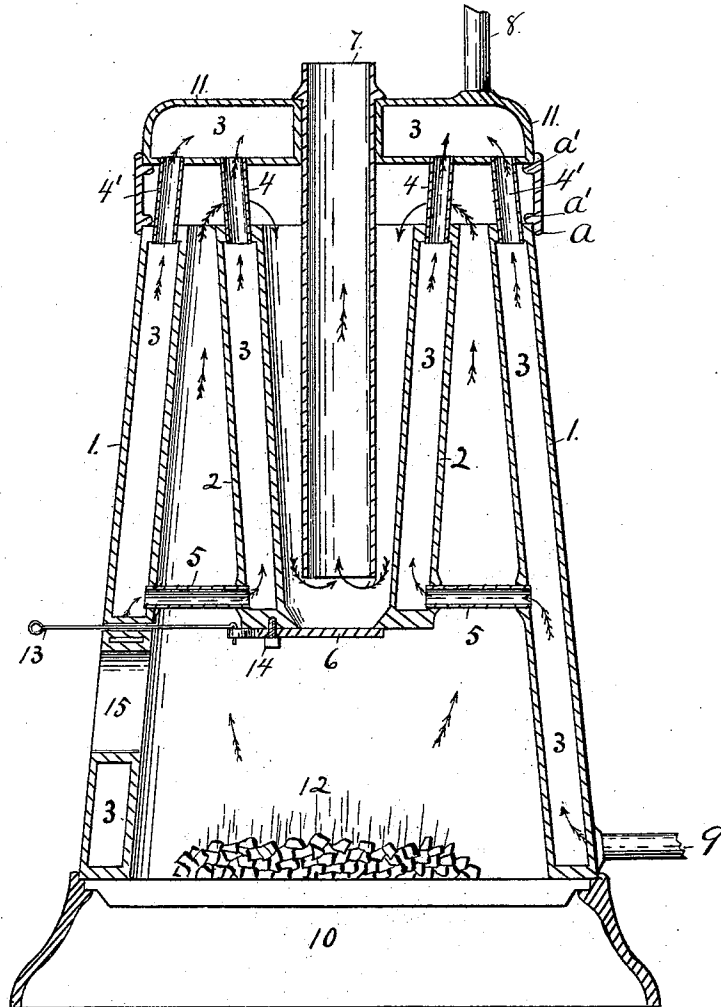


(No Model.)

F. A. GARDNER.
HOT WATER FURNACE.

No. 529,121.

Patented Nov. 13, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK A. GARDNER, OF NEW BEDFORD, MASSACHUSETTS.

HOT-WATER FURNACE.

SPECIFICATION forming part of Letters Patent No. 529,121, dated November 13, 1894.

Application filed July 9, 1894. Serial No. 616,886. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. GARDNER, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Hot-Water Furnaces, of which the following is a specification.

This invention relates to that class of furnaces called hot water furnaces, and its object is to secure the utmost result from the combustion of fuel, and to make the heating surfaces, self cleaning.

The accompanying drawing, is a view in vertical section of my invention, in which—

The figure 1 indicates the outer shell, composed of two walls, inclosing an annular water space 3. This outer shell, tapers from the bottom to the top, and is designed to be made of cast iron.

The letter *a*, indicates a cast iron ring, provided with the inwardly projecting flanges *a'*, and is adapted to fit on the top of the outer shell 1.

The number 11, indicates the top or cap of the furnace, having double walls, inclosing a water space 3, and provided with an opening in its center for the passage therethrough of the smoke pipe 7.

The figure 2, indicates the inner shell composed like the outer shell, of two walls, inclosing an annular water space, and tapers from the top to the bottom. This inner shell is suspended from the cap 11, and its water space is connected with the water space in the cap, by the short tubes 4, and its lower end is connected with the outer shell, by the short tubes 5. The water space in the outer shell 1, is also connected with the water space in the cap 11, by the short tubes 4'. The inner shell 2, extends downward to a convenient distance above the fire 12, and the smoke pipe 7, extends downward to within a short distance of the bottom of the inner shell, which bottom is provided with a damper 6, pivoted at 14, so as to have a lateral movement to uncover or cover the opening in the bottom of the inside shell,

by means of the damper rod 13, which projects through the outer shell.

The number 15, indicates an opening in the side of the outer shell, for the introduction of coal to the fire.

The figure 9 indicates the inlet water pipe, and 8, indicates the outlet pipe.

10, indicates the base on which the furnace rests.

It will be observed, that as the outer shell tapers toward the top, and the inner shell tapers toward the bottom, the heating surface of the outer shell, and the outer heating surface of the inner shell, incline toward each other, and thus receive a greater effect from the heat of the coal, than they would if said surfaces were vertical, or inclined from each other; and also, that being thus inclined, no dirt or ashes can lie on them, and thus in effect they are self cleaning. The outer shell, is preferably made in one piece from cast iron, as is also the inner shell, the water cap, the base, and the pipe 7.

In operation, when a fire is started, the damper 6, is opened, which gives a straight draft from the fire 12, up the smoke pipe 7; but when the coal is well ignited, the damper is closed, and the heat from the fire ascends between the outer and inner shells, against the bottom of the water cap 11, thence downward on the inside of the inner shell, to the bottom of the smoke pipe 7, and thence upward within said pipe. It will be observed that when the damper is closed, the draft is choked at two points, viz: at the top of the outer and inner shells, and at the bottom of the smoke pipe 7. This construction insures the utmost result from the heat of the fire, in heating the water in the furnace.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

In a hot water furnace, the combination of the annular tapering outer shell 1, having inlet pipe 9, and opening 15; the rim *a*, having inwardly projecting flanges *a'*, resting on the top of said outer shell; the water cap 11, hav-

ing outlet pipe 8, and an opening in its center for the passage of the smoke pipe 7, adapted to rest on said rim *a*; the annular tapering inner shell 2, suspended with its smaller end
5 downward, from the cap 11, by the tubes 4, and its bottom connected with the outer shell by the tubes 5, and provided with the damper 6; the smoke pipe 7, extending downward

through the cap 11, and within the inner shell 2, to near the bottom thereof; and the base 10; 10 when constructed and operating as shown and described.

FREDERICK A. GARDNER.

Witnesses:

JAMES C. HITCH,
HENRY W. MASON.