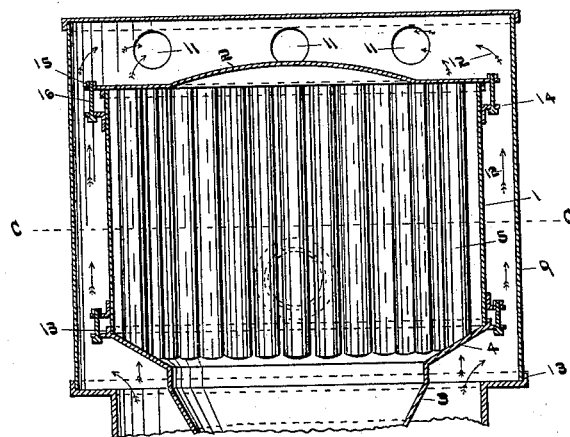
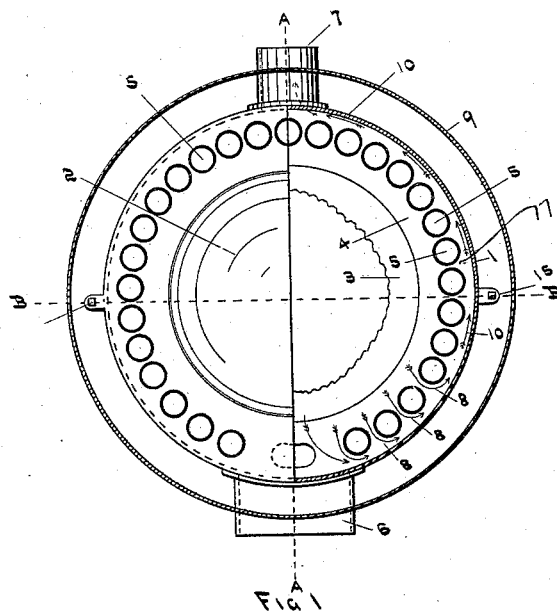


(No Model.)

F. KERNAN, Jr.
HEATING FURNACE.

No. 383,469.

Patented May 29, 1888.



WITNESSES:
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FRANCIS KERNAN, JR., OF UTICA, NEW YORK.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 383,469, dated May 29, 1888.

Application filed April 18, 1887. Serial No. 235,256. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS KERNAN, Jr., of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Heating-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to an improvement in heating-furnaces; and it consists in the mechanism and construction herein pointed out and claimed.

In the drawings presented, Figure 1 represents a plan view of my improved furnace, the top of the outer shell or casing of the furnace being removed to better show its construction, that portion of Fig. 1 lying on the left of line A A showing a plan view of the top of the combustion chamber or dome, and that portion to the right of line A A showing a transverse section of the same on line C C, Fig. 2. Fig. 2 shows a vertical sectional view of my improved furnace on line B B, Fig. 1.

Like figures of reference refer to like parts in the several views presented, and are so referred to in this specification.

My invention relates to that class of heating-furnaces having an annular flue or incased space surrounding the combustion or radiating dome of the furnace, and more particularly to the cellular partition or diaphragm that forms one of the walls of the annular flue and separates it from the combustion-chamber proper of the furnace. It is a demonstrated fact that a solid plate or wall of metal having both of its sides exposed to the intense heat of the ordinary furnace is not durable, and is impracticable as an element of furnace construction. I aim to provide a cellular partition or wall that shall have all the advantages and functions of a continuous solid partition or wall, with the added advantage of being so constructed as to admit of a circulation of air through the same, rendering it practicable and durable, while at the same time I am enabled to utilize the air which becomes heated by its passage through the cellular wall or partition

in augmenting the volume of heated air discharged by the furnace.

Referring more specifically to the drawings, 1, Figs. 1 and 2, represents the outer wall or shell of the combustion chamber or dome of an ordinary furnace. 2, Figs. 1 and 2, represents the top or cover plate of same; and 3, Figs. 1 and 2, represents a portion of the upper part of the fire-pot, the remainder being broken away.

