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PATENTED MAY 3, 1904.

J. MURPHY.
FURNACE.

APPLICATION FILED NOV. 21, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

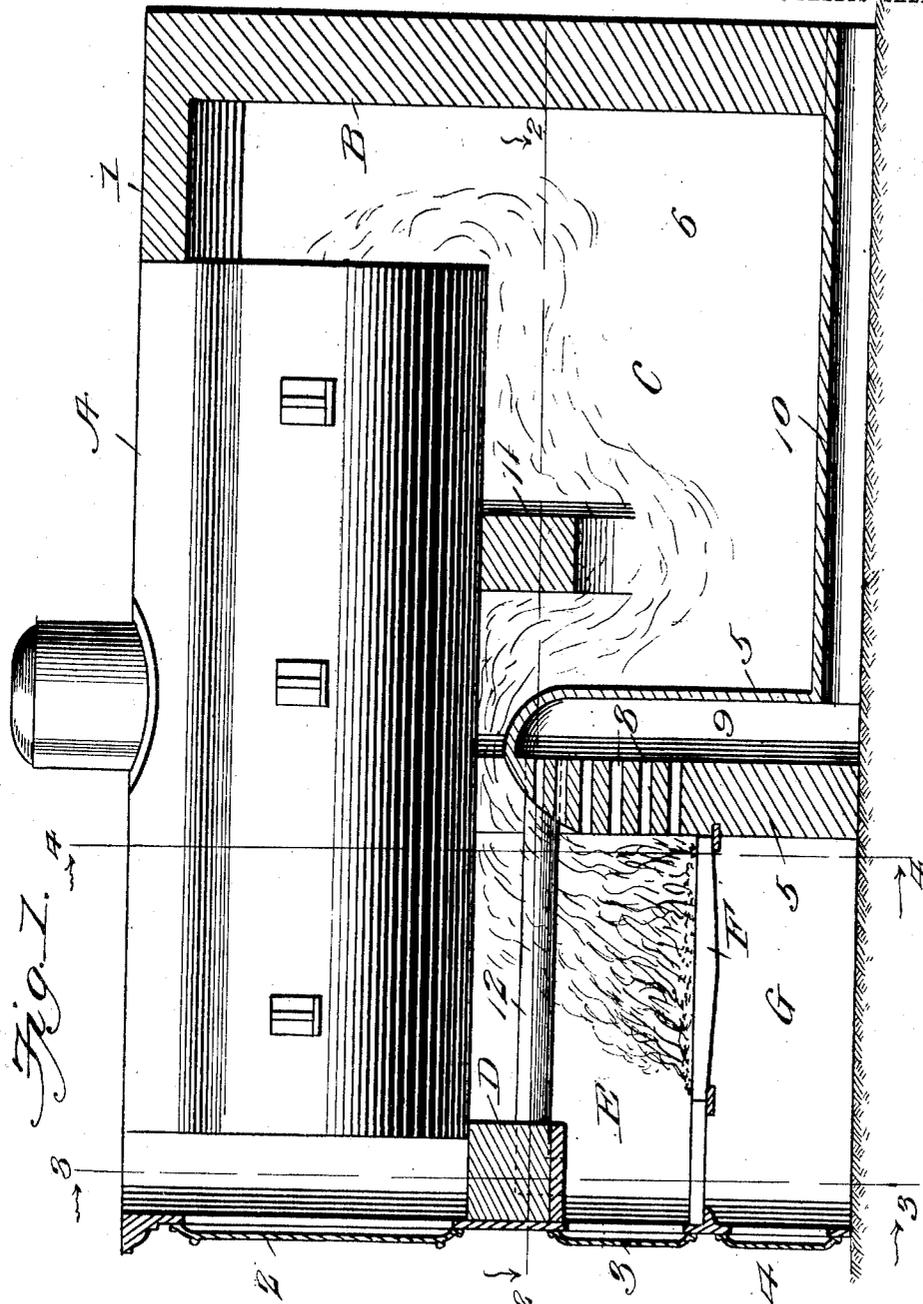


Fig. 1.

