J. M. HICKS.

BURNERS FOR COAL.

No. 182,579. Patented Sept. 26, 1876.

Fig. 1.

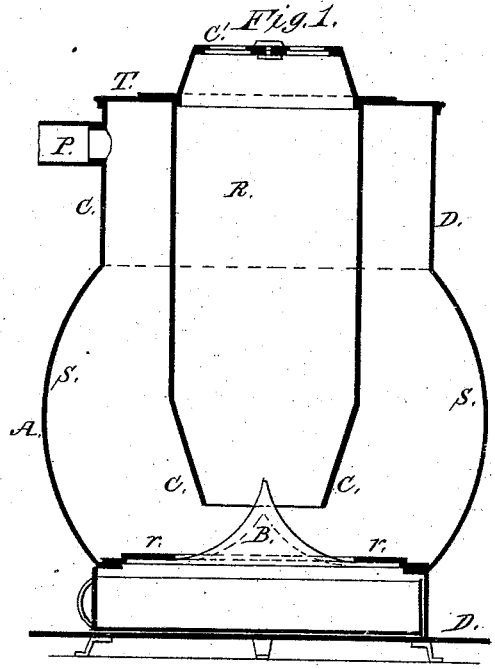


Fig. 2.

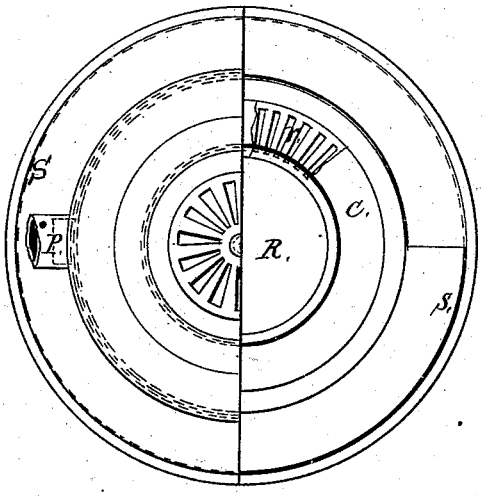
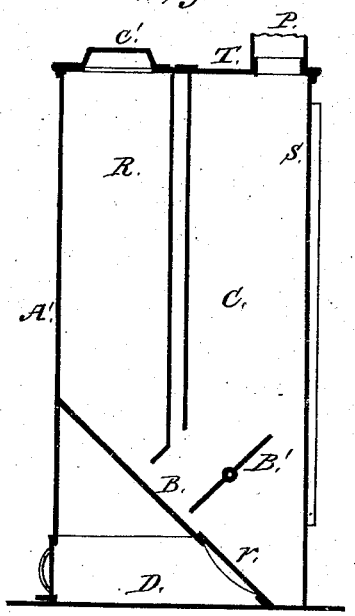


Fig. 3.



Witnesses:
Treadwell Cleveland
Francis & Lees

Inventor:
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UNITED STATES PATENT OFFICE.

JAMES M. HICKS, OF SUMMIT, NEW JERSEY.

IMPROVEMENT IN BURNERS FOR COAL.

Specification forming part of Letters Patent No. **182,579**, dated September 26, 1876; application filed June 23, 1874.

To all whom it may concern:

Be it known that I, JAMES M. HICKS, of Summit, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Burners for Coal and other solid fuel; and that the following is a full, clear, and exact description and specification of the same.

The object of my invention is to prevent the escape of gases from the fuel in an uncombined state, which, in the present mode of constructing furnaces, escape from the surface of the fire without producing the heat they are capable of. Fuel is now burned upon a perforated grate or support, through which air for combustion is admitted, and the bottom of the fuel, being the first to receive the air, is the hottest. Heat, rising to the upper portion, liberates the lighter gases before they become hot enough to burn or thoroughly combine for combustion, and they therefore pass off unutilized. This is particularly the case when fresh fuel is supplied, either by intermittent supply, or by self-feeding appliances.

