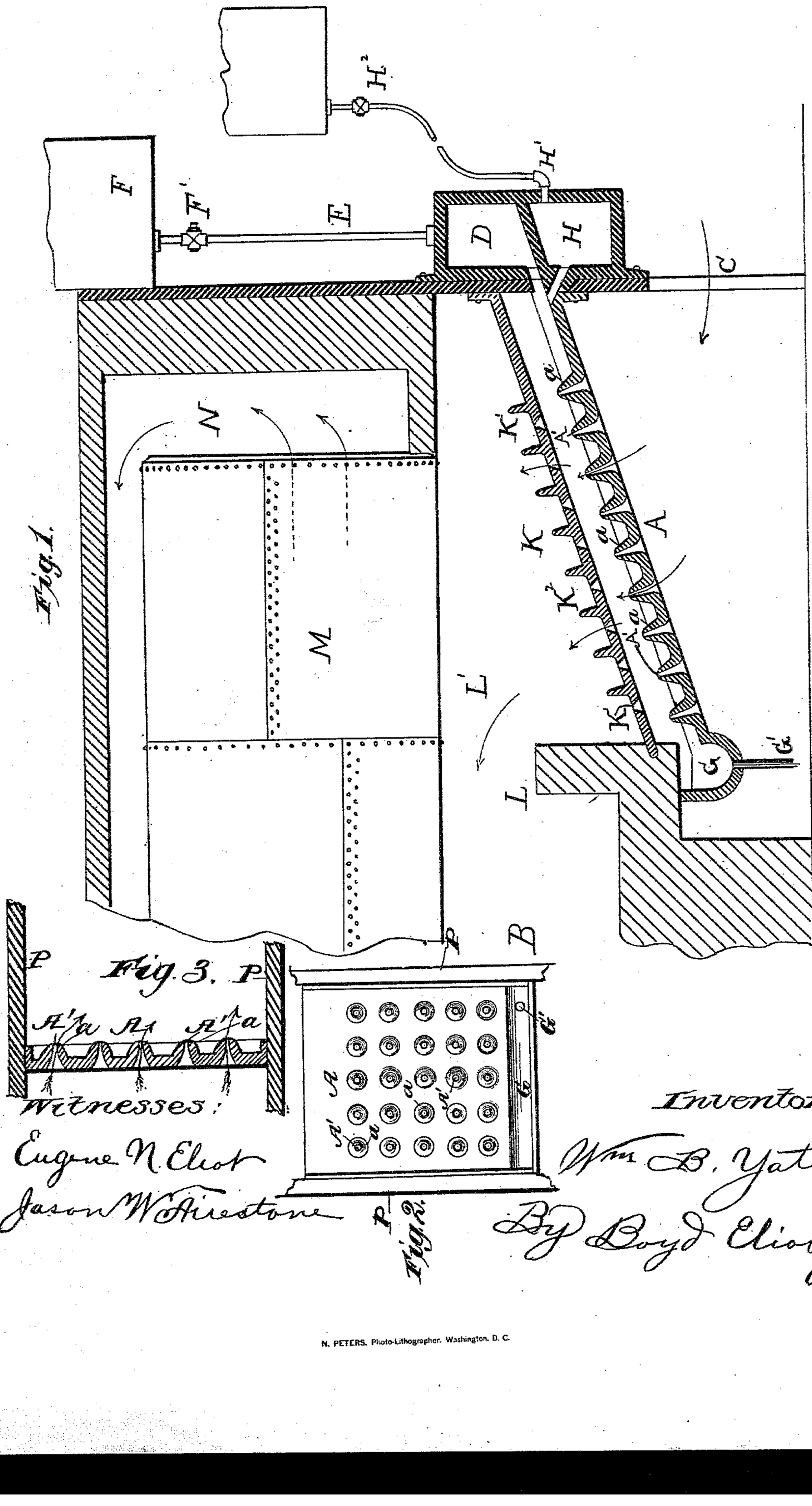

Fig. 1.

Fig. 3.

Fig. 2.

Witnesses:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BURNING PETROLEUM AS FUEL.

SPECIFICATION forming part of Letters Patent No. 303,199, dated August 5, 1884.

Application filed April 28, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. YATES, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing at Adams, in the county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Burning Petroleum as Fuel, of which the following is a specification.

