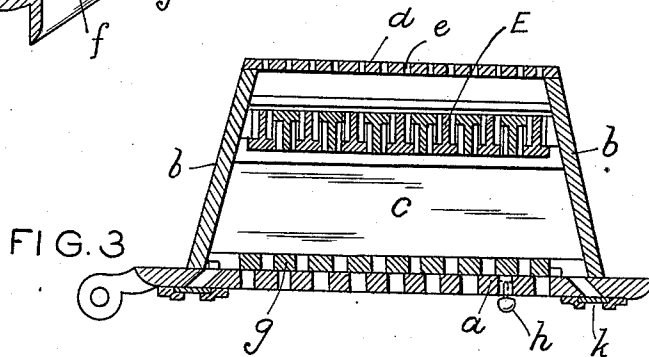
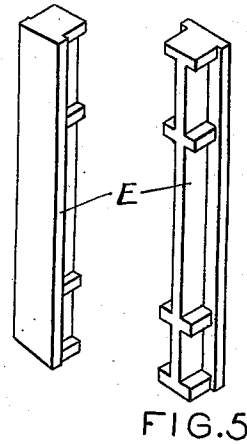
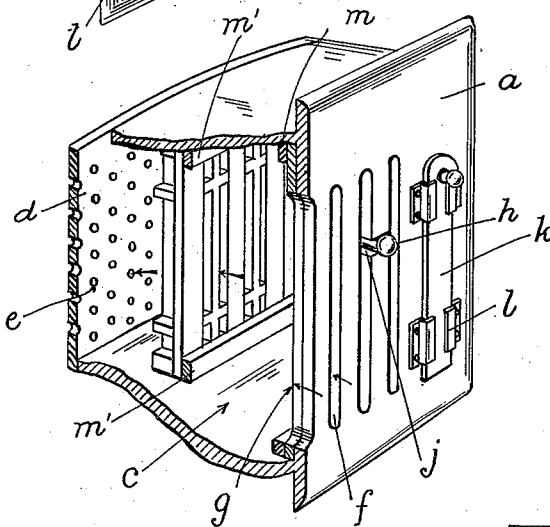
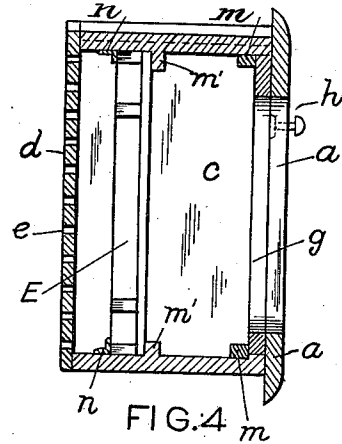
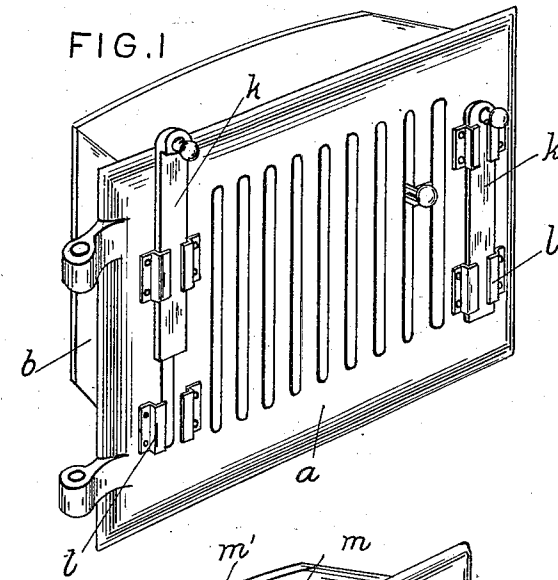


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BOILER FURNACE DOOR.
APPLICATION FILED JAN. 4, 1912.

1,044,830.

Patented Nov. 19, 1912.

2 SHEETS—SHEET 1.



Witnesses
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S. J. Teller

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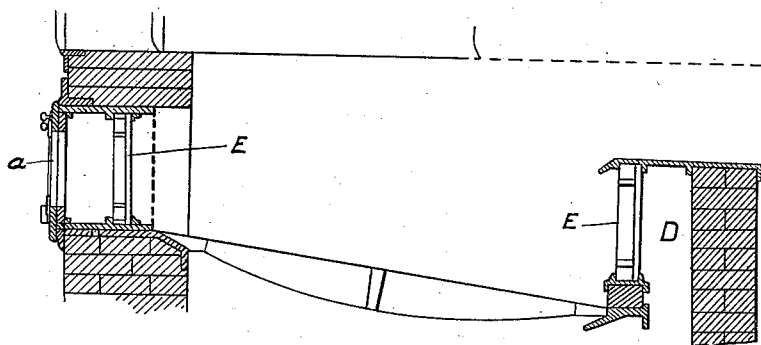


FIG. 6

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UNITED STATES PATENT OFFICE.

ALFRED VINCENT, OF REDFERN, AND CHARLES MUIR, OF ST. PETERS, SYDNEY, NEW SOUTH WALES, AUSTRALIA, ASSIGNORS TO MUIR-VINCENT SMOKE CONSUMERS LIMITED, OF SYDNEY, AUSTRALIA.

BOILER-FURNACE DOOR.

1,044,830.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Original application filed June 7, 1911, Serial No. 631,856. Divided and this application filed January 4, 1912. Serial No. 669,410.

