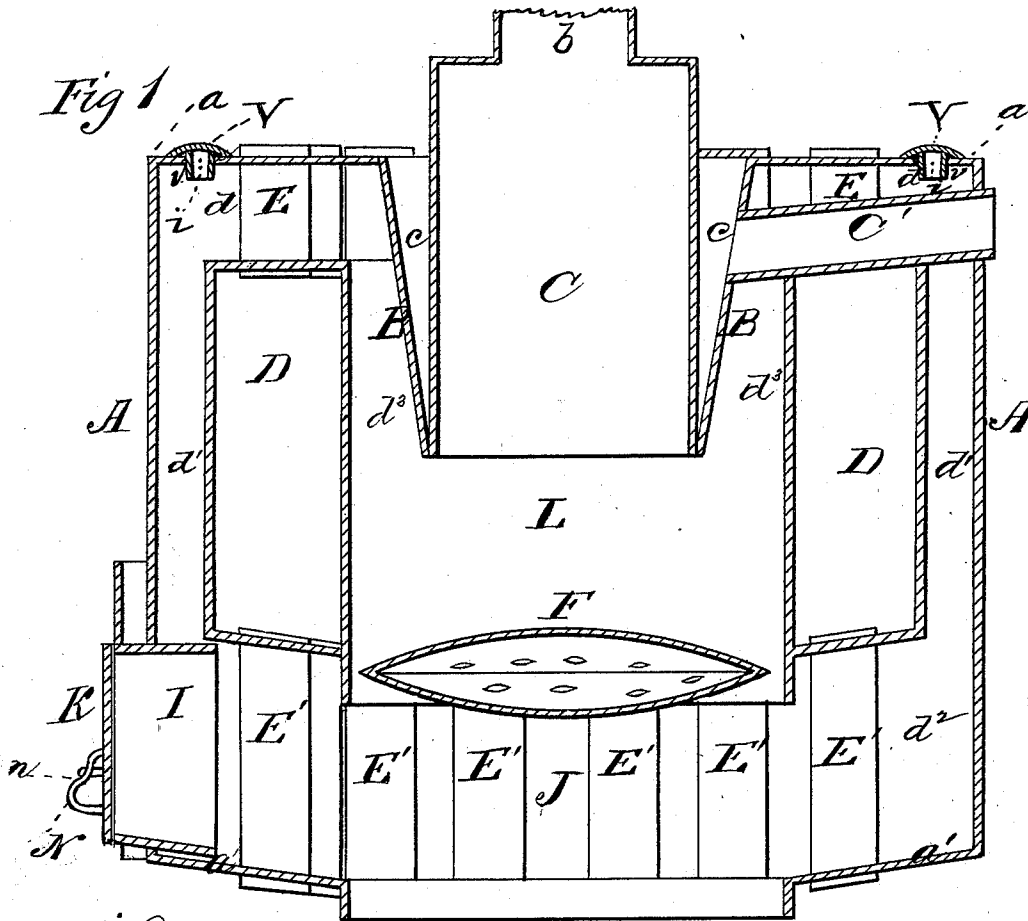


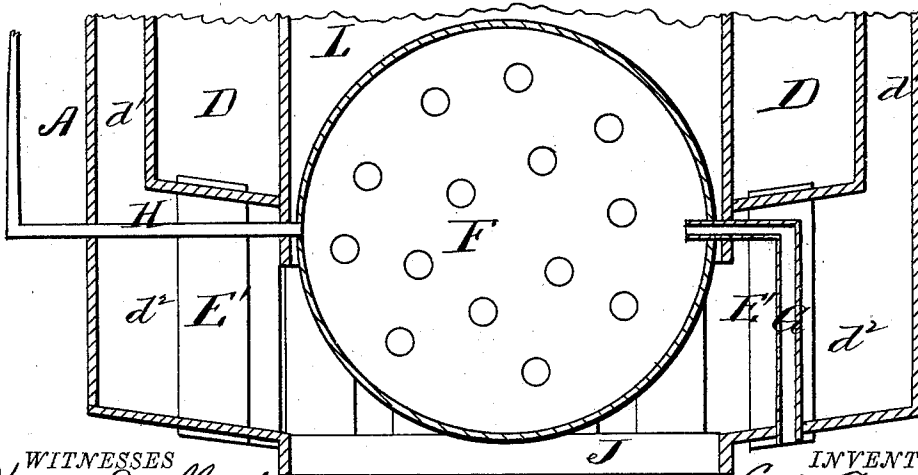
L. R. COMSTOCK.  
HOT AIR FURNACE.

