

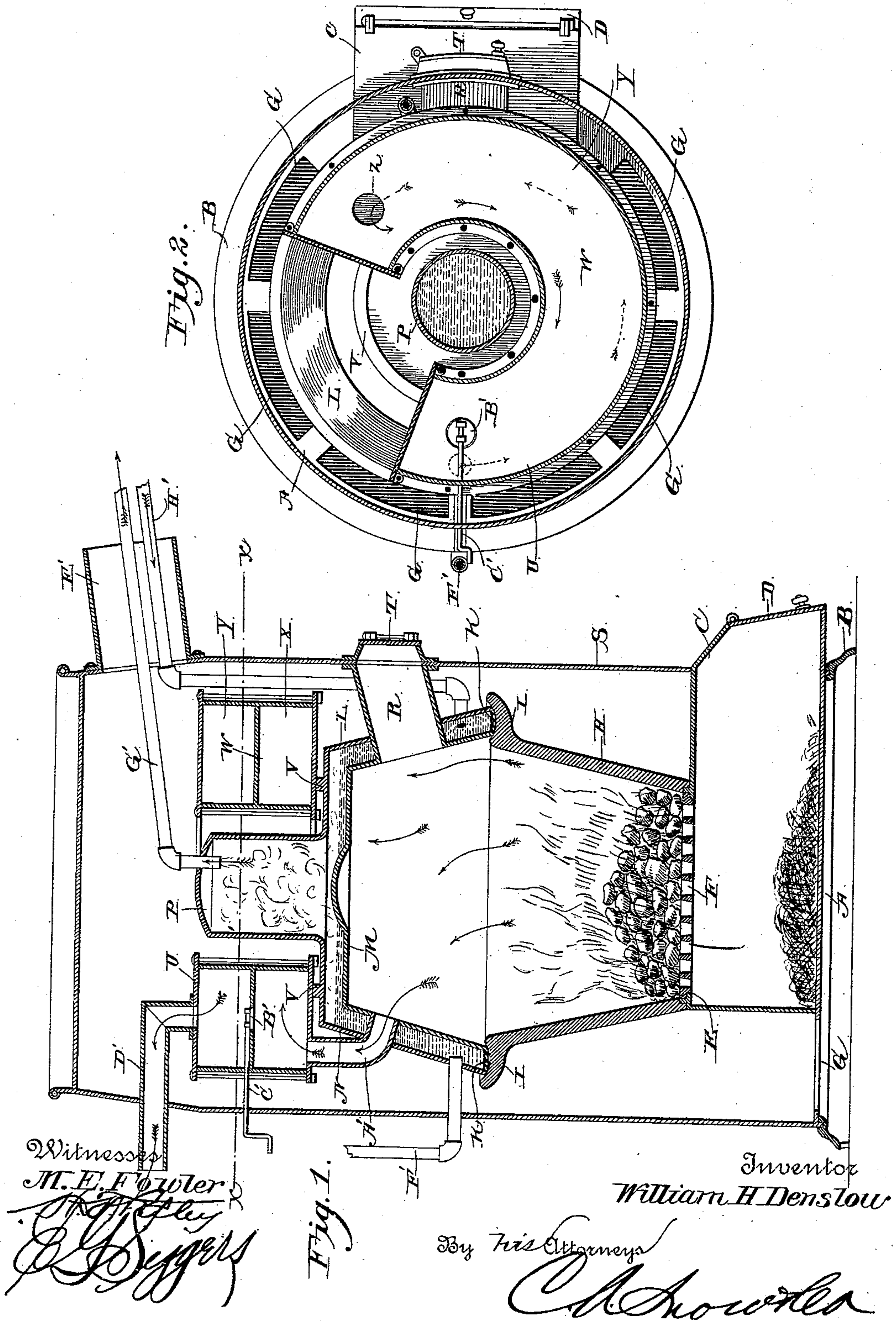
(No Model.)

W. H. DENSLOW.

COMBINED HOT AIR, STEAM, AND HOT WATER HEATER.

No. 446,163.

Patented Feb. 10, 1891.



UNITED STATES PATENT OFFICE.

WILLIAM HURBURT DENSLOW, OF ULSTER, PENNSYLVANIA.

COMBINED HOT-AIR, STEAM, AND HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 446,163, dated February 10, 1891.

Application filed July 28, 1887. Serial No. 245,541. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HURBURT DENSLOW, a citizen of the United States, residing at Ulster, in the county of Bradford and State of Pennsylvania, have invented a new and useful Improvement in Combined Hot-Air, Steam, and Hot-Water Heaters, of which the following is a specification.

My invention relates to an improvement in combined hot-air, steam, and hot-water heaters; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical transverse sectional view of a heater embodying my improvements. Fig. 2 is a horizontal sectional view of the same, taken on the line xx of Fig. 1.

A represents a circular base, which is made of iron, and is provided with a depending annular flange B to support the base at a slight distance above the floor. On the said base-plate is located a cast ash-pit C, which extends from the center of the base to one side thereof and is provided at its outer end with a door D. In the upper side of the ash-pit, at the inner end thereof, is a circular opening E, of a suitable size, in which opening the grate F is located. The base-plate is provided with openings G, which communicate with the outer air by means of suitable fresh-air pipes.

H represents a fire-pot, which is also preferably made of cast metal, is of the form shown in Fig. 1, and has its lower smaller end seated on the upper side of the ash-pit and surrounding the opening E, and the upper edge of the said fire-pot is provided with an annular outwardly-projecting curved flange I, which is higher at its outer side than at its inner side and has its upper side concaved, as at K.

