

2 Sheets—Sheet 1.

Patented Mar. 8, 1892.



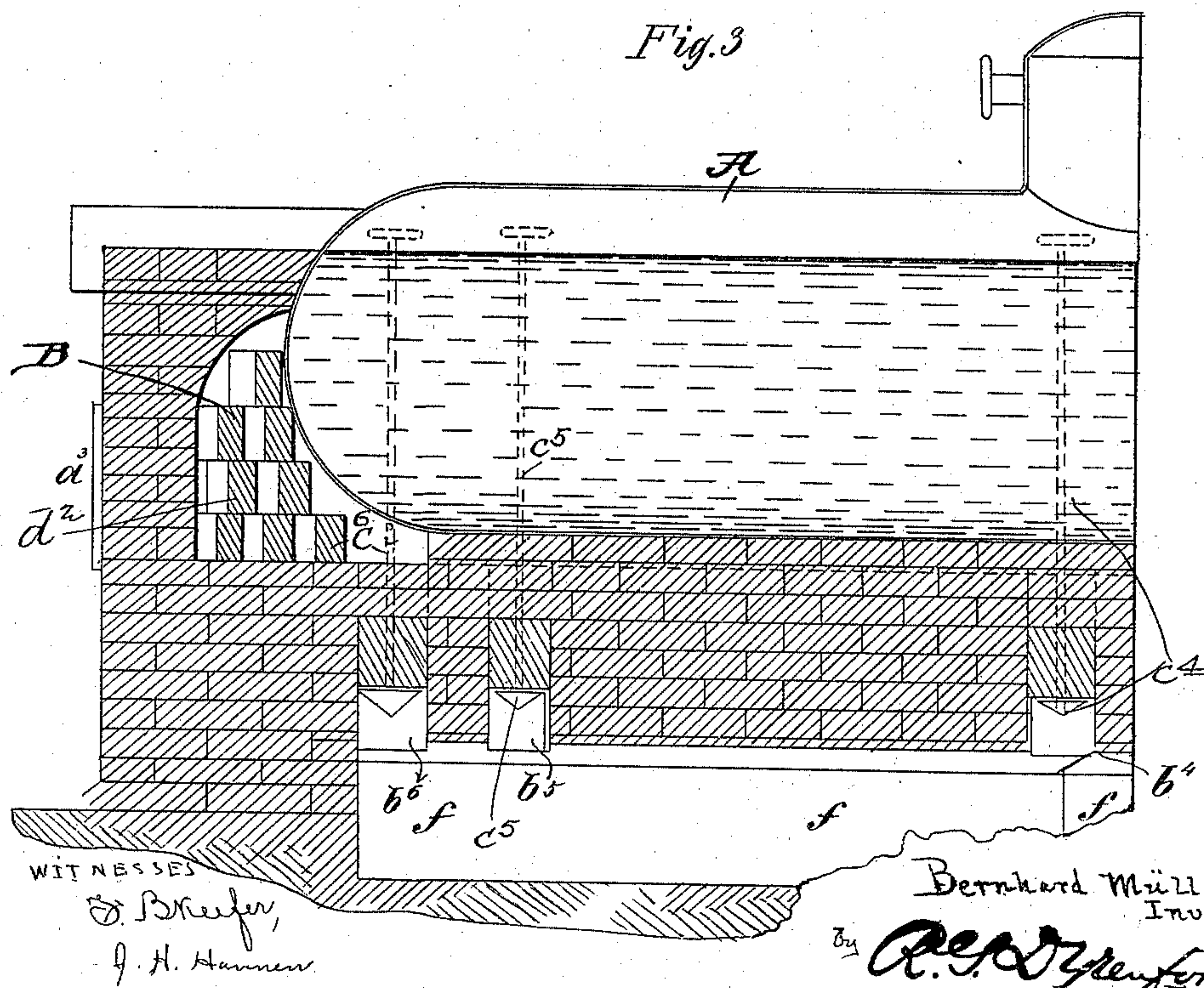