No. 175,854.

Patented April 11, 1876.



*Fig 2*



WITNESSES  
Francis J. Clark  
George E. Upham.

By

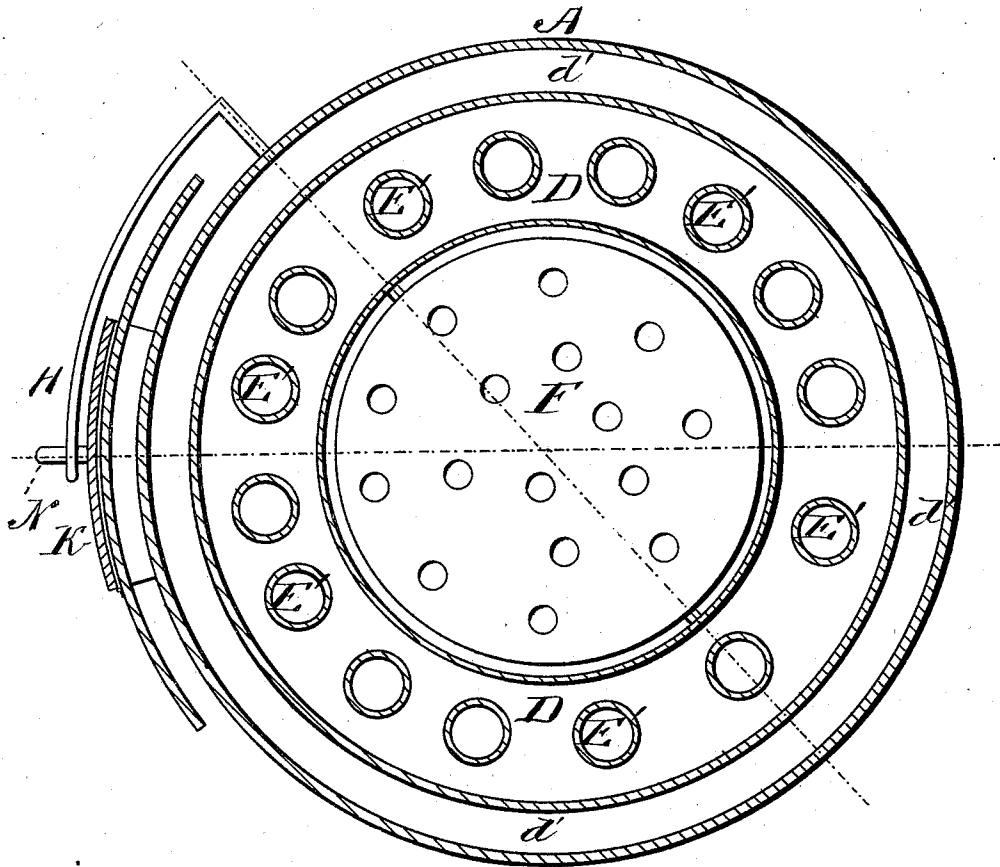
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*Fig 3*



WITNESSES

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# UNITED STATES PATENT OFFICE.

LEVI R. COMSTOCK, OF RICHMOND, VIRGINIA.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 175,854, dated April 11, 1876; application filed August 14, 1875.

*To all whom it may concern:*

Be it known that I, LEVI R. COMSTOCK, of Richmond, in the county of Henrico and State of Virginia, have invented a new and valuable Improvement in Heaters; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a vertical central section of my heater; and Fig. 2 is a vertical central sectional detail view thereof. Fig. 3 is a horizontal sectional view of the same.

This invention has relation to improvements in heaters; and it consists in the novel construction and arrangement of the parts, as will be hereinafter more fully set forth.

