

No. 725,090.

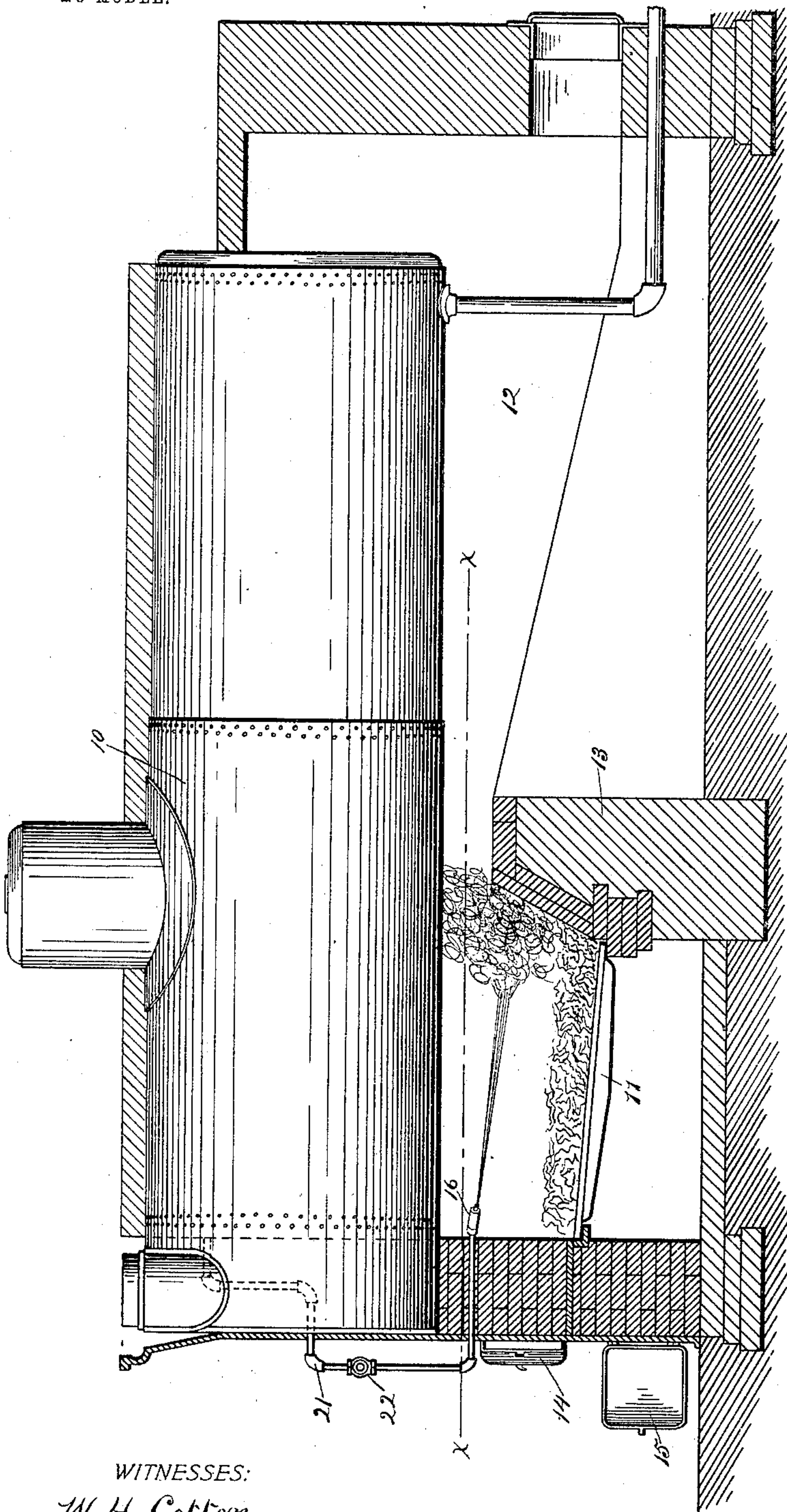
PATENTED APR. 14, 1903.

W. JOURDAN.
SMOKE CONSUMING FURNACE.

APPLICATION FILED JULY 15, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

W. H. Cotton.

Arthur B. Siebel.

