(No Model.)

W. J. OWENS.

HOT AIR FURNACE.

No. 499,573. Patented June 13, 1893.

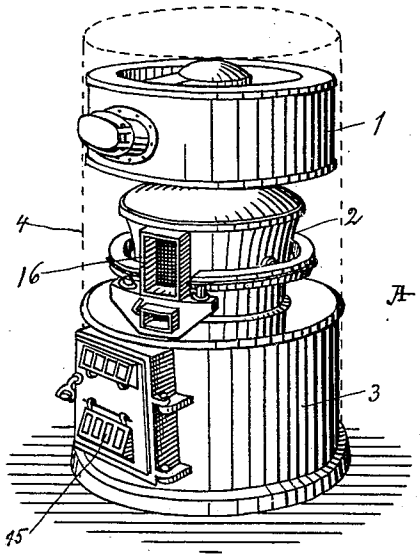

Fig. 1.

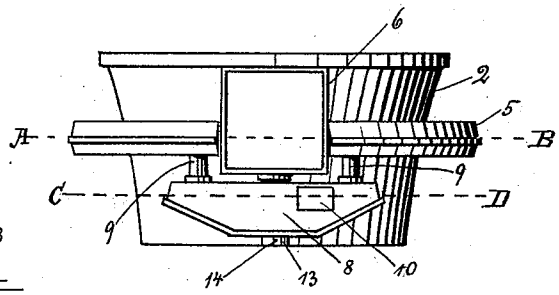

Fig. 2.

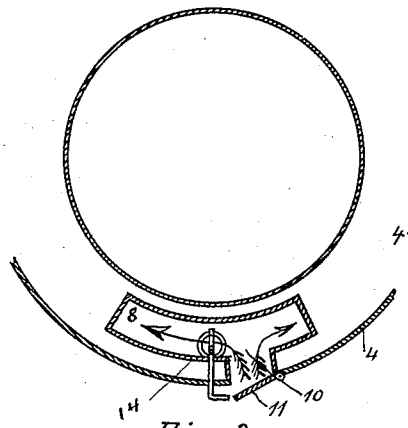

Fig. 3.

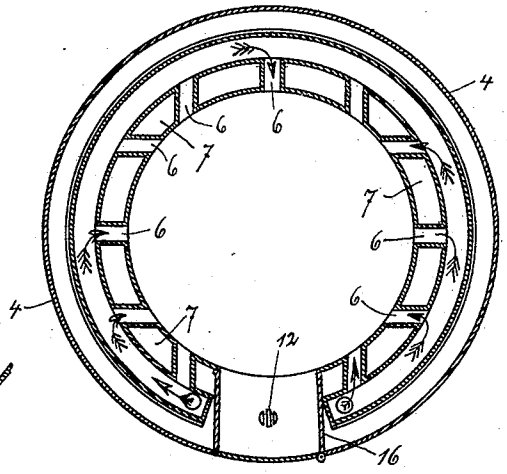

Fig. 4.

WITNESSES.
Rich. A. George
G. A. Gaynaud

INVENTOR.
William J. Owens,
By Risley & Robinson,
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM J. OWENS, OF UTICA, NEW YORK, ASSIGNOR TO THE KERNAN FURNACE COMPANY, OF SAME PLACE.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 499,573, dated June 13, 1893.

Application filed February 9, 1893. Serial No. 461,564. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. OWENS, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Hot-Air 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 figures of reference marked thereon, which form part of this specification.

My present invention relates to an improvement in hot air furnaces.

In the drawings which accompany and form a part of this specification, Figure 1 shows the furnace with my improvements applied, with the outside casing and front removed. Fig. 2 shows on a larger scale, a front view of the fire-pot, and an air heating draft flue surrounding the fire-pot or dome, together with an air heating box, forming portions of my improvements. Fig. 3 shows a longitudinal section through the fire-pot or dome and air heating box taken on line C. D. of Fig. 2. Both of these figures also include the casing in the furnace. Fig. 4 is a longitudinal section on the line A. B of Fig. 2.

Referring more particularly to the reference numerals, 1 indicates the radiator; 2 the fire-pot or dome. The fire-pot proper is usually used with a section or sections which surmount it and form the dome; the fire-pot and dome, however, may be formed integral. 3 indicates the ash pit base, all of which are inclosed in a casing shown in dotted lines at 4. The dome 2 is nearly surrounded by a segmental hot air draft flue 5, which is broken out at each side of the feed door section and also to permit expansion and contraction of the ring. The draft flue 5 is connected by short tubes or flues 6, with openings in the fire-pot or dome above the upper surface of the fuel. Any number of openings and tubes 6 desired may be provided in the dome and the size and shape of the holes varied to suit different conditions. There may be left between the encircling flue and fire-pot, an air space 7. The air flue may be formed integral with the dome, in which case the air space is omitted.

