

W. J. A. MUIRHEAD.
FURNACE.

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1,154,717.

Patented Sept. 28, 1915.

Fig. 1.

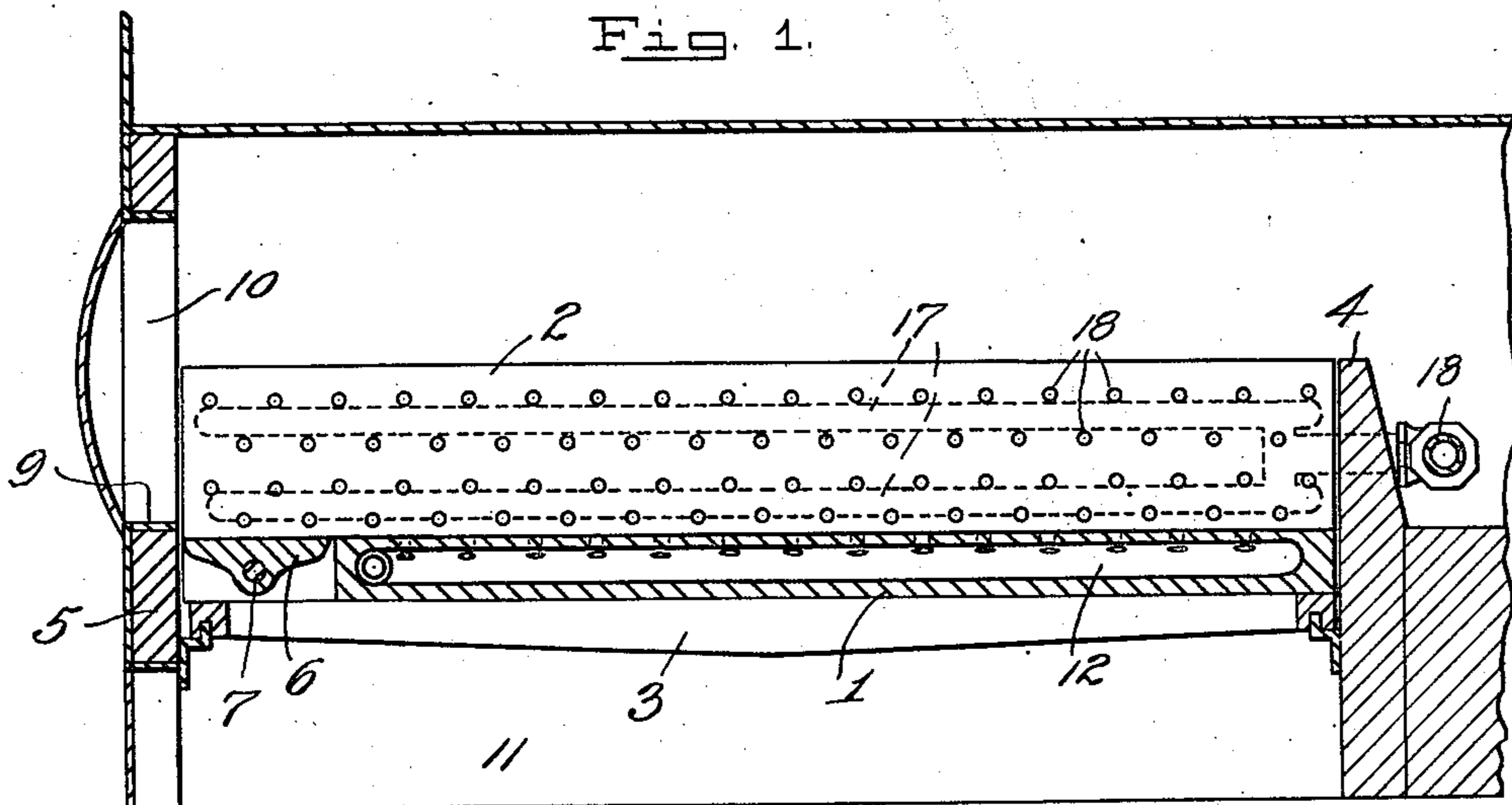


Fig. 2.