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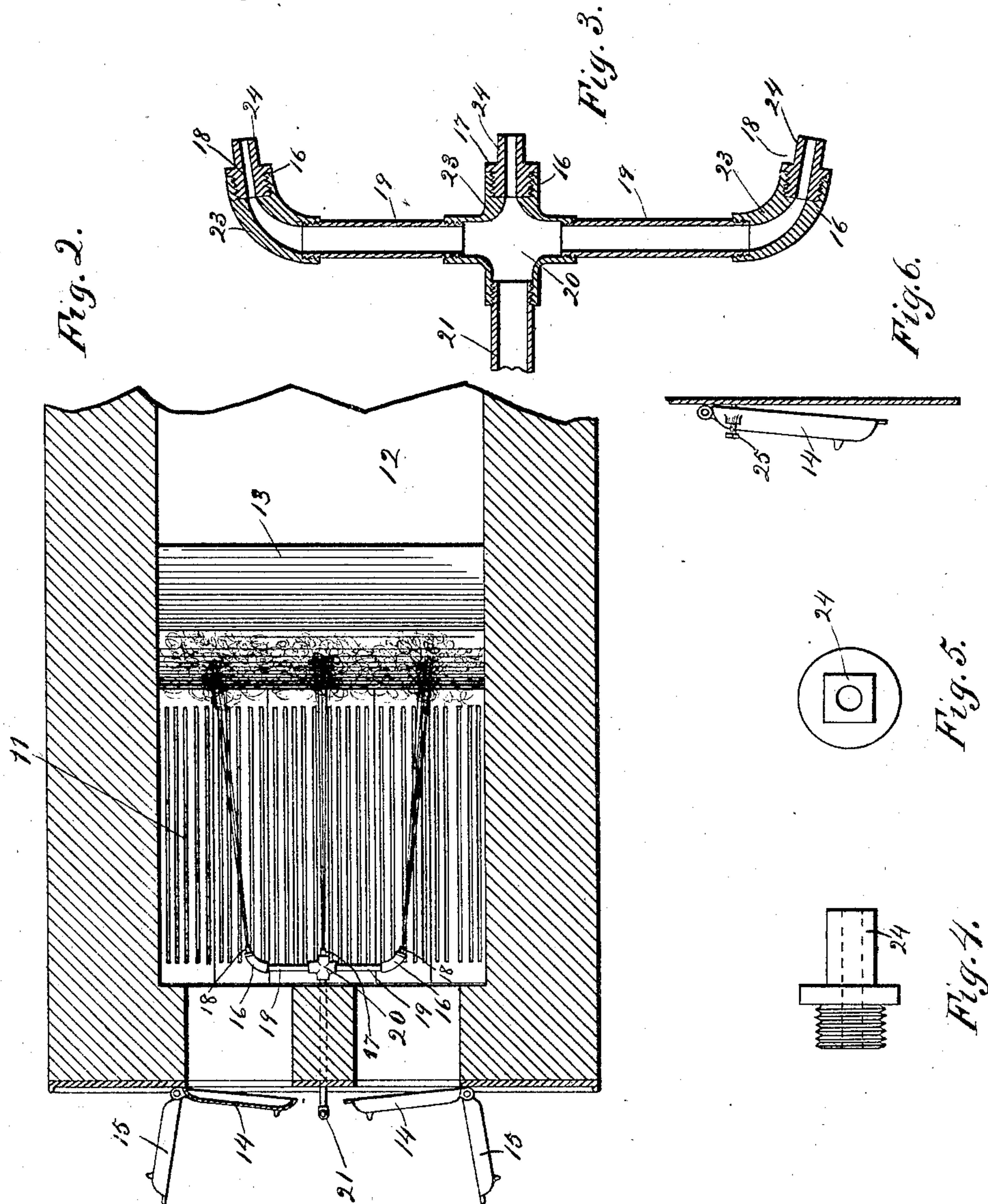
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WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM JOURDAN, OF CHICAGO, ILLINOIS.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 725,090, dated April 14, 1903.

Application filed July 15, 1902. Serial No. 115,736. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOURDAN, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates to an attachment for supplying a steam-blast to furnaces in order to insure complete combustion of the fuel, and particularly the finely-divided carbon or pellicles of carbon in the gas constituting the smoke.

The invention consists generally in combination, with a furnace having a bridge-wall, of a nozzle or nozzles directed over the fire-bed and toward the bridge-wall and connection with a source of steam-supply, such as the boiler of the furnace, whereby steam is projected in the form of a jet or jets toward the bridge-wall and becoming superheated is decomposed, resolving itself into a highly combustible gas or vapor, which when incorporated with air let into the fuel-chamber effects complete combustion of the unconsumed elements of the products of combustion. This combustion of the superheated steam is caused to take place near the opening over the bridge-wall, so that all the carbonaceous particles in the furnace-gases will be intercepted and consumed.

