J. H. MERRILL.
Heating-Furnace.

No. 212,965. Patented Mar. 4, 1879.

Fig. 1.

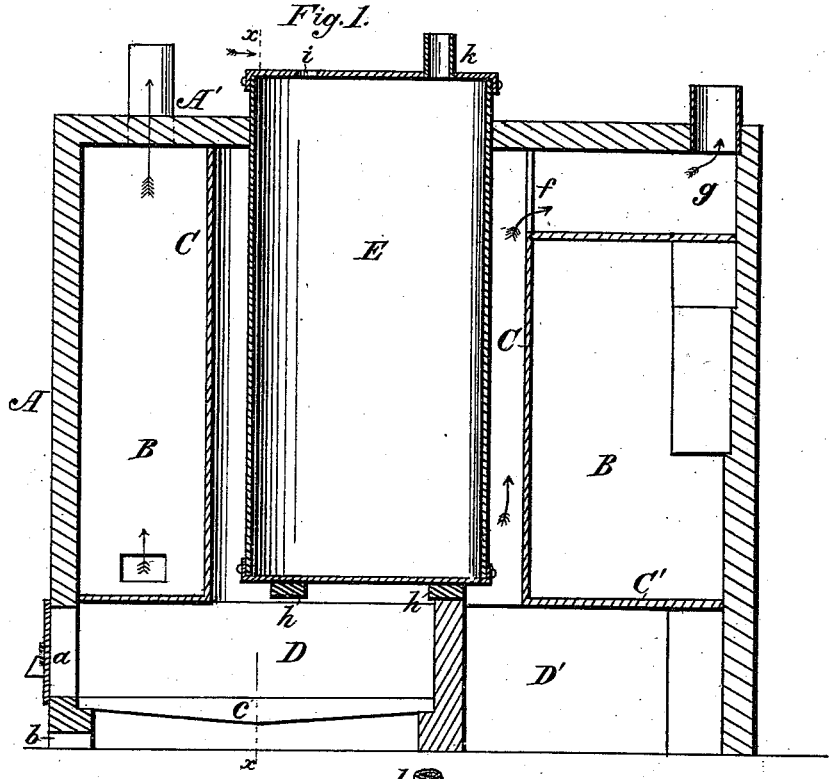
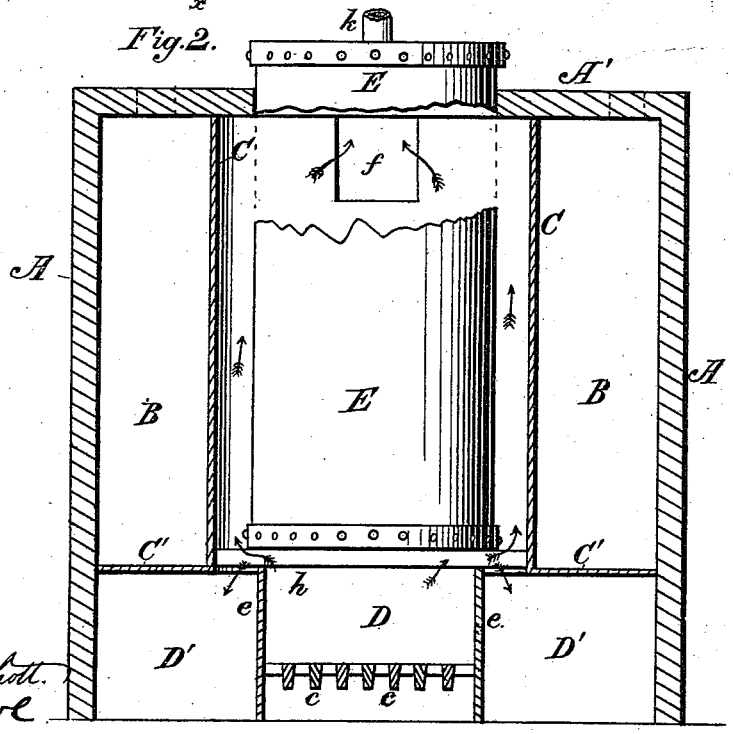


Fig. 2.