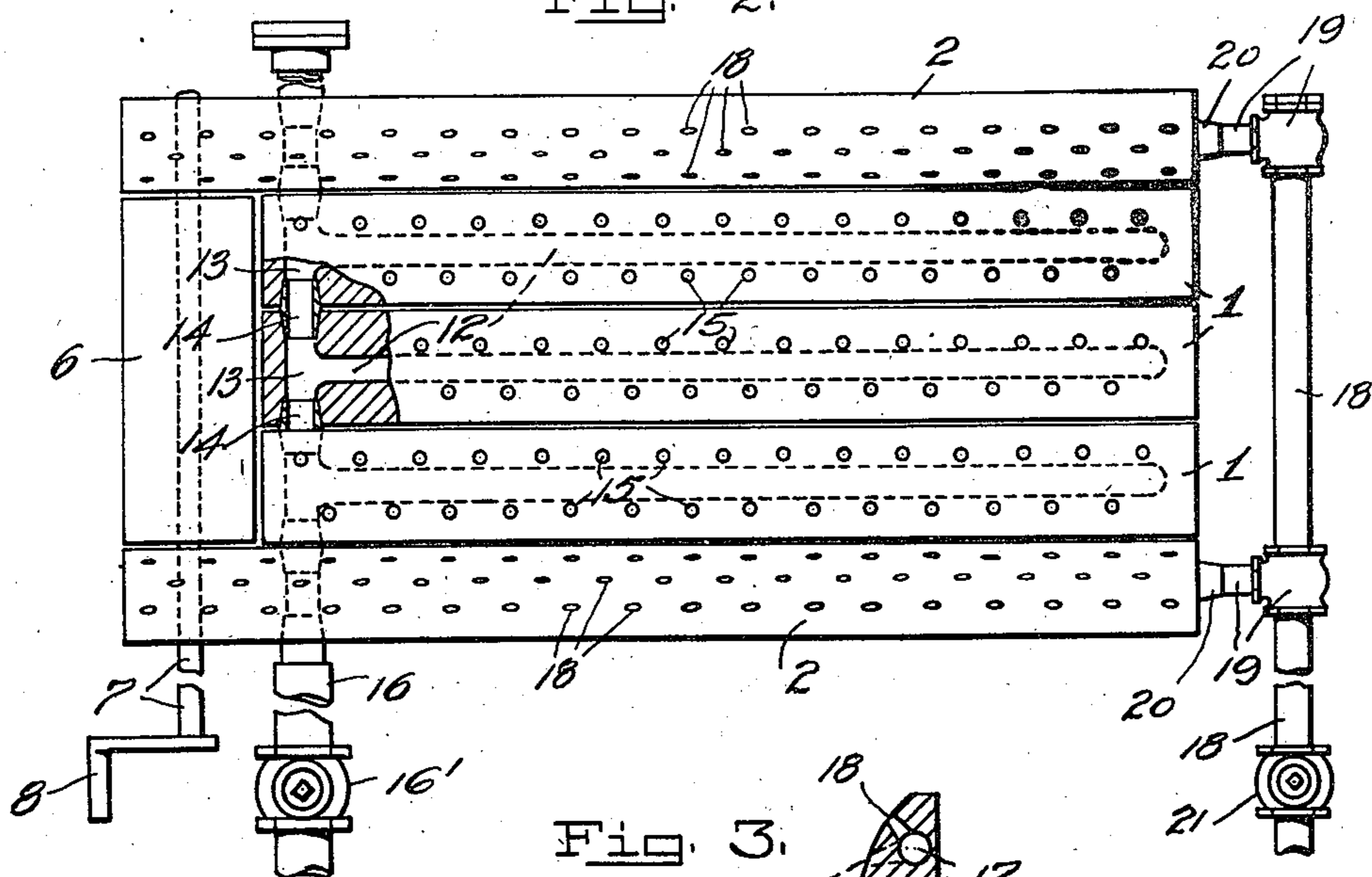