Witnesses
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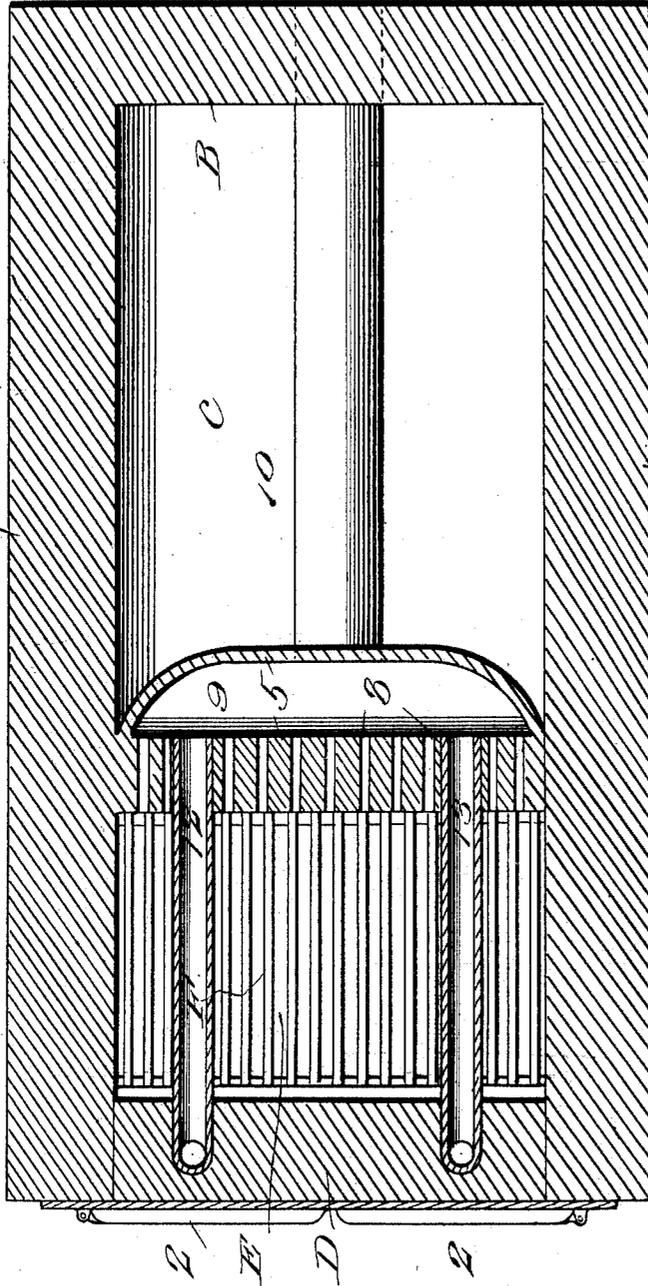
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