At the front of the furnace and below the feed door section is provided a draft flue heating box 8. This box is located between the casing and the fire-pot and is connected to the flue 5 by short vertical flues or pipes 9 of substantially equal size, whereby an equal amount of air is allowed to enter at each end of the draft flue 5.

In the box 8 is provided an opening 10 extending to the outside of the casing and which may be closed by a damper or draft door as 11. The damper or draft door 11 may be hung to swing laterally or vertically as desired.

At the top of the draft heating box 8 is provided an opening 12 into the feed door section, and from the bottom of the box extends a flue 13 into the ash pit base 3, and in the flue 13 is provided a damper 14.

This furnace is more particularly intended for burning soft coal, and is what may be termed a surface burner, and the operation of the device is substantially as follows: The fire may be started in the furnace by putting the kindlings directly on the grate, the coals on top, as is usual with a furnace, in which case the drafts 15 in the ash pit are opened to allow a direct draft. After the fire has been started the drafts may be changed to operate as hereinafter described.

It is preferable to start the fire by putting the coals directly on the grate and the kindlings on top of the coal, in which case the drafts are as follows: The door 11 is opened to allow the air to enter the heating box 8 and thence through the encircling flue 5 and the short cross flues or air passages 6, and is delivered in the fire-pot or dome on top of the fuel; then there is a certain amount of draft down through the fuel and the fire ignites at the top and burns downward toward the grate. After the furnace has become heated, the air on entrance into the box 8 is heated during its slow passage through the box and is further heated in its passage through the encircling draft flue 5, so that a hot blast of fresh air is delivered on the surface of the fuel, and this is the principle func-

tion of the box 8 and the flue 5. During the operation of the furnace there is a certain amount of leakage of air into the ash pit base, which leakage passes up through the flue 13 into the heating box 8, where it is heated and commingled with the fresh air through the opening 10. There is also taken from the ash pit through flue 13 any gases or air delivered from or escaping from the under side of the fire. It will also be noted that from the heating box 8 a portion of air is allowed to enter the fire-pot or dome through the opening 12 and the feed section 6; this equally distributes the air from all sides over the surface of the fire. It will be noted that when the furnace is in full operation, the damper 14 is open; the damper 14 may be closed in starting the fire, as described in the first instance with the kindlings on the grate. It will also be understood that the smoke exit flue is connected to the radiator and is not shown in any of the figures.

The peculiar construction and arrangement of the heating box 8 and the draft flue 5 provides for a first heating of the air in the box 8, and a second heating in the flue 5 after it has been commingled in passing through the flues 9, and the connection of the box 8 to the flue 5 by the pipes 9 operates to distribute air equally over the fire and also furnishes a construction which accommodates itself without breakage to the expansion and contraction of its parts and the fire-pot, or dome. This method of combustion has been the subject of much experiment by me, and it results in a very perfect and complete combustion of the fuel. It is evident that this construction can be modified in several particulars without departing from the equivalents of my construction.

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

1. In a hot air furnace, a fire-pot or dome having a feed section extending to the outside of casing, a draft flue within the casing and nearly encircling the fire-pot and terminating at each side of the feed section, and having a series of openings into the fire-pot above, the fuel line, a heating box within the casing below the feed section and connected by equal contracted air passages with the ends of the encircling flue, combined, substantially as set forth.

2. In a hot air furnace, a fire-pot, a draft flue nearly encircling the fire-pot, having a series of openings into the fire-pot above the fuel line, a heating box below the draft flue and connected to the ends of the draft flue by air passages substantially at right angles with the plane of the draft flue, combined, substantially as set forth.

3. In a furnace, the combination with the fire-pot or dome, of a draft flue nearly encircling the fire-pot or dome, and openings therefrom into the fire-pot or dome above the surface of the fuel, a heating box below the ends of the flue, and connected to each of the ends by contracted or reduced air passages, and a draft opening into the heating box, substantially as set forth.

4. The combination in a furnace, of a fire-pot or dome, an ash pit base, a casing inclosing the same, a feed section extending from the casing, to the fire pot, a draft flue nearly surrounding the fire-pot or dome, and terminating at either side of the feed section and having openings into the fire-pot or dome above the surface of the fuel, a heating box below the flue and connected by contracted and substantially equal air passages to the ends of the flue, a flue connecting the heating box with the ash pit base, and a damper for controlling the same, substantially as set forth.

5. The combination in a furnace of a fire-pot or dome, a draft flue nearly surrounding the fire-pot or dome, a heating box located below the ends of the flue and connected to each end of the flue by contracted and substantially equal air passages, and a draft opening into the heating box from the outside of the casing, substantially as set forth.

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

WILLIAM J. OWENS.

Witnesses:
WILLIAM J. LEWIS,
JNO. M. CATES.