L represents a steam-boiler, which comprises an inner shell M and an outer shell N. The said boiler forms the frustum of a hollow cone, and the inner shell thereof is provided at its upper side with a convex crown, which is arranged directly above the center of the fire-pot, where the heat is greatest, so as to become heated, and thereby cause a most thorough heating of the water directly below

the dome. The lower edge of the boiler rests in the concave upper side of the flange I of the fire-pot, and thus the fire-pot supports the boiler.

P represents a steam-dome, which is formed in the center of the outer shell N at the upper side thereof by contracting the diameter of the shell at this point. From one side of the steam-boiler, and extending through the water-chamber thereof, projects an outwardly-inclined feed-chute R, the inner end of which communicates with the combustion-chamber, and the outer end of which extends through an outer casing S, that rises from the base-plate, and is provided with a door T.

On the upper side of the steam-boiler and around the steam-dome is located a heat-radiator U, which is annular in form and extends around three-fourths of a circle, and is made of sheet or plate metal of suitable thickness. The central opening in this annular radiator is of much greater diameter than the steam-dome, and the latter passes vertically through the same, as shown. The lower side of the radiator does not rest squarely on the top of the steam-boiler, but is supported at a slight distance above the same by means of an annular flange V, thereby leaving a slight space between the opposing sides of the boiler and the radiator.

W represents a horizontal diaphragm, which is arranged in the center of the radiator and extends entirely through the same, the said diaphragm serving to divide the radiator into a lower annular compartment X and an upper annular compartment Y. In the front side of the radiator the diaphragm is provided with an opening Z, forming a communication between the upper and the lower chambers of the radiator. From the lower side of the same, at one end thereof, depends a flue or pipe A', which extends through the water-chamber of the steam-boiler on the side opposite the chute R and communicates with the combustion-chamber. Above this flue or pipe a damper B' is pivoted in an opening made in the diaphragm, and the said damper has a rod C', by means of which it may be either opened or closed. From the same end of the radiator a smoke pipe or flue D' projects from the upper side thereof and extends through the

upper portion of the outer casing S. The said casing S has on its opposite side at its upper end a projecting hot-air flue or pipe E'.

F' represents a water-pipe, which extends through the casing S and communicates with the steam-boiler near the lower side thereof.

From the upper side of the steam-dome extends a steam-pipe G', which passes out through the hot-air flue E' to a suitable steam-radiator, (not shown,) and a return-steam pipe H' extends from the said radiator back through the hot-air flue E' into the casing S and communicates with the lower side of the steam-boiler, the said pipe H' serving to return the water resulting from the condensation of the steam to the boiler.

The operation of my invention is as follows: When a fire is started in the fire-pot, steam is generated in the boiler to supply the steam-radiators in the building, and the smoke and products of combustion pass upward through the combustion-chamber into the heat-radiator U. When the damper B' is closed, the said smoke and products of combustion first pass through and around the lower chamber X of the radiator and then up through the opening Z in the diaphragm into the upper chamber Y thereof and back through the same until it finally escapes through the pipe D', thereby causing the heat, smoke, and products of combustion to circulate entirely through the radiator and heat the latter to a maximum degree. The fresh air which enters the casing S, which surrounds the boiler and the radiator, through the openings G becomes intensely heated by the fire-pot, boiler, and radiator and passes upward through the pipe or flue E' to suitable radiators (not shown) in different parts of the building. When the damper B' is opened, the heat, smoke, and products of combustion from the combustion-chamber pass directly up through the pipe A', through the inner end of chamber Y, and then through the same pipe D', being thus prevented from circulating through the radiator, and consequently only serving to heat the latter to a minimum degree.

A heater thus constructed may be manufactured and sold at a slight cost, and will be found exceedingly useful and durable.

Having thus described my invention, I claim—

1. The combination of the outer shell or

casing S, having the base-plate provided with openings G for the admission of air, the fire-pot arranged in the lower side of the casing and having the upwardly-projecting flange I at its upper edge, the steam-boiler resting on the upper side of the said flange I and having the central upwardly-projecting steam-dome P, the annular radiator surrounding the steam-dome and supported by and upon the steam-boiler, the pipe A', extending downward from the radiator through the steam-boiler to the combustion-chamber, and the pipe D', leading from the radiator, substantially as specified.

2. In a heater, the combination of the outer shell or casing S, having the base-plate provided with air-inlet openings G, the fire-pot arranged in the casing S, the boiler arranged above the fire-pot and having the steam-dome P, the annular radiator encircling the steam-dome, out of contact therewith and arranged above the boiler, the said radiator having lower and upper chambers and provided with a damper B' and the openings Z between the said chambers, the smoke-pipe A', extending from the combustion-chamber to a point in the lower chamber of the radiator below the damper B', and the smoke-pipe D', extending from the upper chamber of the radiator above the said damper through the casing S, substantially as specified.

3. In combination with the fire-pot, the steam-boiler supported thereby and having a convex crown which is arranged directly above the fire-pot, the steam-dome formed by contracting the steam-boiler at the top on a line with the fire-pot, the heat-radiator encircling the steam-dome above the boiler but out of contact with the dome, the tortuous passage in the radiator, and the smoke-flue connecting the radiator with the fire-pot, the pipe D', leading from the heat-radiator, and the pipes G' F', leading from the steam-dome and the lower part of the steam-boiler, respectively, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

WILLIAM HURBURN DENSLOW.

Witnesses:

CHAS. C. MILLER,
JAMES MATHER.