

**FURNACE.**

Patented Feb. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

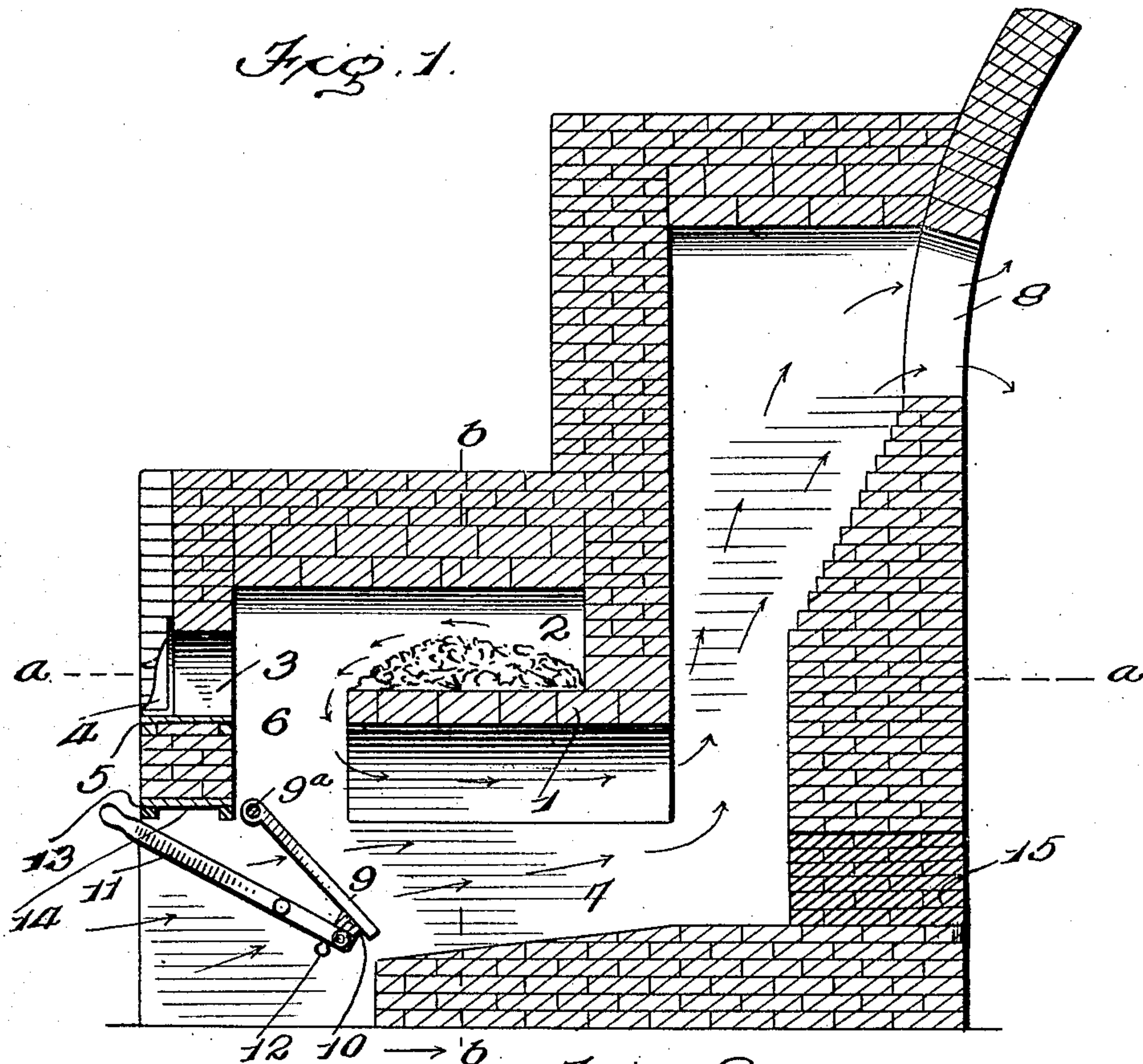
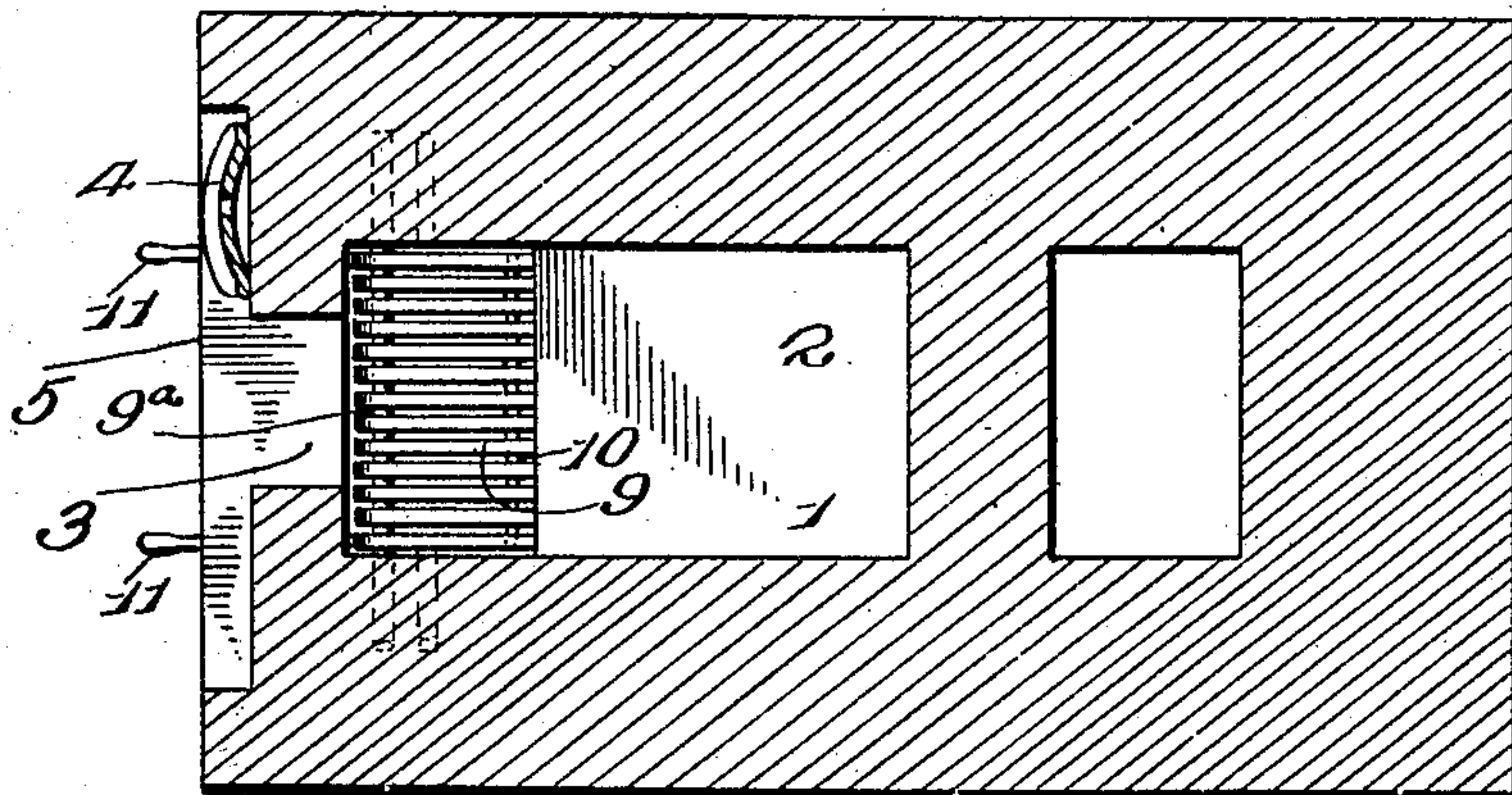


