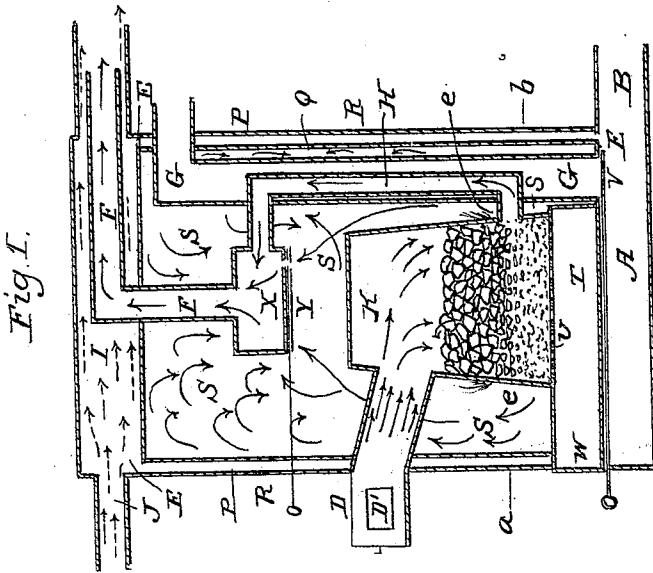
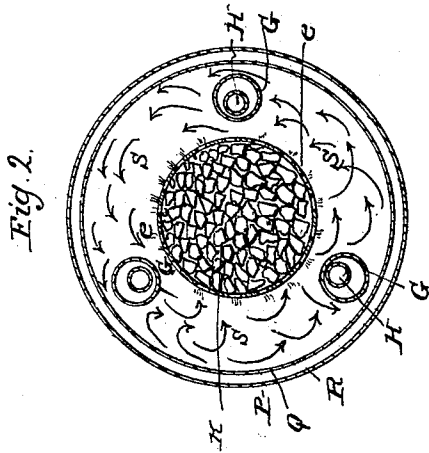


C. B. SAWYER.  
Hot Air Furnace.

No. 25,279.

Patented Aug. 30, 1859.



Witnesses:

Stafford Chamberlain  
Nathl Wood

Inventor

Charles B Sawyer

# UNITED STATES PATENT OFFICE.

CHARLES B. SAWYER, OF FITCHBURG, MASSACHUSETTS.

## FURNACE AND VENTILATOR.

Specification of Letters Patent No. 25,279, dated August 30, 1859.

*To all whom it may concern:*

Be it known that I, CHARLES B. SAWYER, of Fitchburg, Worcester county, in the Commonwealth of Massachusetts, have invented an Improved Furnace and Ventilator; and I do hereby declare that the following is a full and exact description of its construction and operation, reference being had to the accompanying drawings, and to the letters of reference marked thereon, so as to enable others skilled in the art to make and use my improved furnace and ventilator.

Figure 1, of the drawings represents a vertical central section through the furnace, and Fig. 2, a horizontal section on the line *a, b*, of Fig. 1.

The furnace is surrounded by two concentric metal cylinders P, Q, the cylinder Q, being of smaller diameter than the cylinder P, so as to leave a hollow space R, between the two cylinders which serves as a non-conductor of heat in regard to the warm air inside of cylinder Q. Two chambers I, A, are arranged one on top of and the other below the double cylinder P, Q. The space S, within the cylinder Q, contains the radiator X, firepot K, and ashpit T, one above the other.

Three or more warm air pipes G, are arranged around the firepot and radiator and inside of the cylinder Q. Their upper ends pass through the double wall Q, P, of the furnace and into the various rooms to be heated by the furnace. Their lower ends open through the bottom of the furnace into the cold air chamber A and are provided with dampers V. The cold air chamber communicates with the outside air by means of a pipe B.

Fire flues H, one to each of the warm air pipes G, pass from the fire pot into and through the warm air pipes into the radiator X, the bottom of which latter is provided with a damper Y. A pipe F, passes from the radiator through chamber I, into the ventilating conductor O. A passage Z, which leads from the fire pot through the double wall of the furnace and which is provided with a door D, serves for the introduction of the fuel.

U, is the grate in the bottom of the fire pot.

Some kindlings being placed upon the grate, the coal is turned in through the door D, upon the kindlings after which the door D, is closed and damper or door W, in the

ash box T, under the grate opened. The kindlings being now fired the draft through the fire flues H, will cause the flame and heat to ascend through the coal so as to cause it to ignite, after which the door or damper W, is closed, and the damper D', in the door D, is partially opened. In this way all air is shut out from ingress below the coal, and consequently the fresh air to support combustion must pass in through the door D, and then down through the coal and out and up the fire and draft flue H, so that the most intense heat of the burning coal will be on or about on a line with the upper edge of the draft flue H, where they leave the fire pot K, as indicated in red color in the drawings. Now as the air enters the fire pot through the door D, it seeks or flows toward the inside of the fire pot as indicated by black arrows—instead as some would suppose down directly through the coal. It will therefore be seen that the highly carbonized gas which escapes or is evolved by the gradually heating of the coal in the fire pot above the flues H, and before it becomes ignited will to a great extent rise through the coal, until it comes in contact with the fresh air when it will be turned and carried toward and down the sides of the fire pot as indicated by blue arrows. The damper Y, which separates the gas or combustion chamber S, from the radiator X, is now slightly opened so as to cause a slight draft from the chamber S, up through the radiator X, pipe F, and ventilating conductor O, in consequence of which the highly carbonized gas above mentioned flows toward the little holes *c*, arranged around and through the fire pot immediately above the fire flues H, and burns freely as it passes out of said holes *c*, into the space S. Thus all the gases generated from the coal in the firepot are burned and serve to heat the air in the space S, either directly by burning through the holes *c*, as described, or indirectly by heating the surface of the fire pot with which the air in the chamber S, is in contact. This volume of heated air surrounds the warm air pipes G, and thus serves to heat the air passing through said pipes, which, however, is more directly heated by means of the fire flues H, which pass from the fire pot through the pipes G, into the radiator.

Pipes J lead from openings in the floors of the rooms into the ventilating chamber

I, and the vitiated air passes from the rooms through said pipes J, into the chamber I, and out into the ventilating conductor O, as shown in dotted arrows.

5 If there were none of the holes *c*, arranged around and through the fire pot immediately above the fire flues H, the highly carbonized gas generated as above mentioned, would follow the impulse of the strong draft up  
10 through the fire flues H, and would escape unburned. But in my furnace this gas passes through the holes *c* into space S, before it reaches the mouths of the fire flues

H, and is burned in the space S, under a slight draft, so as to effect a thorough combustion. 15

Having described my improved furnace and ventilator what I claim therein as new and desire to secure by Letters Patent, is—

Providing the fire pot with a series of 20 small holes or openings *c*, substantially as and for the purposes set forth.

CHARLES B. SAWYER.

Witnesses:

O. STAFFORD CHAMBERLAIN,  
NATHL WOOD.