In the annexed drawings, A designates the outer metallic casing of my improved heating device, which is designed to be inclosed within a suitable brick-work sheathing. The upper end of this casing is closed by means of an annular flange, *a*, to the inner edges of which is secured a preferably tapering tube, B, which projects downward nearly midway of the length of the heater, and which is provided with a cylindrical smoke-pipe, C, which projects upward above the casing, and is provided with a pipe, *b*, upon which the flue or smoke-conduit leading into the chimney-flue is designed to be fitted. Smoke-pipe C being cylindrical, and tube B in the form of a frustum of a cone, an air-chamber, *c*, is formed between them, which chamber is provided with a suitable metallic conduit, C', passing through exterior metallic casing A below flange *a*, the object of which will hereinafter become apparent. D represents an isolated annular metallic chamber, of less diameter and height than cylindrical casing A, which is arranged inside of the latter, and surrounded by passages, as will be hereinafter more fully described. Hot-air passages *d d' d''* are formed above, below, and on the outer side of the isolated chamber D. This chamber is provided with a number of spaced tubes, E E', the former of which pass upward through flange *a* from the upper wall of the said chamber, and

the latter downward therefrom through a flange, *a'*, of corresponding shape with flange *a* upon the lower end of casing A. The V-shaped tube B projects downward into the space between the inner walls of annular chamber D, a hot-air passage, *d''*, being formed between them, as shown in Fig. 1, communicating with passages *d d'*, as shown in Fig. 1. The lower end of a chamber, L, formed by the inner walls of chamber D, is closed by a double convex hollow perforated damper, F, into which atmospheric air is admitted from the exterior of the casing by means of an elbowed pipe, G. This pipe serves as a journal for the damper, another journal being afforded by means of a crank-arm, H, on the opposite side of the said damper, as shown in Fig. 2. Below this damper is the fire-box J, into which fuel is introduced through an opening, I, closed by a hinged door, K.

The operation of my improved heater is as follows: The damper being closed, the products of combustion will be carried under chamber D through passage *d'*, between outer casing A and the said chamber, thence through passage *d* over the same, down passage *d''* between tapering tube B and the aforesaid chamber, thus making an entire circuit of the same. The air to be heated passes up lower pipes E', where it is subjected to the direct action of the flames in the fire-box, into chamber D, which, being surrounded with passages conducting the products of combustion into smoke-pipe C, increases the heat of the partially-heated air contained therein. The hot current of air then passes up through pipes E, which extend through smoke-passage *d* above chamber D, in which pipes the air is, as it were, superheated, and is then ready for use for heating purposes, and may be conducted through suitable pipes to various parts of the building. The products of combustion in passing down passage *d''* into smoke-flue C raise the air contained in chamber *c*, between the said flue and conical tube B, to a very high temperature, so that it is of itself capable of warming the room of the building in which the heater is placed, being allowed to escape therein through pipe C'. During the combustion of fuel in the fire-box atmospheric air is conducted through elbow G into the interior

of damper F, thus supplying oxygen to the flames, and materially aiding in the consumption of gases evolved by the fuel, as well as adding greatly to the intensity of the heat, and causing the destruction of smoke and soot.

In order to prevent the escape of gases into a room when door K is opened for the purpose of putting in fuel, I have devised the following means for compelling the operator to establish a direct draft: The door is provided with a metallic bail, N, of angular form, having a notch, *n*, of suitable depth thereon. In this notch the end of the crank-arm H of the damper F is adapted to be engaged, thus preventing the said door from being opened until the crank-arm is raised up out of the notch. This raising up of the crank-arm will partially rotate the damper on its bearings, and will establish a direct draft through the fire-box J, chamber L, and smoke-flue O, which will carry off the gases into the chimney-flue.

In order to precipitate the soot carried up chambers *d*<sup>2</sup> *d*<sup>1</sup> by the draft, I have caused spaced openings *i* to be made in flanges *a* at the upper part of the heater, which openings are closed by means of detachable caps V,

which are provided with a flange, *v*, upon their under sides, accurately filling the said openings. These caps may be hinged to the casing, if I so elect. When a suitable number of these openings are disclosed, a current of cold air will descend, bearing with it the particles of soot downward into the fire-box J, where they will be consumed.

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

1. The hollow perforated damper F, having a hollow journal, G, in combination with a fire-box of a heater, substantially as described, and for the purpose set forth.

2. In a heater, the combination of the hollow perforated damper, having the crank-arm H, bail N, provided with a notch, *n*, and hinged door K, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

LEVI RICHARDSON COMSTOCK.

Witnesses:

CHAS. H. SMITH,

WILLIAM WYNYARD ASTELL.