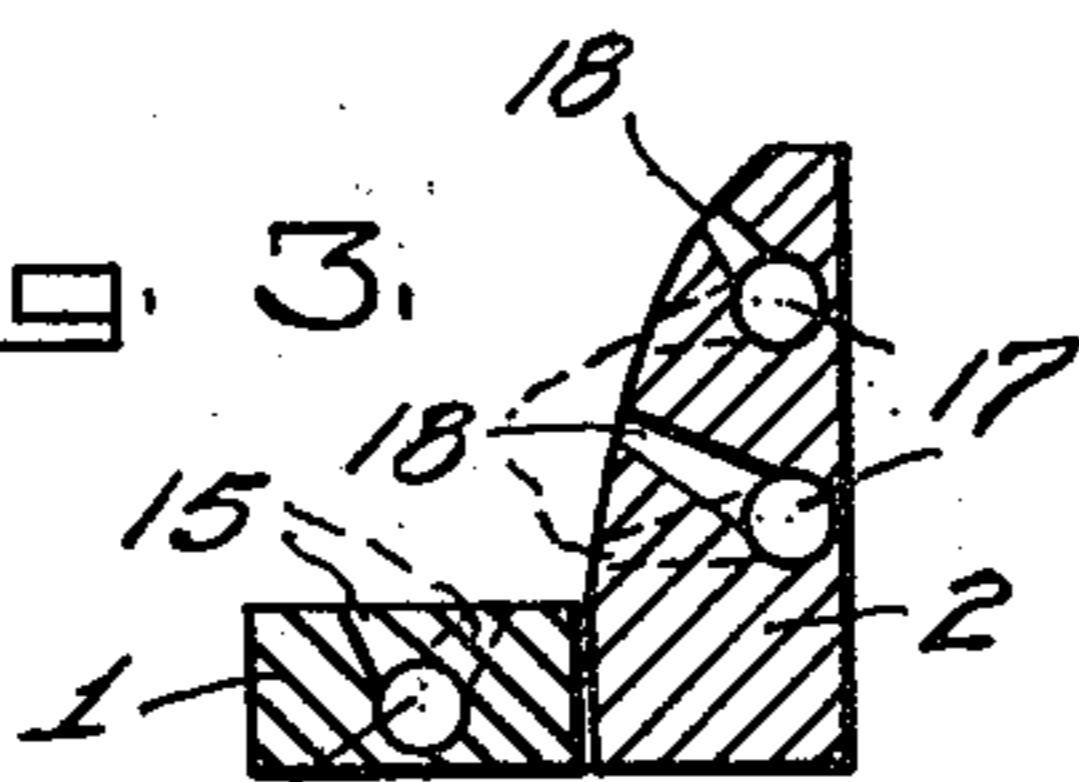