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JESSE H. MERRILL, OF INDEPENDENCE, IOWA.

IMPROVEMENT IN HEATING-FURNACES.

Specification forming part of Letters Patent No. **212,965**, dated March 4, 1879; application filed May 6, 1878.

To all whom it may concern:

Be it known that I, JESSE H. MERRILL, of Independence, in the county of Buchanan and State of Iowa, have invented certain new and useful Improvements in Heating-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 letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of heaters in which the production of steam and hot air for warming rooms and other uses to which such agents are applied is effected by a single fire, which acts upon the air inclosing the fire-place by radiation, and directly upon a steam-boiler or water-heater placed over the fire, the object being to utilize the heat of the fire more effectually than can be done by using either the boiler or air-heater independently, thus economizing fuel and enabling the same fire which heats the air for warming rooms to produce steam or hot water for heating, cooking, or mechanical purposes; and the invention consists in the construction and arrangement of the different parts of the apparatus, as will be hereinafter fully set forth, and then specifically pointed out in the claim.

Figure 1 of the drawings represents a vertical longitudinal section through the furnace and boiler. Fig. 2 is a vertical transverse section on the line *x x* of Fig. 1.

A represents the outer casing of the furnace, which is preferably formed of brick, but may be constructed of cast or sheet metal, if desired. This casing is provided with a door, *a*, through which fuel is supplied to the fire, and an air or draft opening, *b*, below the grate-bars, through which the air needed for the consumption of the fuel is supplied.

Additional apertures are made in the casing whenever needed for the ingress and egress of the air to be heated to the heating-chamber B, which surrounds the inner metallic case or cylinder, C. This chamber B is also provided with a metal bottom, C′, beneath which is a rectangular combustion-chamber, D, provided with a grate, *c*, for the reception of fuel. At each side of this grate rise the side walls *e* of the combustion-chamber as high as the bottom of the plate C′; but as the grate is rectangular and the central opening in the plate C′ circular, segmental openings are left at each side between the plate and the side walls *e*, through which a portion of the products of combustion can expand into the chambers D′, while the remainder passes upward through the space between the cylinder C and the boiler, as indicated by the arrows in the drawings, imparting heat by radiation to the inclosed air in chamber B through metal plates C and C′.

Near the top of the cylinder, and at one side, is an opening, *f*, through which the waste products of combustion pass to the flue *g*, and thence to the chimney. This passage may be provided with suitable dampers for more effectually controlling the combustion of the fuel, if desired.

Through the top A′ of the outer casing is formed a circular opening, into which is inserted a cylindrical boiler, E, placed concentrically within the cylinder C, which retains the ascending products of combustion in contact with the boiler, the latter resting upon the bearers *h*, which cross the combustion-chamber D above the grate. This boiler is preferably formed of sheet metal, and is provided with an inlet-opening, *i*, formed in its top, and connected with any suitable water-supply. An exit-pipe, *k*, is also attached to the boiler, and serves to carry away to the place of use the steam or heated water produced.

The uses of this apparatus are varied, as, aside from its legitimate application as a hot-air furnace for heating buildings, the boiler may be used as a steam-producer for operating a small engine or other mechanical purposes; also, for cooking or for warming rooms, which cannot be conveniently reached by the hot air; or it may be used as a hot-water heater by connecting it with a proper system of circulating-pipes and radiators.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

The combustion-chamber D, chamber D′, and air-chamber B, in combination with the vertically-arranged cylinder-boiler E and smoke-passage *f g*, as and for the purpose specified.

In testimony that I claim the foregoing as my own I hereunto affix my signature in presence of two witnesses.

JESSE H. MERRILL.

Witnesses:
S. NEWMAN,
FRANK JACKSON.