To all whom it may concern:

Be it known that we, ALFRED VINCENT and CHARLES MUIR, subjects of the King of Great Britain and Ireland, and residents, respectively, of 8 Golden Grove street, Redfern, Sydney, New South Wales, Australia, and 88 Sutherland street, St. Peters, Sydney, aforesaid, have invented certain new and useful Improvements in Boiler-Furnace Doors, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to furnaces for boilers and other apparatus, in which solid fuel is burned under natural draft or artificial draft.

It consists in certain improvements in the type of furnace in which the furnace door is formed as an air preheating chamber and air draft distributing device.

It is well known that advantageous results are obtained by preheating the air draft to a furnace and dispersing and evenly distributing air over the fire. Many forms of apparatus for this purpose are known, in which the air is preheated in passing through a chamber formed on the back of the furnace door and is dispersed and distributed over the fire through vents in said chamber.

Our invention consists in an improved preheating device for furnace doors, which device is constituted of a grating or screen composed of two sets of T-bars arranged in alternated order so as to leave zig-zag passages between them, through which passages the inflowing air is caused to pass in thin streams and is heated by contact with the T-bars, which are exposed to the heat of the fire. The heating chamber on the door which carries the T-bar screen is fitted with dampers on the front plate to regulate the air intake, and with a back plate which is perforated to admit preheated air over the fire in a large number of fine jets.

In the accompanying drawings:—Figure 1 is a perspective view of a boiler furnace door, fitted on the front plate with slide grate dampers for controlling the volume of air admitted to the preheating chamber; Fig. 2 is a broken sectional perspective view exposing the internal structure of the preheating chamber in the door shown in Fig. 3; Fig. 3 is a horizontal section through the

door and preheating chamber; Fig. 4 is a vertical section through the same; Fig. 5 shows in perspective two of the T-bars which are used to form a vertical grating in the preheating chamber; and Fig. 6 is a longitudinal section through a furnace having fitted thereto a door according to the present invention, and also an additional air preheating bridge.

a is the front plate of the furnace door, *b* the sides of the air preheating chamber *c*, and *d* the back plate of the chamber *c*. Small holes *e* are provided in the plate *d* forming passages for air from the preheating chamber to the space above the fire in the furnace, and vertical slots *f* are provided through the door front plate *a*.

g is a slotted register plate the slots in which register with the slots *f*. This plate *g* is slidable across the rear face of the plate *a* by means of a hand knob *h* which projects through a clearance gap *j* in one of the bars of the front plate *a*.

k are independent slide plates slidable through rabbet fillets *l* pinned to the plate *a*.

m are strips secured to the top and bottom sides of the preheating box to form guideways for the slotted slide plate *g*.

E are the T-bars which are made of cast iron and arranged as a vertical grating in the preheating box. The bars *E* are held between the integral flanges *m'* and the separately secured flanges *n*.

In operation, air passes through the slots *f* in the door plate *a* under natural draft or forced draft, and in such volume as is permitted by the open area of said slots, which area is controlled by the setting of the register plate *g* and the slide plates *k*. The preheating chamber *c* and the T-bar *E* grating within it and the perforated back plate *d* are heated by radiation from the fire. In passing from the front to the back of the preheating chamber *c* the temperature of the inflowing air is raised by contact with the grating of zig-zagged T-bars *E*. In passing through the zig-zag passages between the T-bars *E* the course of the air is altered and it is thoroughly intermixed, whereby a uniform temperature is assured. The uniformly heated air finds exit through the perforations *e* into the space above the fire and supplies to the fire the necessary

volume of oxygen in a preheated condition for promoting satisfactory combustion. The construction of door front plate *a* with register slide damper plate slotted precisely as shown is not essential. It will suffice if the front plate *a* be fitted with any other form of register or damper by which volume of air flow may be readily controlled and air admitted in dispersed streams or currents to the chamber *c* in front of the T-bar grating E. Additional air passes from the ashpit up into the free space D, thence takes a zigzag course between the T-bars E, becoming heated by contact with them, and finally passes forward in distributed streams into the furnace and mixes with the gaseous products of combustion which are passing toward and over the top of the bridge. The quantity of air so admitted is controlled by working the fire toward or away from the grating of T-bars E. The draft can be diminished to any desired extent by working fuel and ashes back against the T-bar grating. When the fire is raked forward maximum bridge draft is admitted.

This application constitutes a division of our application entitled Furnaces for burning solid fuel, filed June 7, 1911, Serial No. 631,856.

What we claim as our invention and desire to secure by Letters Patent is:—

1. The combination of a door for fuel burning furnaces having an air preheating door chamber therein, an air heating and dispersing grating through which the incoming air passes, the grating being com-

posed of bars T-shaped in cross section set in alternated order with the flange of each bar on the side opposite to the flange or flanges of the next adjacent bar or bars, the bars being spaced apart to leave intervening zigzag passages.

2. The combination of a door for fuel burning furnaces, a draft preheating and dispersing grating mounted on the door and composed of bars T-shaped in cross section set in alternated order with the flange of each bar on the side opposite to the flange or flanges of the next adjacent bar or bars, the bars being provided with bosses for spacing them apart to leave zigzag apertures between them.

3. In a furnace door, the combination with slotted front plate, a slotted slide register movable across the front plate, and a rear plate perforated with small holes, of an air heating and dispersing grating fixed across the chamber between the front and rear plates, the grating being composed of bars T-shaped in section and set in alternated order with the flange of each bar on the side opposite to the flange or flanges of the next bar or bars, the bars being spaced apart to leave intervening zigzag passages.

In testimony whereof we affix our signatures, in presence of two witnesses.

ALFRED VINCENT.
CHARLES MUIR.

Witnesses:

W. J. DAVIS,
N. J. CANDRICK.