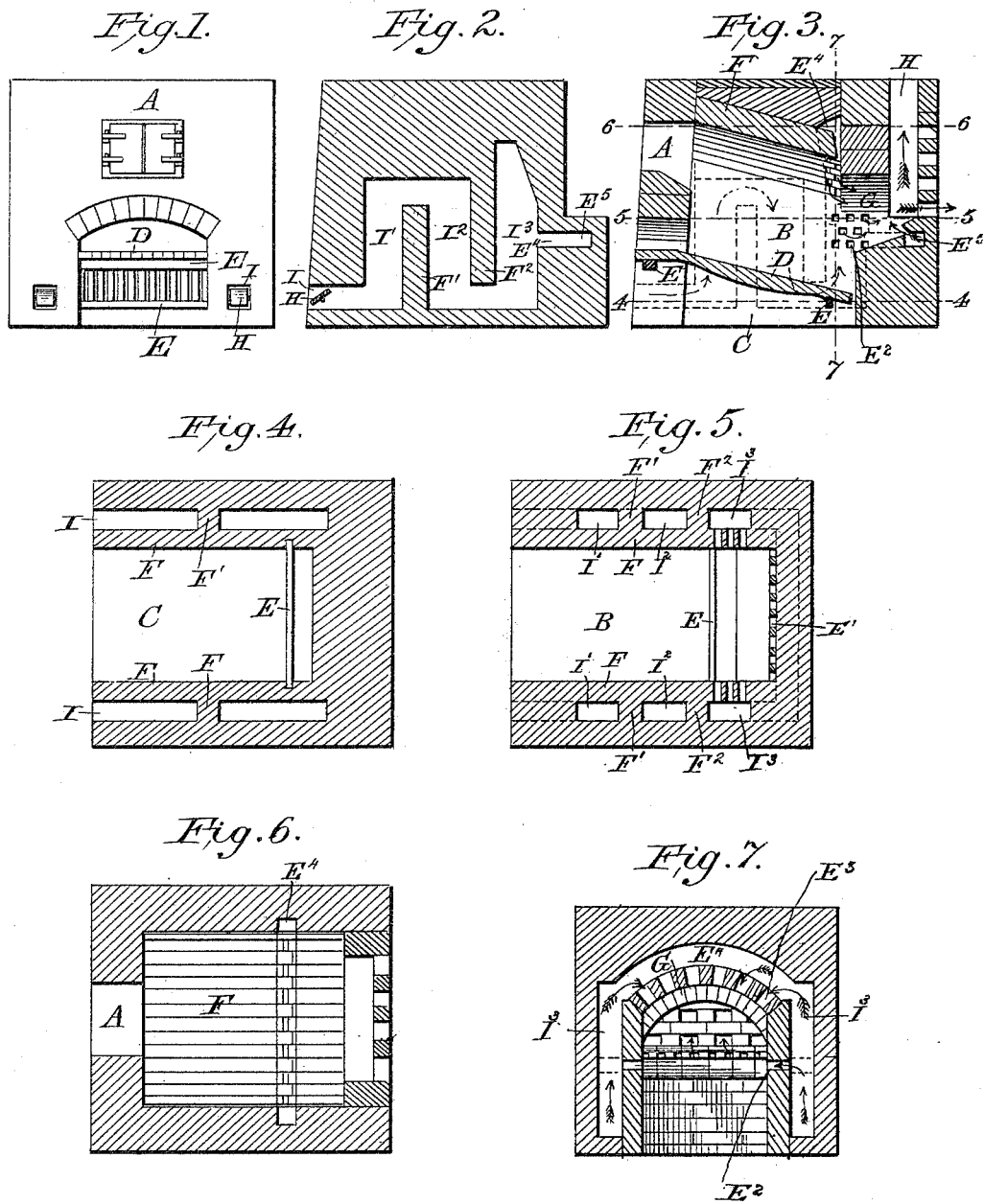


(No Model.)

L. LAWTON.  
POTTERY KILN FURNACE.

No. 491,569.

Patented Feb. 14, 1893.



Witnesses:  
J. A. Goodenough  
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# UNITED STATES PATENT OFFICE.

LEWIS LAWTON, OF TRENTON, NEW JERSEY.

## POTTERY-KILN FURNACE.

SPECIFICATION forming part of Letters Patent No. 491,569, dated February 14, 1893.

Application filed June 9, 1890. Serial No. 354,699. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS LAWTON, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Furnaces for Pottery and other Kilns; 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.

This invention pertains generally to furnaces, and especially to that class of furnaces intended for use in connection with terracotta and pottery kilns.

The use of the furnaces now commonly employed in connection with these kilns, entails serious loss upon the manufacturers, by reason of the waste occasioned by imperfect combustion of fuel, as well as by reason of injury to the articles being burned from the impurities with which the imperfectly ignited gases passing into the kiln are laden.

My present invention has for its object to provide an improved construction of furnace or fire-box, whereby a more perfect consumption of the gaseous products of combustion is obtained, together with a more intense heat and greater elimination of the impurities in the gases. Incidentally, also, its object is to increase the durability of these furnaces by providing air-spaces on the sides of the fire-box whereby its walls are enabled to withstand a greater degree of heat without danger of breaking or cracking.

