2 Sheets—Sheet 1.

R. M. BOWMAN.

HOT-AIR FURNACE.

No. 175,849. Patented April 11, 1876.

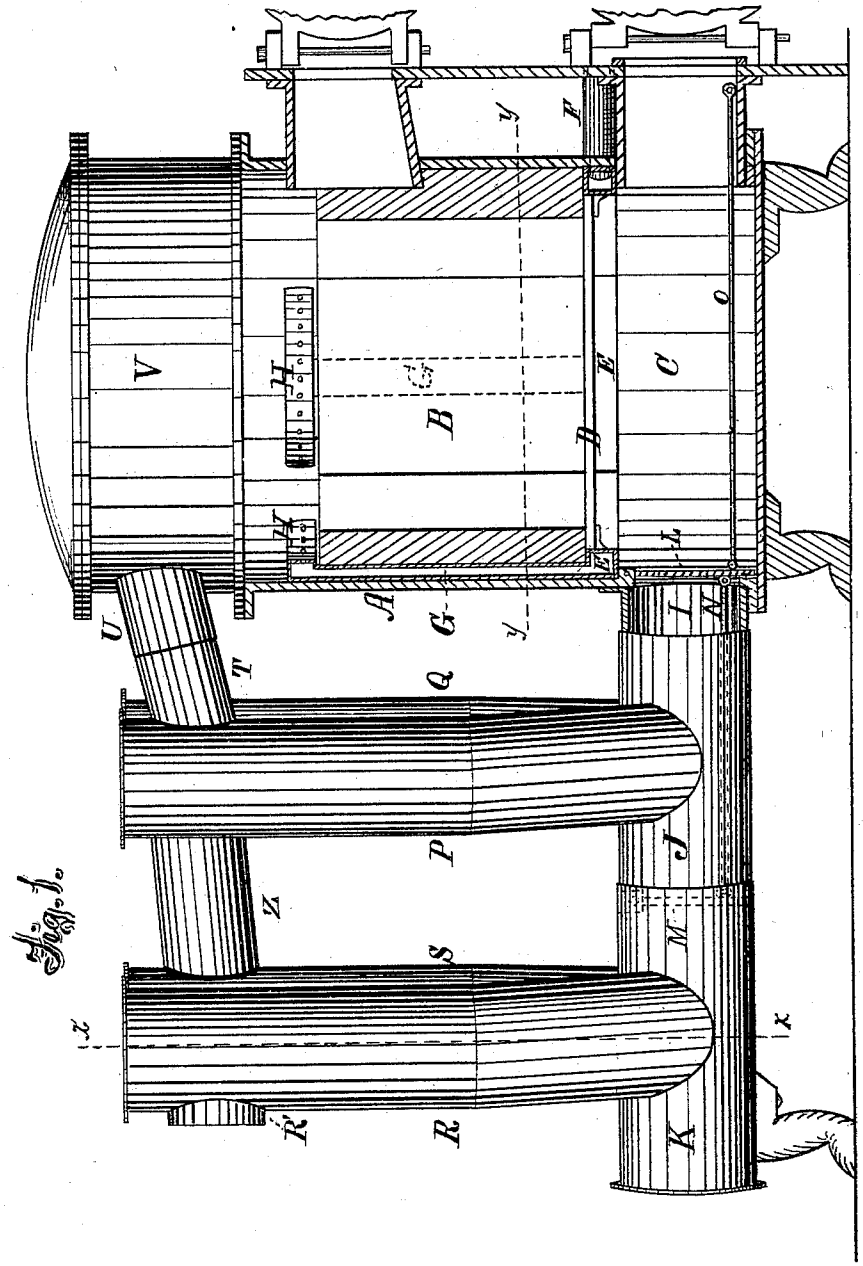


Fig. 1.

Witnesses.
J. Bonsall Taylor.
J. Dunn

Inventor.
Ralph M. Bowman,
by his Atty,
Horace Binney, 3rd.

2 Sheets—Sheet 2.

R. M. BOWMAN.

HOT-AIR FURNACE.

No. 175,849. Patented April 11, 1876.

Fig. 2.

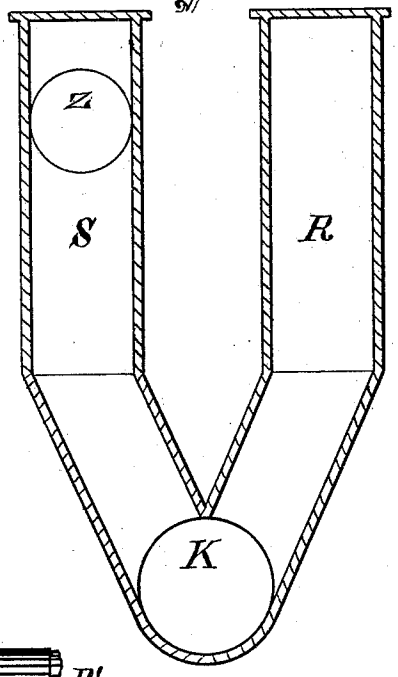


Fig. 3.