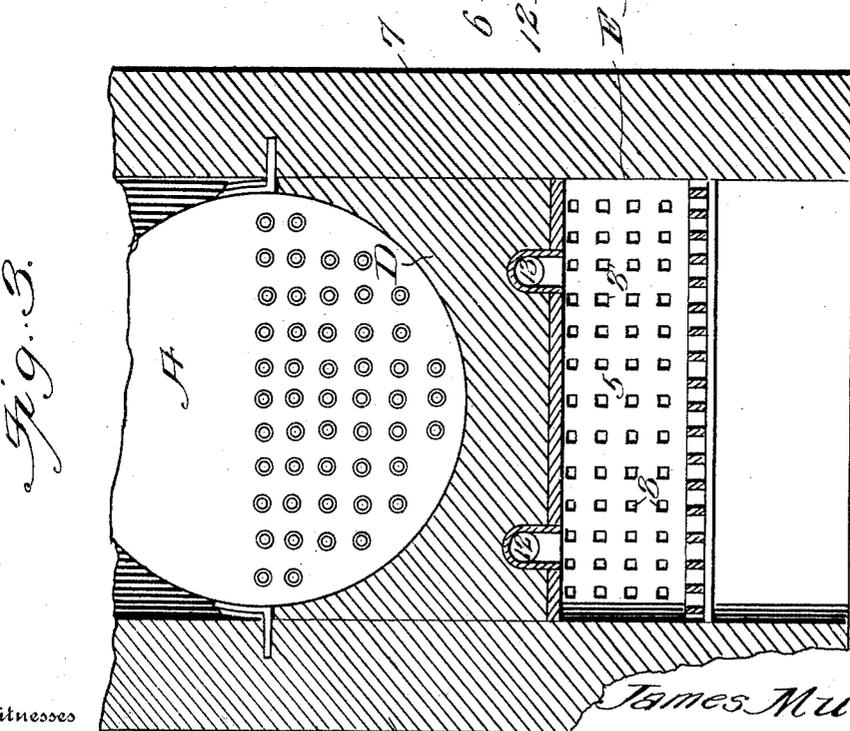
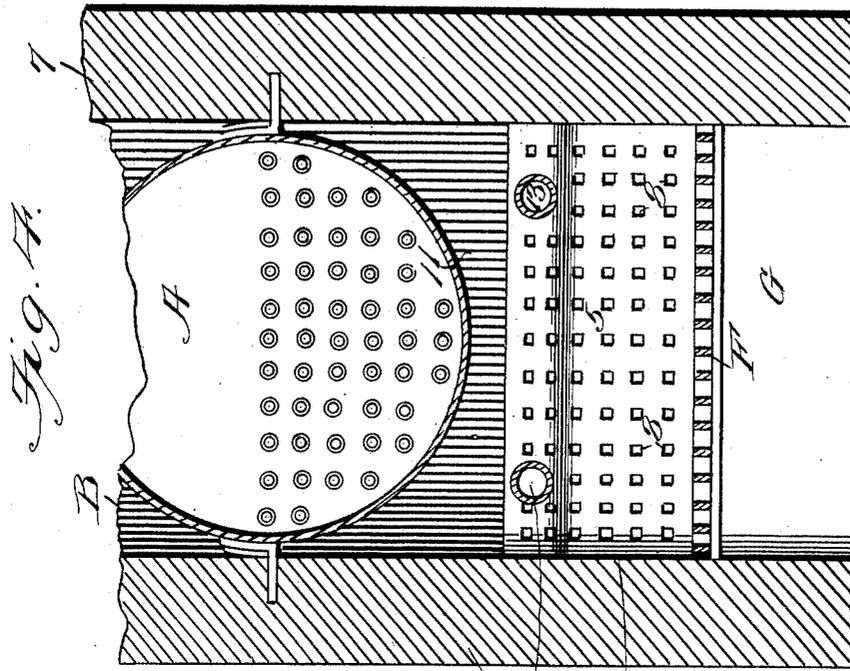


Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JAMES MURPHY, OF CHICAGO, ILLINOIS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 759,002, dated May 3, 1904.

Application filed November 21, 1903. Serial No. 182,187. (No model.)

To all whom it may concern:

Be it known that I, JAMES MURPHY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates to improvements in boiler-furnaces of that kind and construction particularly adapted for consuming the gases and smoke arising in the process of combustion of the fuel usually used in the utilization of such furnaces; and the object is to simplify and perfect the adjunct and appliances for the introduction of air to combine with the gases, smoke, and unconsumed products of the fuel.

The improvements embody a furnace provided with air-induction pipes leading from the combustion-chamber into the bridge-wall, thence to the rear of the fuel-chamber or fire-pot, and side air-pipes leading from the hollow bridge-wall into the front of the fire pot or chamber, all as will be hereinafter fully described and the asserted novelty then particularly pointed out and distinctly claimed.

I have fully and clearly illustrated my improvements in the accompanying drawings, to be taken as a part of this specification, and wherein the same parts appearing in the several illustrations are designated by the same notations, and reference being had to the drawings, Figure 1 is a side elevation of a furnace, partly in longitudinal central vertical section, showing the boiler in position. Fig. 2 is a horizontal section through the furnace, taken on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section through the furnace, taken on the line 3 3 of Fig. 1. Fig. 4 is a vertical transverse section through the furnace, taken on the line 4 4 of Fig. 1.