Fig. 2.



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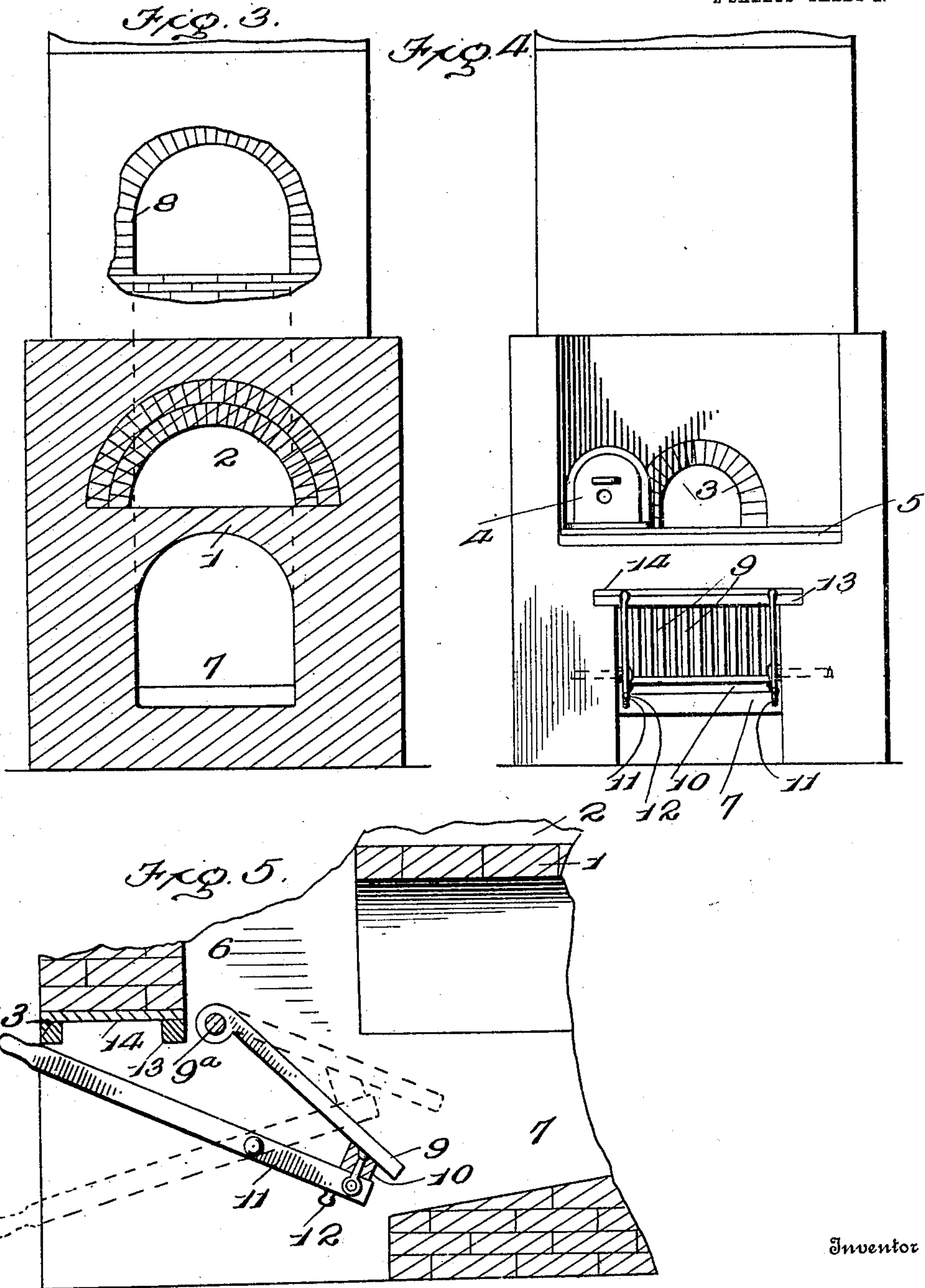
FURNACE.

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912,828.

Patented Feb. 16, 1909.

2 SHEETS—SHEET 2.



Inventor

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# UNITED STATES PATENT OFFICE.

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## FURNACE.

No. 912,828.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed April 7, 1908. Serial No. 425,716.

*To all whom it may concern:*

Be it known that I, SIMON DEWHIRST, a citizen of the United States, residing at Oskaloosa, in the county of Mahaska and State of Iowa, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention comprehends certain new and useful improvements in furnaces designed particularly for use in connection with kilns for burning brick tile or other clay products and useful also generally wherever a high and equable temperature is acquired, and the invention has for its object a simple and efficient construction of furnace of this type arranged to burn "slaked" coal.

The invention consists in certain constructions, arrangements and combination of parts, that I shall hereinafter fully describe and then point out the novel features in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings in which:

Figure 1 is a longitudinal sectional view of a furnace constructed in accordance with my invention; Fig. 2 is a horizontal sectional view taken on line *a—*a** of Fig. 1; Fig. 3 is a transverse sectional view on the line *b—*b** of Fig. 1; Fig. 4 is the front elevation; and Fig. 5 is an enlarged longitudinal sectional view of a portion of the furnace, illustrating the different positions of the grate bars in full and dotted lines.