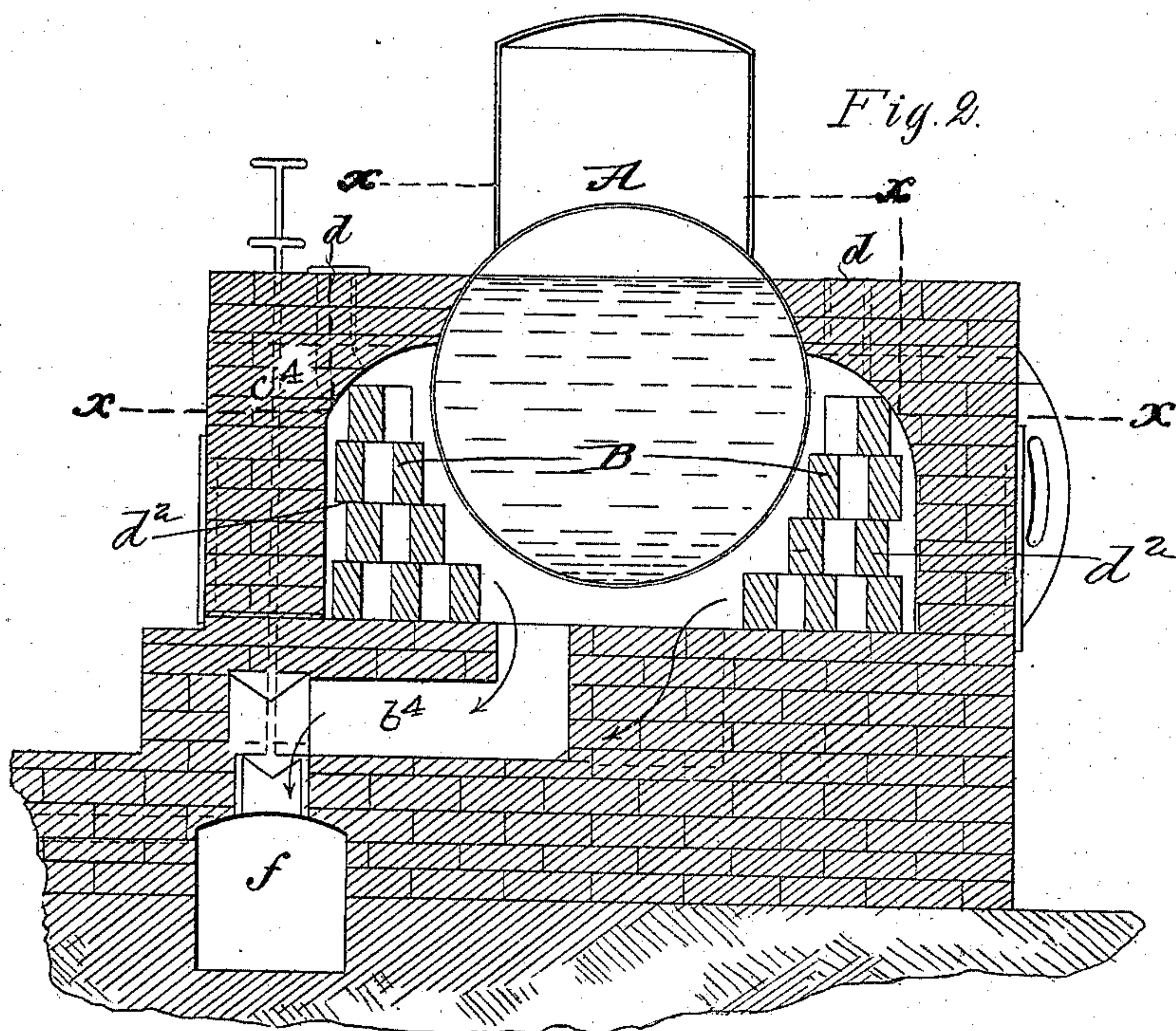
(No Model.)