In the drawings hereunto attached and forming part of this specification, Figure 1, is a front elevation of my improved furnace; Fig. 2, is a vertical section through one of the air flues at the side of the fire-box; Fig. 3, a vertical, central section thereof; Fig. 4, is a horizontal section on the line 4—4, Fig. 3; Fig. 5, is a similar section on the line 5—5, and Fig. 6, a like section on the line 6—6, and Fig. 7, is a vertical transverse section on the line 7—7, Fig. 3.

The same letters indicate like parts in the several views.

A denotes the usual door through which the furnace is charged.

B is the fire-pot, C the ash-pit, and D the overlying grate-bars. These bars are prefer-

ably inclined downwardly toward their rear end, as shown, and are upheld by transverse grate-supporting bars E at their front and rear ends, as seen in Fig. 3.

F is a bonnet-arch surmounting the fire-box, G the throat-way for the escape of the products of combustion into the passage H, whence they escape through suitable communicating openings into the chamber of the kiln where the articles to be fired are placed.

On each side of the fire-box, and separating its walls from the inclosing brick-work, are the flues I, for the admission at the front part of the furnace of fresh air which is carried therethrough and delivered at the rear part of the fire-box in a highly heated condition, as more particularly described hereinafter. These flues may be of any preferred conformation or structure adapted to offer to the incoming fresh air a large amount of heating surface. As shown, they are formed by the partitions F', F<sup>2</sup>, into the ascending and descending passages I', I<sup>2</sup>, respectively, opening into the enlarged passage I<sup>3</sup> at the rear.

In that part of the brick-work at the rear of the grate-bars which corresponds to the usual bridge-wall, is formed the transverse air-chamber E<sup>3</sup>, extending from side to side of the furnace and communicating at its ends with the narrow passage E<sup>4</sup> leading from the large chamber I<sup>3</sup> terminating the air-flues I. Dampers or draft regulators H are preferably provided at the mouths of the flues I for an obvious purpose.

At the rear of the fire-box, between the bonnet-arch and the brick-work, is arranged the space E<sup>4</sup>, extending from side to side and communicating with the upper ends of the passages I<sup>3</sup>, which are extended upward beyond the main portion of the air-flues I. The arch F is preferably, as shown in the drawings, constructed with a downward trend toward the narrow throat-way G at the back of the furnace. At the rear end of this arch the vertical openings E<sup>3</sup> forming escape outlets for the air supply from the passage E<sup>4</sup> into the upper, rear part of the combustion chamber.

Leading from the chambers I<sup>3</sup> at the sides are the apertures E<sup>2</sup> in the side walls of the throat-way, forming a direct communication of the air-flues with the combustion chamber

at that point. Leading from the chamber E<sup>5</sup> in rear of the fire-box, and, as before explained, communicating at its ends with the rear ends of the air-flues, are apertures E', forming a still further communication of the air-flues with the combustion chamber of the furnace at a point farther to the rear than the other openings heretofore mentioned. The construction being as thus described, it will be seen that the fresh air taken in through the flues at the sides of the fire-box will be delivered to the products of combustion at the top through the passage E<sup>4</sup> and the apertures E<sup>3</sup>; also that a further supply of air will be admitted at the sides of the throat-way through the openings E<sup>3</sup>; also that at a point farther on in the passage of the products they are fed with an additional supply of air through the transverse passage E<sup>5</sup> and its communicating openings E'. It is preferable to connect the air-chambers E<sup>4</sup>, E<sup>5</sup>, with the interior of the combustion chamber by a considerable number of small apertures E<sup>3</sup>, E', respectively, whereby the incoming current of fresh air is broken up into numerous smaller currents or jets, thereby facilitating a thorough intermixture of the air supply with the gaseous products. It will also be seen that the walls of the air-flues I, being in close proximity to the fire-box, will become highly heated, thus delivering the air into the furnace in a state most favorable to immediate combination with the gases.

I have found that in the practical operation of these furnaces the incoming air must be heated to a very high degree in order to effect that prompt ignition and perfect combustion of the gaseous products necessary to produce the best results, 800° Fahrenheit being about the proper temperature.

This furnace is particularly designed with a view to the use of bituminous coal, but it is found to work with advantage with anthracite.

The number, size and position of the air-heating flues may be varied as experience shall demonstrate to be most desirable, the nearer they are located to the fire-box and the greater amount of heating surface they offer to the incoming air the greater the degree of heat imparted to the supply and the better the results.

What I claim and desire to secure by Letters Patent is:—

In a furnace for pottery kilns, the combination of the fire box, the bonnet arch F, inclined downwardly toward the rear, the constricted throatway G with its arch depending below the rear end of the bonnet arch, the chamber H communicating with the throatway and with the kiln, the air supply flues on each side of the fire-brick between its lining and the brick work, a transverse passage E<sup>4</sup> arranged over the rear of the bonnet arch, connected with the side flues and communicating with the openings E<sup>3</sup> at a point slightly above the throatway, a transverse passage E<sup>5</sup> in the rear of the throatway and communicating therewith by a series of openings E' and connected with the air supply tubes, and openings E<sup>3</sup> in the sides of the throatway and communicating with the rear of the air supply tubes, substantially as shown and described.

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

LEWIS LAWTON.

Witnesses:

JOS. L. WATSON,  
L. SCHOONOVER.