Corresponding and like parts are referred to in the following description and indicated by the same reference characters.

My improved furnace, which is preferably built of brick contains a coke table 1 made of brick or other suitable material over which is an arch 2 constituting a coke chamber. The front end of the chamber 2 is formed with an opening 3 which is controlled by a door or other closure 4 which in the present instance slides upon the iron plate 5.

The forward end of the chamber 2 communicates with a passage 6 which in turn communicates with the combustion chamber or passage 7 leading rearwardly and passing upwardly back of the chamber 2 and separated therefrom, said combustion chamber or passage 7 finally opening into the

kiln through the opening 8 formed in the wall thereof.

A series of downwardly and rearwardly sloping grate bars are supported by the pivot rod 9<sup>a</sup> embedded in the brick-work of which the walls of the furnace are formed, at the juncture of the openings 6 and 7 or in other words at the front end of the passage way or combustion chamber 7. The lower rear ends of the grate bars 9 are designed to rest upon a transversely extending bar 10 to the ends of which hand levers 11 are secured, said hand levers being fulcrumed intermediate of their ends upon pins embedded in the brick or projecting inwardly as shown, the lower or inner ends of the levers being adapted to rest upon inwardly projecting pins 12.

13 designates iron bars upon which rest the plate 14 so as to support the front wall of the furnace. 15 designates a point where the bricks may be removed to provide an opening through the kiln wall, through which part of the draft may be made to pass if needed.

In the practical operation of my improved furnace, if fire be placed on the grate bars 9 and coal be placed upon coke table 1 it is evident that the heat from the fire on the grate will cause the coal on the table 1 to be heated, thus driving off the gases and coking the coal. The gases thus driven off pass downwardly through the passage 6 and through the fire on the grate 9 as indicated by the darts and are mixed with the heated air which passes through the fire on the grate bars by means of an opening in the front furnace wall. Hence the mixture of gas and other combustible matter and air is ignited before its exit from the furnace, thereby effecting a maximum thermal efficiency in the use of the gases in their combustion. After the coal on the coke table 1 has become sufficiently coked, it is drawn forwardly with a suitable tool from the coke table and falls onto the grate bars 9. The coking chamber 2 is then supplied with another charge of fuel, the door being slid away from the opening 3 for this purpose and the door being obviously open for the preceding operation of raking the coked coal down upon the grate bars.

From the foregoing description in connection with the accompanying drawings it is clear that the arrangement of the grate bars



is an advantageous one in that the grate can be shaken frequently by a short movement of the levers 11 as indicated by the dotted lines, thus causing the clinkers to work downward to the bottom of the grate bars and thereby maintaining a free draft through the fire. By increasing the movement of the hand levers 11 so as to raise the grate bars near the upper limit of their movement, it will be noticed that the clinkers will remain upon the bed of the combustion chamber where they may be easily removed with a hook or other suitable tool after which the grate bars are again dropped to their original position. It is clear that the arrangement of parts permitting of this operation is also highly advantageous because clinkers are removed while the grate bars are covered with burning fuel, thereby maintaining a full heat in the furnace through the process of removing the clinkers and avoiding the necessity of reducing the heat or of putting the fire entirely out in order that the clinkers may be removed. Thus it will be seen that the grates are always clear as by my arrangement of parts it is possible to have a thick fire which together with the frequent shaking of the grate does not permit the clinkers to adhere to the grate bars. It will also be seen that my invention provides a durable construction and one that requires practically no repairing, as the mechanism is simple as well as positive in its action.

Having thus described the invention what is claimed as new is:

1. A furnace of the character described, comprising side and end walls and a top portion, and provided with a passage way communicating with openings formed in the end walls, a coke table positioned in the passage way, and in line with one of the end wall openings, grate bars pivotally secured to the side walls and arranged to be moved toward the coke table, and a lever pivotally secured to the side walls and having connections with the grate bars for moving the same.

2. A furnace of the character described, embodying a coke chamber, a coke table therein, the furnace being provided with a combustion chamber underneath the coke chamber and in communication with the forward end thereof, the combustion passage having a forwardly sloping bottom wall, a series of grate bars pivoted at one end to turn about a horizontal axis in the forward end of the combustion chamber and sloping downwardly and rearwardly toward the inclined bottom wall of the combustion chamber, and means for raising said grate bars.

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

SIMON DEWHIRST. [L. s.]

Witnesses:

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