The invention consists of the combination and arrangement of parts hereinafter set forth, particularly designated in the claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of a steam-boiler furnace, showing my invention applied thereto. Fig. 2 is a section on the line xx of Fig. 1. Fig. 3 is a detail longitudinal sectional view of the steam-blast attachment which is shown in Fig. 2 in plan. Figs. 4 and 5 are a side and front elevation, respectively, of one of the nozzles shown in Fig. 3. Fig. 6 illustrates a stop for limiting the degree of opening of the firing-doors.

The steam-blast attachment is designed to be employed with any furnace of the ordinary and usual construction, and where there is any departure from the conventional lines

the invention may be readily adapted to the furnace without structurally changing the latter.

In the drawings the invention is shown applied to a steam-boiler furnace of a well-known type, comprising a horizontal boiler 10, grate 11, soot-chamber 12, bridge-wall 13 between the grate and the soot-chamber, firing-doors 14, and ash-doors 15.

Located over the grate 11, so as to be above the fire-bed, are a plurality of steam-jet nozzles 16, which are preferably so disposed that the steam issuing therefrom will be projected toward the bridge-wall 13. In the construction illustrated the blast device is provided with three nozzles, comprising a central nozzle 17 and end nozzles 18, located at the ends of horizontal connecting-tubes 19, extending from a central supply connection 20.

A steam-pipe 21, leading from the steam-boiler, passes through the front wall of the furnace and enters the connection 20 and is provided with a controlling-valve 22. As the pipe 21 in the arrangement shown enters through the front wall of the furnace at a point above the top of the bridge-wall 13, the nozzles 17 and 18 are inclined downwardly, so that they will direct the jets of steam issuing therefrom at a point preferably near the top of the bridge-wall, as seen in Fig. 1, and the outer nozzles 18 are bent outwardly, so that the jets issuing therefrom will diverge, as illustrated in Fig. 2, distributing the steam equally over the fire-bed.

The specific arrangement and construction of the parts described, however, are not material, so long as the nozzles are so disposed as to be located over the fire-bed and directed so as to project the jets of steam over the fire-bed and toward the bridge-wall, and any number of nozzles may be used, depending on the size of the fuel-chamber and other conditions.

Each nozzle consists of a section 23, having a tapering bore, and a plug 24 screwed into the section 23 and provided with a contracted outlet, the effect of which is under proper boiler-pressure to deliver the steam in jets of sufficient intensity to carry it to a point near the bridge-wall before it becomes disintegrated and converted into gas.

Ordinarily the steam-blasts need be used

only during firing and for a short while after or when the fire is being stirred up. At such times the ash-doors are left wide open in order to supply an updraft through the fire-bed and the firing-doors opened to a degree depending on the chimney-draft and which will best be determined by experiment with firing under different conditions. The steam having been turned on by manipulating the valve 22, it is projected toward the bridge-wall 13 and upon becoming disintegrated is decomposed and converted into a highly-inflammable gas. This inrush of steam into the firing-chamber creates a suction, inducing a flow of air through the firing-openings, and such air becoming highly heated meets and intermingles with the superheated steam near the bridge-wall, furnishing oxygen for the combustion of the unconsumed particles of carbon rising with the gas from the fire-bed.

By effecting the evolution of the gas due to the superheated steam at the rear end of the combustion-chamber such gas is consumed near the outlet over the bridge-wall and in the path of all combustible matter thrown off in the furnace-gases, even that arising from the fire-bed adjacent to the bridge-wall.

In order to set the firing-doors for a predetermined opening, a stop, consisting of a screw-bolt 25, passing through each door and bearing at its end against the furnace-front,

as shown in Fig. 6, may be provided and adapted to prevent the door being closed beyond a certain point. By adjusting the screw the degree of opening may be varied.

By the use of my invention the gases escaping to the chimney are almost entirely freed from carbonaceous matter, and the deposit of soot in the boiler-flues is greatly decreased, so that less frequent cleaning is rendered necessary.

I claim as my invention—

1. In combination with a furnace having a bridge-wall, a plurality of steam-blast nozzles located in the fire-box of the furnace and directed over the grate toward the bridge-wall and near the top thereof and each of which is provided with a contracted outlet, and a firing-door normally open during the admission of steam to the fire-box.

2. In combination with a furnace having a bridge-wall, a firing-door, and an ash-door located below the firing-door, a plurality of steam-blast nozzles located in the fire-box of the furnace and directed over the grate toward the bridge-wall and near the top of the same and each of which is provided with a contracted outlet, and a stop for regulating the degree of opening of the firing-door.

WILLIAM JOURDAN.

Witnesses:

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