Fig. 3.



WITNESSES:

Charles L. Reynolds.
E. Peterson.

INVENTOR

William J.A. Muirhead

BY

Pierre Barnes
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM J. A. MUIRHEAD, OF SEATTLE, WASHINGTON.

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To all whom it may concern:

Be it known that I, WILLIAM J. A. MUIRHEAD, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to furnaces, and comprises the novel construction and combinations of parts which are shown in the drawings, and will be hereinafter described and claimed.

The object of my improvements is to furnish movable floor and wing members of a furnace to supplement or be used instead of the ordinary grate bars and enable fine coal, such as "screenings" or "steam coal" to be economically used as a fuel. Said members are provided with passages through which atmospheric air, or steam, may be delivered into the furnace, selectively, either above or through the fuel-body therein to provide most advantageously the necessary chemical conditions for perfect combustion;—that is to say, the proper supply of oxygen for the carbon and hydrogen of the fuel and the intermixture of these gaseous products to afford a substantially complete combustion.

In the drawings, I have shown my invention in its preferred form.

Figure 1 is a view in longitudinal section showing the present invention applied in a boiler-furnace. Fig. 2 is a plan view of the invention, a part being broken away and shown in section. Fig. 3 is a detail transverse section through two members of my improved furnace bed.

In carrying out my invention, I provide a number of auxiliary horizontal floor or bed members 1 and wing members 2, which may be supported upon the usual furnace grate 3, as shown in Fig. 1. The members 1 are laid side by side upon the grate, and are of lengths to extend from the bridge-wall 4 to within a short distance of the front wall 5 of the furnace. The wing members 2 are placed at the sides of the furnace, and extend above the level of the upper surfaces of the members 1. Between the members 1 and the front wall 5 of the furnace I provide a dumping member 6 which is constituted of a bar or plate extending transversely across the furnace and supported by a rod 7 which is journaled in the wing members 2. A crank-arm, or handle, 8 may be employed at an end of rod 7 for tilting the dumping

member. The top surface of this dumping member is in approximately a plane with the top surfaces of the members 1 and desirably below the sill element 9 of the furnace-door opening 10.

To clean the furnace, the ashes and clinkers are raked forwardly by any suitable tool, onto the member 6 and thence dumped into ash-pit 11 by tilting such dumping member by means of the crank-arm 8.

The bed-members 1 are provided with longitudinally arranged passages 12 extending from transverse passages 13 which are connected with each other, as by nipples 14. A plurality of relatively small outlets 15 are provided at intervals in the top of the members 1 for discharging air from the passages 12 into the furnace. These outlet openings are preferably reduced in size toward their discharge ends, as shown in Fig. 3. A supply pipe 16 is connected with the passages 13 and is provided with a valve 16¹ to regulate the quantity of air discharged through the various outlets 15 of the horizontal members 1.

In the same manner, the wing-members 2 are provided with passages 17 having discharge openings 18 located at varying distances above the top of the members 1. Air is conducted to the passage 17 through supply-pipes 18, fittings 19 and nipples 20. A valve 21 is provided to regulate the flow of air through pipes 18 into the wing-members 2.

It will be seen that the flow of air into the furnace can be regulated both as to quantity and as to place of delivery by means of valves 16¹ and 21. The air is preferably supplied under pressure and can be discharged selectively through either the bed or wing-members or through both together and in varying ratios. By such control of the air, oxygen for combustion purposes may be supplied where required, to effect the most efficient burning of the fuel. For example, when fresh fuel is supplied to a fire, the heat from the latter causes the more volatile gases to be first driven therefrom into the space above the fire to be but incompletely burned unless a supply of oxygen is available to combine therewith. If air is delivered to such space through the fire, it has a tendency to cool the fire or, what is worse, to unite with the coal gases in the fire and be burnt therewith, instead of above the fire to there combine with the gases driven off

from the fuel and prevent the escape of un-combusted gases through the stack.

The proper way to insure the most efficient burning of the gases above the fire is
5 by first supplying air or steam thereat, and after the gas is consumed air should be admitted into the fire from below to burn the residual coke or other combustible elements.

What I claim as my invention is—

10 In a furnace, the combination of two side members having air passages communicating with air inlet and outlet openings, a plurality of parallel bed members arranged between the side members and being substantially rectangular in cross-section, each of
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said bed members having an air passage-way and further provided with aligned transverse openings communicating with said air passage-ways, air distributing outlets in the side and bed members communicating with the said passage-ways, a nipple connection between the adjacent transverse openings of the bed members, and fluid supply means connected to said bed members.

Signed at Seattle, Wash., this 5th day of 25
October, 1914.

WILLIAM J. A. MUIRHEAD.

Witnesses:

HORACE BARNES,

E. PETERSON.