Dec. 26, 1922. 1,440,342

W. M. DAVIS.
HOT BLAST BOILER FURNACE.
FILED DEC. 8, 1920.

2 SHEETS-SHEET 1

Fig. 1.

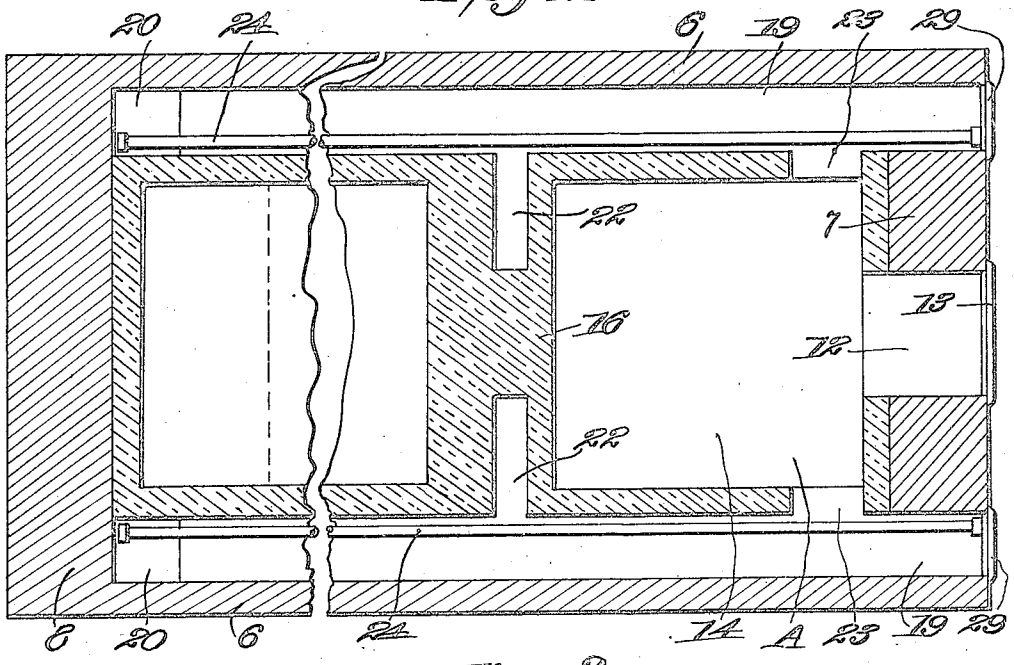
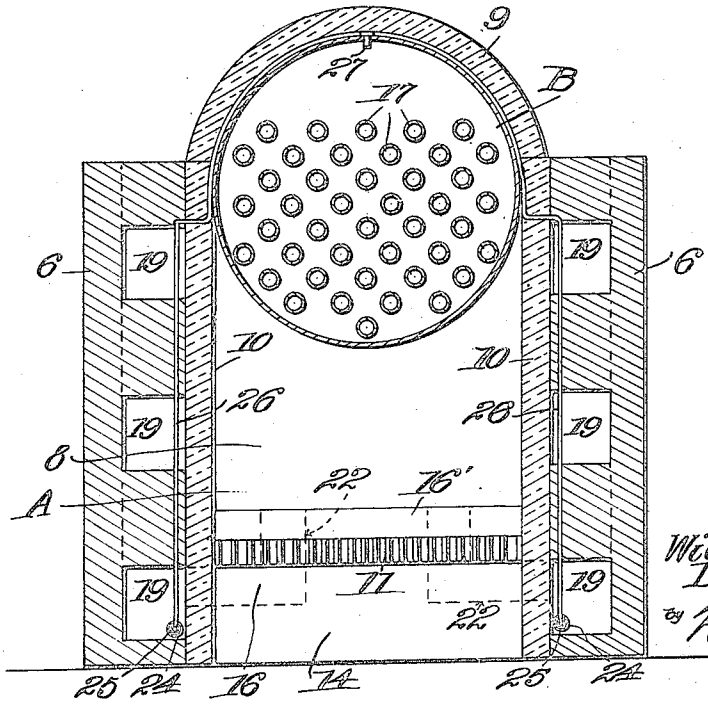


Fig. 2.