A designates the boiler set on and supported by suitable masonry in any proper manner and of any construction and capacity required to meet the demands of the furnace.

B designates the rear wall of the furnace, having an overhanging arch 1, extending to the boiler. The space between the inner face of the rear wall and the end of the boiler constitutes a flue to carry the heat to the flues of the boiler and thence to the flue in front of

the boiler, whence it has escape to a stack in the usual manner.

C designates the combustion-chamber.

D is the front wall, which supports the front end of the boiler and is the separating masonry work between the flue at the front of the boiler and the fire-chamber.

E is the fire or fuel chamber, F the grate-bars, and G is the ash-pit. The flue in front of the boiler, the fire or fuel chamber, and the ash-pit are all closed by doors 2 3 4, substantially as shown. These parts and elements may all be of the usual constructions and arrangement and do not form part of my present improvements, except as they may make up or constitute parts of combinations with those of my invention.

Proceeding now to describe the elements directly forming the improvements involved in my invention, 5 designates the bridge-wall of the furnace, extending between the side walls 6 7 of the furnace and built up to the right height, closing the rear of the ash-pit and extending vertically at the rear end of the fire-chamber, substantially as shown. In that part of the bridge-wall at the end of the fire-chamber are formed a plurality of horizontal passages 8, through which air from the outside coming through the main air-flue is projected into the fire-chamber. The bridge-wall is made hollow at its rear, as at 9, the chamber or hollow being closed at the top, as indicated, so that the air admitted cannot escape at that end of the chamber. The air is admitted to the chamber 9 at the base through a suitable pipe or conduit 10, which opens through the base of the rear wall of the furnace, as shown in Fig. 1 of the drawings.

To the rear of the bridge-wall 5 at a proper distance is positioned a deflecting-arch 11, built across between the side walls and supported by them and extending downward such a distance as to be encountered by the progressing flames from the fire-chamber, whereby they are turned downward in their course to impinge and act upon the air-conduit 10, and thus heat the incoming current of air through that member.

At the top of the bridge-wall, opening from

the chamber therein and laid horizontally in forward direction, are two air-pipes 12 13 at opposite sides of the fire-chamber and opening at their front ends down through the wall D into the front part of the fire-chamber, substantially as shown, so as to convey air from the chamber 9 in the bridge-wall 5 and deliver it to the front part of the fire-chamber to promote combustion from that direction.

10 These air-pipes 12 13 may be concealed in the masonry of the side walls of the furnace and open into the fire-chamber at their front ends through either the side walls or through the wall D.

15 The operation of the furnace may be stated as follows: The fire in the fire-chamber having been started, the draft carries the heat and flame upward and over the bridge, thence down under the deflecting-wall 11, and thence through the combustion-chamber upward through the boiler. A portion of the heat in its entrance to the combustion-chamber is cast down onto the air-conduit 10, and thus heats the incoming air, which rushes up through

20 the chamber 9 and is fed to the fire-chamber through the passages 8. At the same time the warm air is carried through the side pipes 12 13 and fed to the fire-chamber at the front.

Thus it will be perceived that air is delivered hot at both the rear and the front of the fire-chamber, creating such perfect combustion by mixing with the generated gases and smoke as to consume them, so that a clear and intense caloric current passes through the combustion-chamber to the boiler.

Having thus fully described my invention, what I claim as new is—

In a furnace, a bridge-wall formed with a vertical chamber having a plurality of passages leading therethrough into the fire-chamber and communicating with said vertical chamber, side pipes leading from the chamber in the bridge-wall and communicating at their forward extremities with the front portion of the fire-chamber, an air-conduit opening through the rear wall of the furnace and communicating with the lower terminal of the vertical chamber in the bridge-wall, and a depending deflecting-wall across the combustion-chamber in rear of and adjacent to the said vertical chamber in the bridge-wall.

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Witnesses:

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