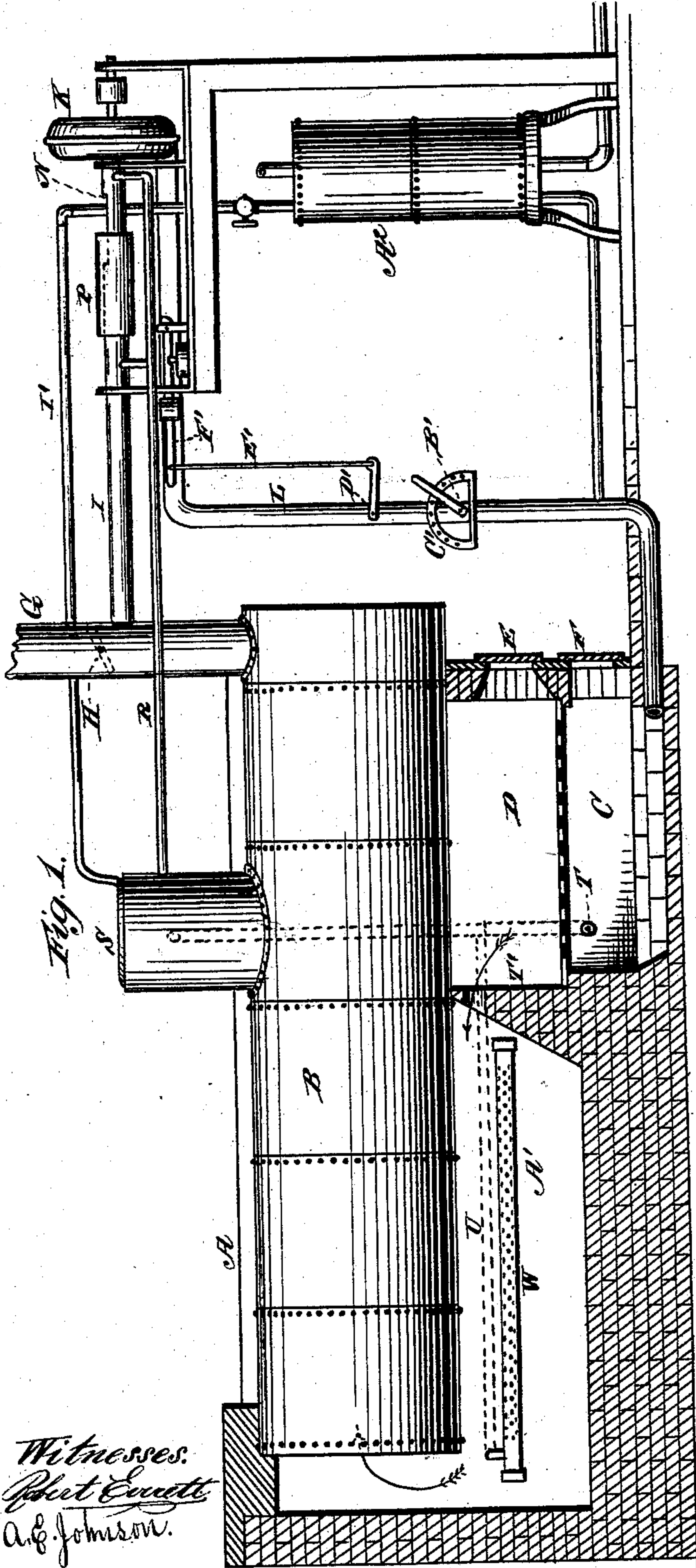


(No Model.)

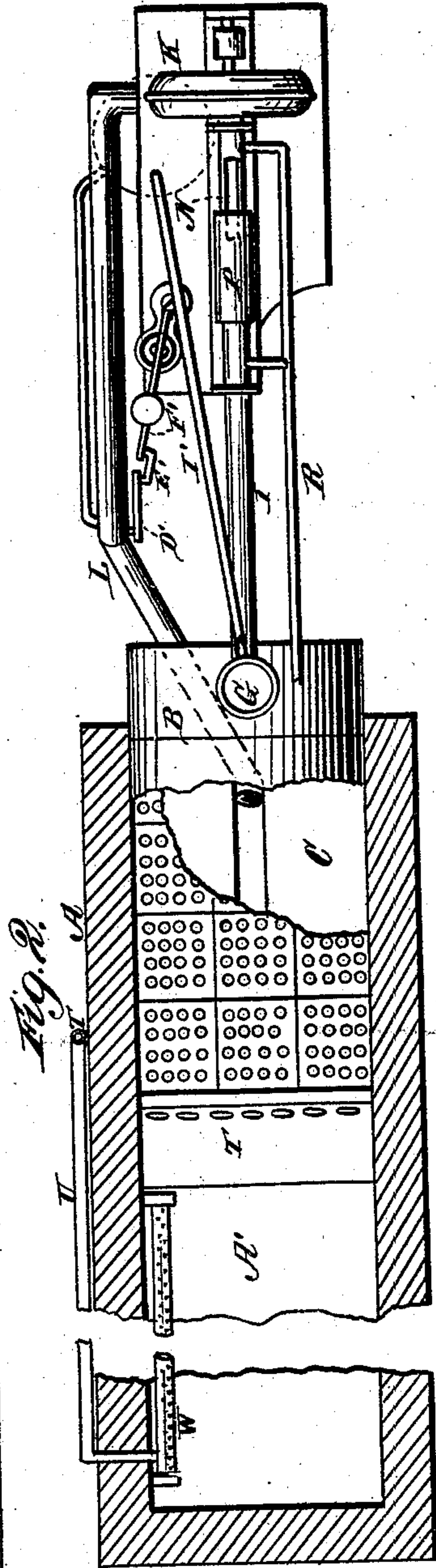
P. W. LAMB.  
Boiler Furnace.