This invention pertains to that class of devices intended for using the crude petroleum as a fuel; and it chiefly consists in the peculiar construction of a metallic inclined surface formed with grooves and projections on its upper side, through a portion of which projections holes are made for the purpose of permitting the passage of air either by natural or forced circulation, as from a fan, as may be required. The said inclined grate, or that which corresponds to the grate, is connected with a suitable tank or reservoir in such a manner as to conduct and distribute the liquid petroleum through the said inclined surface, which is mounted in the furnace, or inclosure corresponding thereto, so that as the liquid descends by its own gravity down the inclined surface the gas or vapor evolved therefrom will become ignited and the flame produce the required heat necessary for generating steam, or other purposes to which it may be applied.

In the drawings, Figure 1 represents a vertical section of the furnace-wall and the grate, and also a portion of the boiler in side elevation; and Fig. 2 is a detached plan view of the inclined plate on a reduced scale, with some of the nipples or projections omitted. Fig. 3 is a cross-section through Fig. 2 illustrating the plate A as fitting close against the walls of the furnace. Plate K will fit against the wall in the same manner.

At A is the inclined plate or surface, over which the liquid fuel is to descend to be burned, and it is mounted in the interior of the furnace at B, a door through the front wall of which is represented at C, forming an inlet underneath the grate corresponding to the ordinary ash-pit in furnaces provided with grate-bars. The said inclined plate is formed with spaces in its upper surface extending longitudinally, and transversely formed by raised projections, through the centers of which are perforations A′ for the admission of air from the chamber below, and which is necessary in order to furnish complete combustion to the crude material as it descends through the said inclined plane and along the said raised projections, which are like nipples in the upper surface of the plate. The upper end of said plate is connected with the chamber at D, which is supplied with the petroleum through the pipe E from the tank at F, which serves as a reservoir for the material, the flow of which is regulated by a cock at F′. The lower end of the said inclined grate is provided with a channel or trough at G to receive the surplus oil, if any should happen to travel over the entire surface before being consumed, and which may be drawn off through the outlet-pipe at G′, formed at one end and connected with the bottom of said trough. The oil in passing over this plate of course strikes the nipples, and is thereby deflected, so that it is made to pursue a zigzag course over the plate. A water-chamber may also be provided, as at H, which is connected with the upper end of the grate, so that the entire surface may be covered with water, which may be permitted to flow down along the grate and thereby serve in keeping it clean, and may also serve to assist under certain conditions in supplying the requisite amount of hydrogen gas for assisting in the proper combustion. This water-chamber may be supplied from a tank connected to the elbow at H′, and provided with a cock at H^2, so that the feeding may be done by hydrostatic pressure, or it may be supplied as from a pump, as desired.

For the further distribution and mingling of the gases, a deflecting-plate at K is placed in an inclined position and parallel to the upper surface of the inclined grate at A, and it is also perforated with holes at K′, and also provided with deflecting-ribs, as at K^2, through which holes the gas may escape as it passes into the flame, and thus the inclined grated surface would form to a certain extent a gas-generating chamber or generator for converting the petroleum into a gaseous condition, and for combining it with the required amount of oxygen before it escapes through the upper plate, K. A bridge-wall is represented

at L, and over which the flames may pass, as represented by arrows at L′ in the ordinary manner, and having passed underneath the boiler, as at M, may then be returned through the flues, as indicated by the arrows at N, and the products of combustion be drawn off the same as in the ordinary arrangement of flue-boilers, as usually mounted in furnaces.

Having thus described my invention, I claim—

1. The combination, with a furnace, of an inclined grate having perforated projections on its upper surface for retarding the downward flow of the liquid over the grate, and for admitting air to assist in combustion, substantially as described.

2. The combination, with a furnace, of an inclined grate having perforated projections on its upper surface for retarding the downward flow of the liquid over the grate, and for admitting air to assist in combustion, and a trough at the end of the inclined grate to receive any unconsumed liquid, substantially as described.

3. In a furnace, an inclined grate having perforated projections on its upper surface, in combination with an inclined plate above the same provided with deflecting-ribs and perforations, substantially as described.

4. The inclined grate provided at its upper end with a water-chamber for distributing a flow of water across the end of the grate, as hereinbefore set forth.

In witness whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

WM. B. YATES.

Witnesses:
EUGENE N. ELIOT,
J. B. EDSON.