To remedy this difficulty I have arranged certain devices by which the air for combustion is caused to pass down through the fuel, first coming in contact with its upper surfaces. The fuel is lighted, as usual, from the under side. The air, in descending, mixes with the gases which are evolved. They pass on through the fire, become heated to the same temperature, and burn. The air, in descending, cools the upper surfaces of the fuel, and is gradually heated itself. Gases are thus prevented from forming or being evolved at this point, but are evolved from the under side, mixed with air, and then burned. This method produces very nearly perfect combustion. No smoke is visible at the exit-pipe, even with the softest bituminous coal.

In the drawings which form part of this specification, Figure 1 is a vertical sectional view of one form of furnace arranged for the above purpose. Fig. 2 is a plan of same, partially in section. Fig. 3 is a vertical sectional view of another form.

In Figs. 1 and 2, R is a reservoir for fuel. B is a closed base-plate, having an inclined surface to support and guide the fuel, and it has also a perforated portion, closed by a valve or register, in order that the user may be able to uncover said perforations and remove the ashes; but no air or gases are allowed to pass through to support combustion, that being entirely supplied through the valve or register in the reservoir. C is the combustion-chamber. S is the shell or wall of furnace. P is the exit-pipe for the volatile products of combustion. C′ is the cover to reservoir, with register to control the supply of air for combustion. D is the bottom plate of furnace. T is the top plate of furnace on shell S. All are held together by suitable stays. *r* is a register in base-plate B, for discharge of ashes when desired.

In Fig. 3, B′ is a plate to give direction to the volatile products of combustion, and may be made adjustable to any angle with base-plate, and at any convenient distance from it, to allow ashes to pass between it and the said base-plate.

The operation of my improvement is as follows: Kindling is placed on the base-plate B, and ignited. Fuel is added through reservoir R to any convenient depth; register in cover C′ is opened to admit air, which passes down through the fuel to the ignited kindling. The products of combustion or gases pass through chamber C, and through exit-pipe P. The fuel is ignited at its under side, setting free the gases from the lower surfaces. The air passes down through the fuel, mixes with these escaping gases, having become more or less heated in its downward course by contact with the fuel and sides of the reservoir. Thus combined, they become heated in their passage through the lower part of the fire, and improved combustion ensues, being completed in chamber C. The heat thus made is radiated through the walls of chamber C to whatever it is intended should be heated.

The results which follow from this method of burning fuel I have found in practice to be complete prevention of smoke, even while burning the softest bituminous coal. No solid particles are eliminated from the fuel, but very nearly perfect combustion and gasification of the fuel is attained.

Many variations from the forms of furnace shown may be made without departing from the necessary features of my improvement.

Shapes of reservoir, base-plate, and the relative positions of parts suited to the positions and purposes for which they are to be used, such as house-furnaces, stoves, boilers of vaous kinds, for heating various materials, may be varied. My aim is to more thoroughly mix and burn the gases from fuel with the proper amount and temperature of air than is now done by any known means, without departing from the general features of my arrangement, or by its equivalent, whereby air is caused to pass down through the fuel to the ignited portion, thence to the exit-pipe or chimney.

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

The combination, substantially as hereinbefore set forth, in a stove or furnace, of a combustion-chamber provided with no other opening except that for the escape of the gaseous products of combustion, and an outlet covered by a valve, for the discharge of ashes at the bottom, and a closed base-plate inclined upward, for guiding and directing the fuel, air for combustion, and ashes in their passage from the reservoir to the combustion-chamber, with a fuel-reservoir provided with an adjustable air-valve arranged, as described, above said closed inclined base-plate, and in reference to said combustion-chamber, all the air for combustion being compelled to pass through said air-valve and between said inclined base-plate and the lower edge of the reservoir, through the fuel, there being no other communication between the reservoir and the combustion-chamber, all constructed and arranged to operate in manner described.

JAMES MILNOR HICKS.

Witnesses:

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