4, Figs. 1 and 2, represents the cone-shaped bottom plate of the combustion chamber or dome.

5, Figs. 1 and 2, represents the tubes forming the cellular wall or partition hereinbefore referred to. These tubes are preferably circular in form, but might be square, elliptical, or polygonal and answer the same purpose.

6, Fig. 1, represents the charging door or nozzle of the furnace; and 7, Figs. 1 and 2, represents the ordinary smoke exit or collar.

9, Figs. 1 and 2, represents the outer shell or casing of the furnace proper.

It will be observed that the ends of tubes 5 are inserted in or attached to the opposing top and bottom plates of the furnace in such a manner that air has an unobstructed passage through them, and that the greater portion of them are placed in as close proximity to each other as the details of practical mechanical construction will admit of. For a short distance on each side of the charging-door I separate the tubes slightly, so as to allow the passage of the products of combustion between them, as shown at 8 8 8, Fig. 1. The purpose of this construction is to allow greater space for the products of combustion and prevent their "puffing" or blowing out upon the opening of the charging-door. I do not, however, limit myself to this specific construction, as in the use of some kinds of fuel such arrangement would not be necessary. I also preferably locate smoke-exit 7 at or near the bottom of the annular flue or space formed between cellular wall or partition and outer shell of combustion-chamber, as such location counteracts the tendency of the products of combustion to rise and effects a better distribution of same in the annular flue.

The action of my device is as follows: Fire being kindled in the fire-pot, the products of

combustion rise therefrom and, separating, pass into the annular flue or space 17, Figs. 1 and 2, between cellular partition or wall and shell of combustion-chamber, imparting their heat thereto and passing off through the smoke-exit 7, their course being indicated by arrows 10, Fig. 1. Air is admitted into the space between outer shell 1 of combustion-chamber and outer shell 9 of furnace, and, becoming heated by contact therewith, is carried off in any desired direction through hot-air pipes 11 11, Fig. 2. The course of the heated air is indicated by arrows 12 in Fig. 2. I preferably construct plate 4, Figs. 1 and 2, of inverted conical form, as such conformation does not afford a lodgment for the dust or ashes arising from the fire.

Reference to Fig. 2 will show that I provide the top and bottom plate of both furnace and combustion-chamber with projecting flanges, inside of which I place the vertical walls or sides of the same, as shown at 13 13, Fig. 2. As a detail of mechanical construction such arrangement is valuable, as it affords better facilities for retaining the packing material used in the joints than when the vertical walls or sides are placed outside the flanges. For securing the bottom and top plates of the combustion-chamber to its sides, I use "knees" 14, Fig. 2, attached to the side walls and opposed by ears 15, Figs. 1 and 2, which are attached to or a part of the plate. These are properly perforated for the reception of bolt 16, Figs. 1 and 2, which are used for clamping the parts together. The shape of the knees renders them slightly elastic and affords com-

pensation for slight change and dimension due to variations of temperature. Reference to Fig. 2 will show that the upper portion or radiating drum of my furnace is of larger diameter than that portion surrounding the fire-pot. This necessarily furnishes a greater amount of radiating-surface than would be the case were the entire outer casing constructed of the same size as that portion surrounding the fire-pot.

It is evident that various changes could be made in the construction of my device without departure from the central feature or spirit thereof; hence I do not limit or confine myself to the precise specific construction described herein.

What I claim as new, and desire to secure by Letters Patent, is—

The combination, with the combustion-dome, of larger diameter than the fire-pot immediately above the same, of a circular cellular partition formed of vertical air-tubes passing through the dome, forming a combustion-chamber within the dome, and a circular flue between the partition and the wall of the dome, the air-tubes having spaces between them in front and adjacent to the charging-door, and the remainder being so nearly in contact as to form a partition in front of and adjacent to the smoke-exit, as described.

In witness whereof I have affixed my signature in presence of two witnesses.

FRANCIS KERNAN, JR.

Witnesses:

EDWIN H. RISLEY,

W. G. STONE.