2 Sheets—Sheet 2.

B. MÜLLER.
SMOKE CONSUMING FURNACE.

No. 470,501.

Patented Mar. 8, 1892.



WITNESSES

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UNITED STATES PATENT OFFICE.

BERNHARD MÜLLER, OF CHEMNITZ, GERMANY.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 470,501, dated March 8, 1892.

Application filed August 22, 1889. Serial No. 321,686. (No model.) Patented in England January 2, 1889, No. 70, and in Germany December 4, 1889, No. 48,890.

To all whom it may concern:

Be it known that I, BERNHARD MÜLLER, of Chemnitz, in the Kingdom of Saxony and German Empire, have invented a new and useful or Improved Smoke-Consuming Fire Device for Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to furnaces for various purposes, and is designed to effect the entire combustion of carbon which at present is wasted in the form of smoke, and thus to effect greater economy in heating and to avoid contamination of the atmosphere.

In order that my invention may be better understood, I now proceed to describe the same in relation to the accompanying drawings, reference being had to the letters and figures marked thereon.

This invention was patented in England January 2, 1889, No. 70, and in Germany December 4, 1889, No. 48,890.

Figure 1 is a sectional plan view of the furnace on line *xx* of Fig. 2. Fig. 2 is a sectional view on line *yy* of Fig. 1. Fig. 3 is a view of a longitudinal section on line *zz* of Fig. 1.

The arrangement shown in the drawings contains six furnaces; but I may use only one or any other number, and they may be arranged around the boiler in an oval or circular or other suitable form. All furnace-spaces are partially filled with porous brick in the form of bricks *d*², placed beside and above one another and at suitable distances from one another, so that the flames may pass or envelop and heat them to a high degree. When the smoke developed by the fuel comes in contact with these glowing fire-bricks *d*² and the same fine carbon particles constituting the smoke are rendered incandescent and are partly consumed, while the products of combustion—such as carbon acids and carbonic oxide—enter the chimney without any smoke. The furnaces 1 to 6 are supplied with furnace-doors *a'* *a*² *a*³, &c., and smoke tubes or channels *b'* *b*² *b*³, which can be regulated by the slide *b*, and further with valves *c'*, &c.

f is the common flue, which connects the several furnaces to the chimney.

The slide *b* allows of each furnace being connected to or disconnected from each other

at pleasure. The working of this arrangement is effected as follows: The furnaces are started in the usual manner, and when the slide *b* is placed as in the drawings—*i. e.*, between the fire-boxes 1 and 6—the door *a'* and the valve *c'* are left open to produce rapid circulation of air until the fire-bricks in the furnaces are brought to a glowing heat. The valves *c'* to *c*⁶ regulate the draft of gases in the smoke-channels *b'* to *b*⁶, while the slide *b* separates or connects, respectively, the fire-places 1 to 6, according into which of the recesses that slide is inserted. The door *a'* is closed and the firing is continued through the opening *d*, arranged on the top and which may be closed hermetically, the air being admitted through openings of any suitable description arranged on the fire-doors. The fuel, of not more than nut size, is fed among the glowing fire-bricks in small quantities and at short intervals through the tubes *d*. When the fire-bricks in one furnace have been brought to white heat, the next furnace is proceeded with, and so on until all are in working order. It is evident that a greater or less number of furnaces may be worked at pleasure. This arrangement is more economical than the ordinary fire-grate arrangement, when the whole grate must be covered with fuel, thus rendering regulation more difficult. The combustion of the fuel, which consists of coal of any kind, is effected completely without smoke and without the formation of cinder, only light ashes being formed, which are taken to the common flue, where they can be easily removed. When the fire-bricks of the furnaces 4 5, &c., have been brought to a strong glowing heat, the fires in 1, 2, and 3 may be slackened, while the admission of air through the respective furnace doors or openings in said furnace-doors is continued, the air arriving at the fire-place strongly heated. When the fire-bricks in the discontinued furnace or furnaces have become cold, the air is allowed to enter through the next furnace-door, while such discontinued furnaces are disconnected from the main smoke-flue, and may thus be easily cleaned, together with the channel of the flues. When it is desired to restart the disconnected furnace 1, the valve *b*, which is now inserted between 1 and 6, is taken out

and inserted between 1 and 2, the valve c' and the furnace-door a' are closed, while the valve c^3 is opened, when all furnaces will be again in working order. In the above-described manner the other furnaces 2 3 4, &c., may also be discontinued by opening on the adjoining furnaces 3 4 5, &c., the furnace-doors $a^3 a^4 a^5$, &c. In restarting, the valve b is advanced one or more furnaces (according to the number discontinued) between the furnaces 2 and 3, 3 and 4, 4 and 5, &c. The open furnace-doors $a^2 a^3 a^4$, &c., and the valves of the discontinued furnaces 2 3 4, &c., are closed, except the door through which the air is admitted to the fire. At the same time the valve in the smoke-flue nearest the valve or slide b must be closed. According to the size of the arrangement, such change in working the furnaces may be effected every ten or fifteen hours. When the working is to be interrupted, the open furnace-door through which air is admitted is closed, as well as the valve of the open smoke-flue, which is connected to the

furnace at work and the chimney. The fire then does not burn further, while the heat is maintained for days.

I claim as my invention—

1. In combination, the fine-fuel-burning furnace having the fire-spaces with the door-openings and the openings d and the fire-bricks arranged within the fire-space, substantially as described.

2. In combination, the series of fine-fuel-burning furnaces, each having a door-opening, a flue f , common to all the furnaces, the channels leading from the several furnaces into said flue and having valves, and the slide b , arranged to connect or disconnect the furnaces, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

BERNHARD MÜLLER.

Witnesses:

W. B. MURPHY,
HERNANDO DE SOTO.