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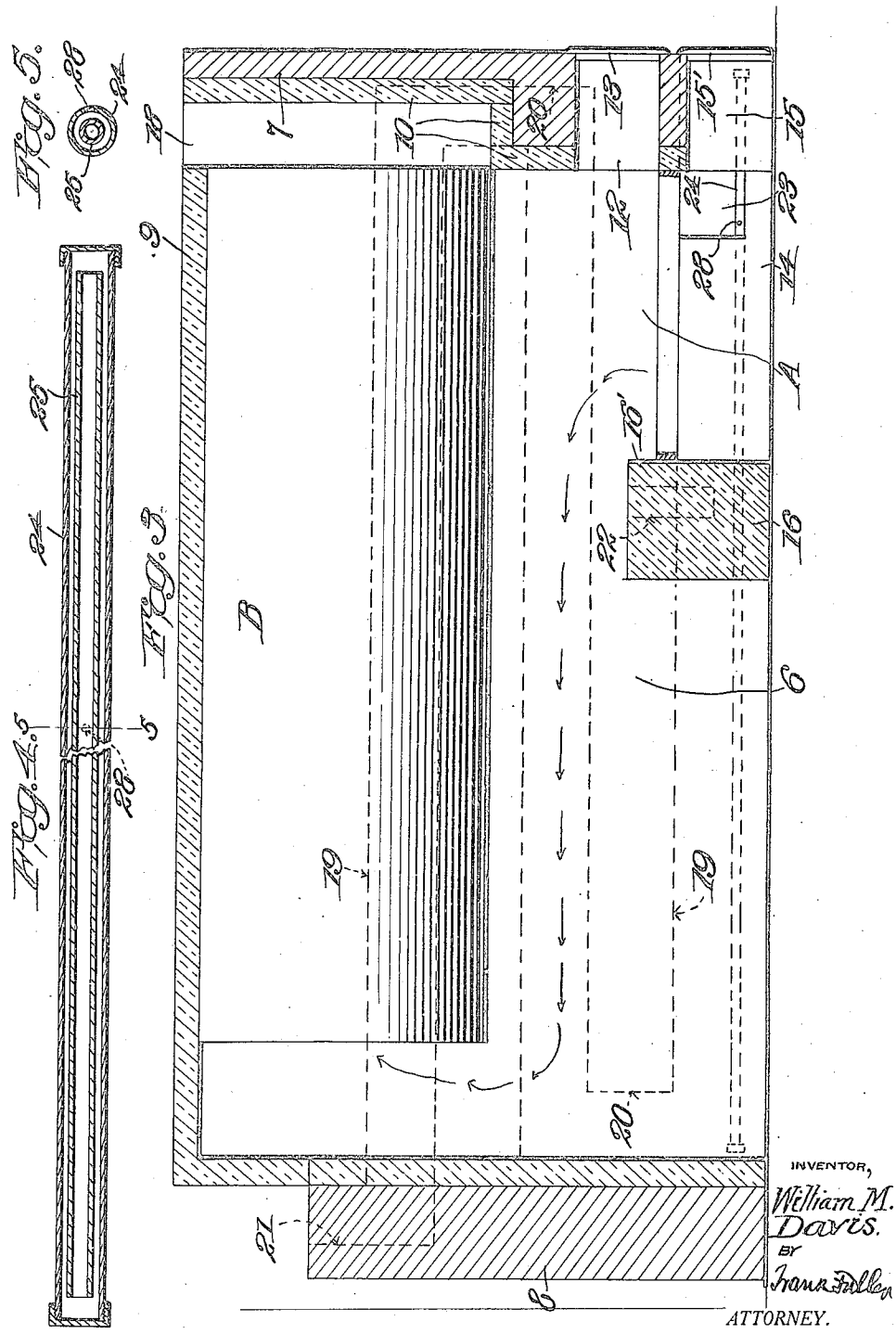
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2 SHEETS-SHEET 2



Patented Dec. 26, 1922. 1,440,342

UNITED STATES PATENT OFFICE.

WILLIAM M. DAVIS, OF TERRE HAUTE, INDIANA.

HOT-BLAST BOILER FURNACE.

Application filed December 8, 1920. Serial No. 429,214.