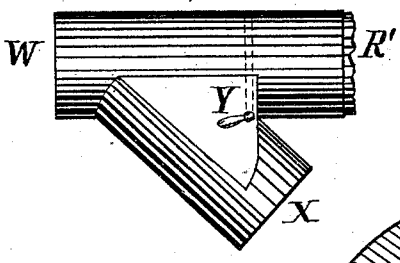
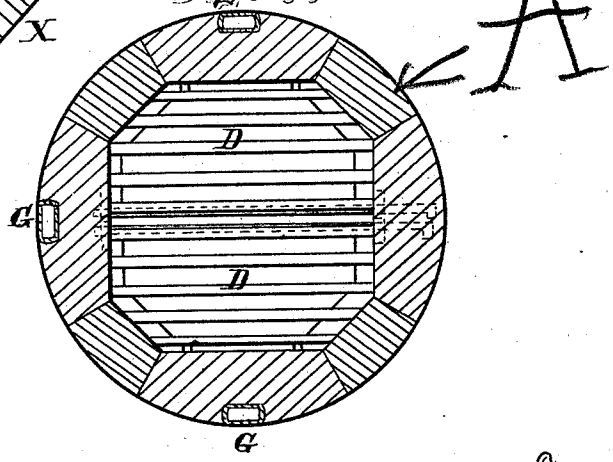


Fig. 4.



Witnesses.
J. Bonsall Taylor.
J. Quinn.

Inventor.
Ralph M. Bowman,
by his Atty,
Horace Binney, 3rd.

UNITED STATES PATENT OFFICE.

RALPH M. BOWMAN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **175,849**, dated April 11, 1876; application filed November 30, 1874.

To all whom it may concern:

Be it known that I, RALPH M. BOWMAN, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Hot-Air Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof, 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, which form a part of this specification, and in which—

Figure 1, Sheet 1, is a perspective view, showing the interior of the fire-pot and the lower part of the furnace in section. Fig. 2, Sheet 2, is a vertical section of the radiators R S and horizontal drum, taken on the line *x x*, Fig. 1. Fig. 3, Sheet 2, is a detached view of the double pipe W X; and Fig. 4, Sheet 2, is a horizontal section through the fire-pot, taken on the line *y y*, Fig. 1.

The same parts are denoted by the same letters in all the figures.

This invention consists in the combination of upright drums and a horizontal drum, constructed with doors, so arranged that when said doors are closed the products of combustion pass through all the drums; but when they are opened for raking the fire or cleaning, the dust and ashes pass only through the lower drum and one upright drum into the chimney. It also consists in a grate-rest, which not only supports the grate-bars, but also the fire-pot, and conveys atmospheric air into the furnace to assist the combustion; and in a double pipe, provided with a damper, by which the products of combustion are permitted to pass into the chimney when the heater is in operation, while at other times the communication between the chimney and the interior of the heater is cut off, and the soot permitted to fall into the cellar.

A in the drawing represents the body of the furnace, containing a fire-pot, B, and ash-pit C. The grate D D is provided with the usual draw-bars, and is made in two sections, as shown in Fig. 4, for convenience of insertion. It is supported on the grate-rest E, which consists of an annular tube, cast or otherwise secured to the body of the furnace, and communicating with the outer air by the tubes F F. Into this tubular grate-rest also open the vertical tubes G G, cast or otherwise secured to the body of the furnace, and terminating in the gas-burners or perforated plates H H, through which jets of atmospheric air enter the furnace, to assist in completing the combustion of the unconsumed carbon and gases. The fire-pot is lined with fire-bricks or soap-stone. I is a collar fastened to the body A and opening into the ash-pit; and on this collar is fitted the section J of the lower drum, and the section K is fitted on J in like manner. L is a swinging door or damper, hinged at its top, and shown in Fig. 1 as closing the collar I, so as to cut off communication between the ash-pit and the lower drum. The section J is constructed with a similar door, M, which opens or closes communication between the sections J and K, and which is connected to L by a rod, N. Both doors are simultaneously opened or closed by pulling out or pushing in the rod O, which is connected to L. To the section K are secured the upright drums or radiators R S, whose lower ends open into K, as shown in Fig. 2; and the similar radiators P Q are secured to the section J in like manner. From the radiator P projects a collar, T, which fits over a collar, U, on the top V of the furnace. The radiators Q and S are likewise connected by collars Z. On the radiator R is a collar, R′, over which is fitted the branch W of the double pipe W X, which branch opens into or is connected with the chimney. Y is a damper, by which either branch of the pipe may be closed alternately, as shown in Fig. 3.

When the heater is in operation the doors L and M are closed, as shown in Fig. 1, and the damper Y reversed from the position shown in Fig. 3, so as to open pipe W and close X. The products of combustion pass from the furnace, through the collars U and T, into the radiator P, down through P and up through Q, thence, through collars Z, into radiator S, down S, and up through R and R′ into pipe W, whence they escape into the chimney.

When raking the fire or cleaning the heater, the rod O is pulled out so as to open L and M, thereby causing the lower drum to operate as a dust-flue, permitting dust and ashes to pass directly through it into radiator R, and thence into the chimney.

In summer, when the heater is not in operation, the damper Y is kept in the position shown in Fig. 3, closing the branch W, so as to protect the interior of the heater from dampness, and opening X, which permits the soot to fall into the cellar.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combination of the drums P Q R S with the drum J K, doors L M, and rods N O, all these parts being constructed and arranged to operate substantially as described.

2. The annular chamber E, delivering air as described, and adapted to support the removable lining-plates and the grate, substantially as set forth.

3. In combination with a hot-air furnace, the pipe W X, constructed substantially as described, to permit the products of combustion to pass into the chimney, or the soot to fall into the cellar, as may be desired.

RALPH M. BOWMAN.

Witnesses:

THOS. DUKE,

WILLIAM PARENT.