

(No Model.)

C. McWILLIAM.
Furnace.

No. 243,286.

Patented June 21, 1881.

Fig. 1

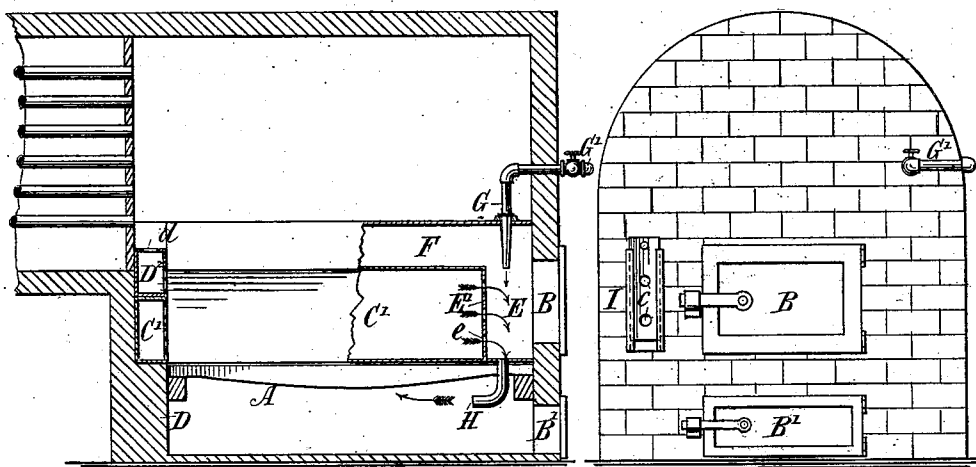
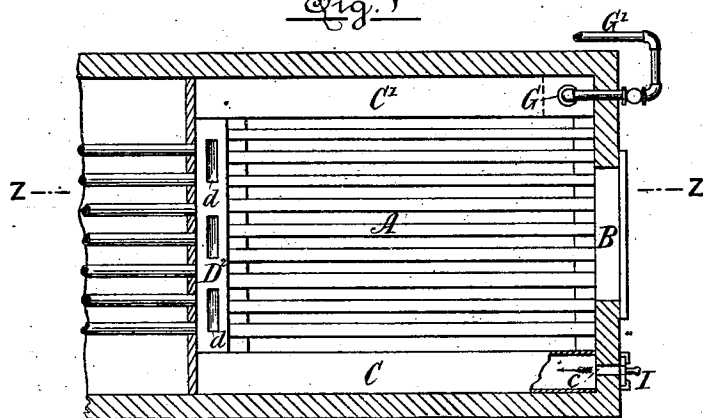


Fig. 2

Fig. 3

Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES McWILLIAM, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR OF TWO-THIRDS TO ALICE FINLAY FOSTER, OF PROVINCE OF QUEBEC, AND HASCAL A. HOGEL, OF NEW YORK, N. Y.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 243,286, dated June 21, 1881.

Application filed February 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES McWILLIAM, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention has reference to the furnaces or fire-chambers used in connection with steam-generators, and has for its object not only to utilize to the fullest extent the fuel burned, but also to enable that of an inferior quality to be used, and to consume the products of combustion.

I propose to construct on either side of the grate an air-chamber, these being connected with each other by a similar chamber formed in the bridge, so as to make a continuous air-chamber nearly all round the grate. Into this the air is admitted, preferably from the front, and having become heated in its passage round the fire is conducted into an exhaust-chamber, into which a jet of superheated steam is injected so as to form the exhaust, and thence discharged under or over the grate, thus serving as a hot blast and insuring the perfect combustion of whatever fuel may be employed. In the upper part of the bridge is formed a chamber communicating through a pipe or duct with the exhaust above mentioned, and having openings in it through which the products of combustion are drawn to the exhaust, and there mingling with the heated air are discharged below the grate.

For full comprehension, however, of the invention reference must be had to the annexed drawings, in which—

Figure 1 is a horizontal sectional view of a furnace embodying my invention; Fig. 2, a vertical sectional elevation on line *z z*, Fig. 1, with side partly broken away to show the exhaust-chamber; and Fig. 3 front view of furnace.

Similar letters of reference indicate like parts.

A is the grate, of any usual size and con-

struction, B being the fire-door, and B' the ash-pit door in the ordinary way.

C C' are air-chambers formed on either side of the grate, as shown in Figs. 1 and 2, connected together by a chamber, D', formed in the under part of the bridge D, so as to make one continuous air-chamber round the grate.

E is an exhaust-chamber, formed at the end of the chamber C', and divided off from same by diaphragm E', in which are pierced any number of openings *e*. The upper part of this exhaust-chamber E communicates by a pipe or duct, F, with a chamber, D², formed in the bridge, into which ingress is afforded from the fire-chamber by openings *d*. This duct or passage F usually forms the upper part of the longitudinal chamber C', and is divided therefrom by a diaphragm, *f*.

G is an injector, through which a jet of superheated steam (brought by the pipe G') is discharged into the chamber E, so as to partially create a vacuum, and H is a discharge-pipe from E.

Air is admitted to the chamber C through any suitable number of openings *c*, the supply, and consequent draft to the fire, being cut off or regulated by a slide, I. The air admitted through these openings *c* is in its passage through the chambers C, D', and C', considerably heated, and on passing out into the chamber E, and thence through the pipe H under the grate, serves as a hot blast.

In some cases, and with some forms of construction of boiler, it may be found desirable to place the outlet of the pipe H above the grate, instead of under it as just described.

The superheated steam passing through the injector G creates a partial vacuum in the chamber E, thus drawing the products of combustion from the fire-chamber through the openings *d* into the chamber D², and thence by the duct F into the chamber E, where they mix with the heated air, and are discharged with it under the grate. By this means the smoke is to a very great extent consumed.

It must be understood that although one particular form of furnace is shown and has

been described, my invention is not restricted to this, but is equally applicable to all kinds of furnaces, and that the air-chambers can be formed in the walls surrounding the furnace, and in the bridge, when of brick.

The air-chamber may, in some cases, be carried around the boiler, as well as the fire-chamber, and the position of the exhaust be varied to suit differing circumstances.

In some cases, too, it may be found possible, and even advantageous, to dispense with the jet of steam, the heated air affording sufficient draft, or a blast may be substituted for the jet.

What I claim is as follows:

In a furnace, the combination, with the grate, of an air-heating chamber surrounding the same, said chamber receiving air from the outside, and discharging it, when heated, into a chamber, E, in the front, in which chamber an exhaust is formed by a jet of steam, and into which the gases from the furnace are drawn from the chamber in front of the bridge D, the mixture of heated air and gases being discharged under the grate, all as herein set forth.

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Witnesses:

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