T. ANGELL.

HEATING FURNACE.

No. 181,125. Patented Aug. 15, 1876.

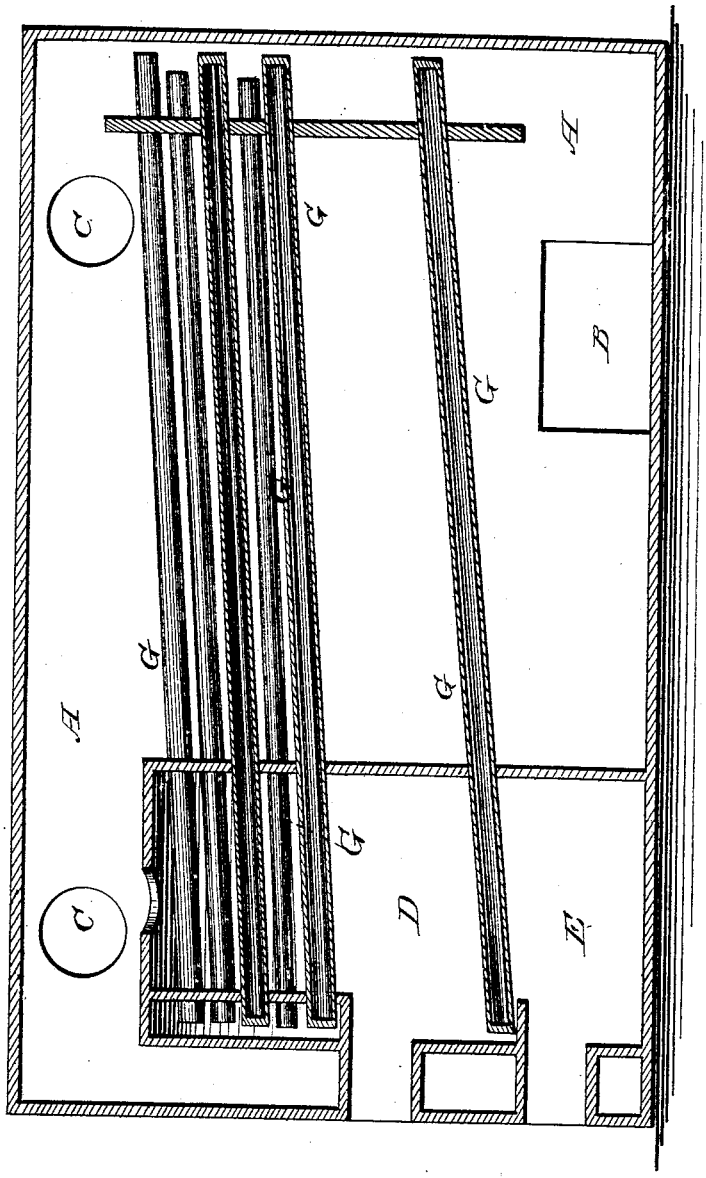

Fig. 1.

Witnesses:
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Per: C. H. Watson & Co. Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS ANGELL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HEATING-FURNACES.

Specification forming part of Letters Patent No. **181,125**, dated August 15, 1876; application filed May 10, 1876.

To all whom it may concern:

Be it known that I, THOMAS ANGELL, of Brooklyn, in the county of Kings and State of New York, 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 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, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention consists in the construction and arrangement of a combined steam and hot-air furnace, as will be hereinafter more fully set forth.

In the annexed drawings, Figure 1 is a central vertical section.

A represents the hot-air chamber, of any suitable form and dimensions, and provided at the bottom with the cold-air inlet B, and, at or near the top, with one or more outlets, C, for hot air. Within the hot-air chamber A is the fire-chamber D, with ash-pit E underneath, formed of metal; or this fire-chamber may be built of brick, entirely separate from the hot-air chamber, if desired. In the hot-air chamber A are arranged a number of tubes or pipes, G G. These tubes may stand vertically, or be at any angle desired, only so that they are arranged with one end lower than the other, and the lower end be within the fire-chamber D. Each pipe or tube G is independent of the others, and contains a certain quantity of water or other liquid, and the air above such liquid exhausted, after which the tube is closed hermetically.

When the fire is started in the fire-chamber the liquid is at once converted into steam, and there being a vacuum in the tubes above the liquid, the steam at once fills the tube to the extreme end, and the tube being hermetically sealed, neither the steam nor liquid can escape, but the liquid, as condensed, runs back to the fire, to be again converted into steam.

The tubes G may be single or double, as desired, and arranged in almost any conceivable form. Each tube, however, being independent of the others, in case of breakage of any one, it does not interfere with the working of the others.

The lower ends of the tubes may be arranged as grate-bars, or on the sides of the fire; or above the same, or in all the places together, the simple idea being to have one end of each tube acted upon directly by the fire, whether the fire is located within or without the hot-air chamber.

In many places it will be very convenient to run the tubes across the fire-chamber, the middle part being exposed to the fire, and both ends extending into the hot-air chamber. It is also practicable to use these pipes under very high pressure without exhausting the air in creating the vacuum.

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

1. The hot-air chamber A, provided with a number or series of independent pipes, G, containing a quantity of liquid, and each pipe hermetically sealed, and the inlet B and outlet C, substantially as and for the purpose set forth.

2. The hot-air chamber A, provided with the pipes G, sealed as described, the inlet B, outlet C, fire-chamber D, and ash-pit E, all constructed and arranged as and for the purpose set forth.

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

THOS. ANGELL.

Witnesses:
A. M. DAVENPORT,
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