To all whom it may concern:

Be it known that WILLIAM M. DAVIS, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, has invented certain new and useful Improvements in Hot-Blast Boiler Furnaces, of which the following is a specification.

My invention relates to a hot blast boiler or furnace.

The principal object is to provide a construction in which practically all of the gases from coal or coke and the smoke will be burned.

Subsidiarily I aim to use heated instead of cold air for the draft and to preferably heat the air by the waste heat from the boiler.

Another object is to add steam to the heated air before passage to the grate so that in treating the burning fuel the formation of clinkers will be reduced.

With the above and additional objects such as will hereinafter appear in view, the invention has been embodied in one preferred form as hereinafter described and illustrated in accompanying drawings.

In said drawings:

Fig. 1 is a horizontal sectional view of the furnace taken below the grate;

Fig. 2 is a transverse sectional view of the furnace taken on a line passing through the grate;

Fig. 3 is a substantially central longitudinal vertical sectional view of the furnace;

Fig. 4 is a longitudinal sectional view of one of the steam distributors employed, and

Fig. 5 is a cross-sectional view of the furnace on the line 5—5 of Fig. 4.

Referring specifically to the drawings wherein like reference characters designate like or corresponding parts, the boiler or furnace rests upon a suitable support and has a casing or body having side walls 6 front and rear end walls 7 and 8 a top or cover wall 9. These walls are made of any suitable material, usually being of bricks and mortar, but with the wall 9 and the facings of the other walls as at 10 of fire brick or refractory material.

The fire box is located at A and comprises a grate 11, an entrance 12 thereto normally closed by a door 13, an ash pit 14 with an entrance 15 thereto normally closed by a door 15′, and a rear wall 16, preferably of fire brick which extends above the grate as at 16′ to retain fuel thereon. The boiler is designated B and the heat from the fire box takes the course of the arrows in Fig. 3 to the boiler. The smoke escapes through tubes 17 of the boiler into a chimney or stack opening 18 in the front wall.

In each side wall an S-shaped duct or passageway is provided consisting of horizontal portions 19 and vertical or connecting portions 20. Air enters these ducts through vertical portions 21 in the rear wall communicating with the atmosphere. Auxiliary ducts or passageways 22 are provided in wall 16, leading from the lowermost portions 19, to supply heated air adjacent the grates. Heated air also reaches the grate from said ducts at portion 19 through ducts or openings 23 in the side walls and leading to the ash pit.

Steam is preferably injected into the heated air as it enters openings 23. To this end manifold pipes 24 closed at each end are disposed in the lowermost duct portions 19, within manifolds 24, smaller pipes 25, open at each end so as to discharge steam into the manifolds, are located. Steam supply pipes 26 communicate with the boiler at 27 and connect to the pipes 25, preferably passing through the portions 19 so that the heat from the steam therein will heat the air in the ducts. Steam escapes from the manifolds through ports 28.

Access to the manifolds 24 is had through ways covered by doors 29. In operation with burning fuel upon the grate, draft air enters ducts 19—20 through entrances 21, being heated by the heat of the walls and the steam within pipes 26. It is also heated as it passes through the ducts 22. A portion of the heated air escapes through ducts 22 into the firing chamber and the remainder enters the ash pit 14 through the openings 23. As the same enters the ash pit, steam is injected into it through the ports 28.

By using hot air instead of cold air, practically all of the gases from the fuel will be burned and as the air is superheated by the furnace itself, it is an inexpensive process. The use and superheating of the steam is also inexpensive. By using the steam, formation of clinkers is considerably reduced.

Since merely the preferred embodiment of the invention has been illustrated and de-

scribed, it is to be understood that changes in the details may be resorted to without departing from its spirit and scope.

I claim:

A furnace of the class described having side walls and a boiler, said walls having tortuous ducts therein for communication with the atmosphere in the rear of the furnace, said walls having openings through which draft air passes into the ashpit, pipes disposed in the lowermost ducts in communication with the boiler to convey steam to the air as it discharges adjacent said openings, a wall in the rear of and extending above said grate, and ducts in the last mentioned wall leading from the first mentioned ducts and having their outlets above the grate.

In testimony whereof I affix my signature.

WILLIAM M. DAVIS.