No. 235,686.

Patented Dec. 21, 1880.



Witnesses:  
Robert Everett  
A. G. Johnson.



Inventor:  
Patrick W. Lamb,  
By Theo. Mungen,  
Attorney.



# UNITED STATES PATENT OFFICE.

PATRICK W. LAMB, OF ALBANY, NEW YORK.

## BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 235,686, dated December 21, 1880.

Application filed September 4, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, PATRICK W. LAMB, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Boiler - Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, 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, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to an improved process and apparatus for burning soft or bituminous coal, coal-dust, and refuse in boiler-furnaces, whereby the combustible gases and unburned carbon, which escape in large quantities when such fuel is employed in the ordinary manner, are utilized and consumed, and the fuel thereby economized and the nuisance of the escaping gases and carbon obviated, as more fully hereinafter specified.

This invention relates to boiler-furnaces; and it consists in improvements in the construction of the same, hereinafter fully described, and particularly pointed out in the claims.

Figure 1 represents a view, partly in side elevation and partly in vertical section, of my improvement applied to a steam-boiler furnace, and Fig. 2 a top view of the furnace, with a portion of the boiler cut away to show the interior of the furnace.

The letter A indicates the walls of the furnace, which are constructed of masonry or other suitable material, and B the boiler set therein in the usual manner.

The letter C indicates the ash-pit, and D the fire-box of the furnace, provided with the usual doors E F.

The letter G indicates the smoke-stack of the furnace, which is provided with a damper, H, and from which extends, from a point below the damper, a pipe, I, connecting with the induction-port of an exhaust and forcing fan, K, the eduction-port of which connects with a pipe, L, leading into the ash-pit of the furnace below the grate. The pipe I is provided with an opening, N, for the admission of air when desired, and with a short sliding tube, P, by

means of which said opening may be partially or wholly closed.

The letter R indicates a steam-pipe leading from the steam-dome S or other portion of the boiler above the water-level, and connecting with the pipe I, by means of which a current of steam may be admitted to said pipe to commingle with the smoke taken from the smoke-stack.

The letter T indicates a steam-pipe leading from the dome S or other steam-space of the boiler into the ash-pit below the grate. From said pipe T branches a pipe, U, which latter pipe connects with the longitudinal perforated pipes W, located in the flue A' below the rear part of the boiler, at each side of said flue, whereby steam in jets may be admitted to said flue to mix with the gases therein, and by mutual decomposition in connection with said gases insure their perfect combustion.

The pipe L is provided with a hand-damper, B', and an indicator-plate, C', by means of which the quantity of smoke and air supplied to the furnace can be accurately determined. The said pipe is also provided with an automatic valve or damper, D', the operating-lever of which is connected by means of a rod, E', to the weighted lever F'.

The letter H<sup>2</sup> indicates a feed-water heater, connected by a pipe, I', with the boiler and with the pipe L, whereby the water may be heated before passing into the boiler.

The letter T' indicates the bridge-wall at the rear of the combustion-chamber, the rear face of said wall being inclined rearwardly, as shown, in order to conduct the hot gases unobstructedly to the flues of the boiler, and near the upper edge the said bridge-wall is perforated in order to divide the current and more thoroughly distribute it through the boiler-flues. The front of the bridge-wall is perpendicular, in order that the coal-dust will not lodge thereon.

The forward wall of the fire-box is lined with fire-brick, and is beveled from the door inwardly, as shown, to keep the fire from immediate contact with the door, and thus prevent injury to the same.

The operation of my invention will be readily understood in connection with the above description, and is as follows: The smoke is



withdrawn from the smoke-stack by the fan, and is forced into the furnace under the grate, so as to be passed through the fire in the combustion-chamber. Steam is admitted at the same time to the pipe through which the smoke is passing, and to the furnace below the grate, and in the flue under the boiler, insuring the perfect combustion of the smoke. Atmospheric air is also admitted to the pipe I through the opening therein, to mix with the smoke, in order to regulate its temperature and assist in its final combustion. In the case of an upright boiler the pipe I terminates in a funnel-opening, I', beneath the center of the grate. Where the process is applied to a horizontal boiler an elongated discharge equal to the length of the grate is made in the middle of the ash-pit, so that the blast of commingled steam, air, and smoke will extend the entire length of the grate, although it should be understood that the blast may be admitted to any portion below the grate by any artificial means, so far as the process is concerned.

Having thus fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. In combination with the exhaust-pipe leading from the smoke-stack to the fan, and provided with an opening, as described, the sliding tube adapted to open and close the said opening, for the purpose set forth.

2. In combination with the furnace and the devices for returning the smoke to the same, the steam-pipe leading from the boiler to the ash-pit, and the longitudinal perforated pipes connecting with said steam-pipe and located in the flue below the boiler, substantially as and for the purposes set forth.

3. In combination with the fire-box and boiler-flues, the bridge-wall T, inclined at its rear, and perforated as described, for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

PATRICK W. LAMB.

Witnesses:

WILLIAM F. HOLTON,  
THEO. MUNGEN.