JAMES L. PFAU, Jr.

Improvement in Hot-Air Furnaces.

No. 114,035. Patented April 25, 1871.

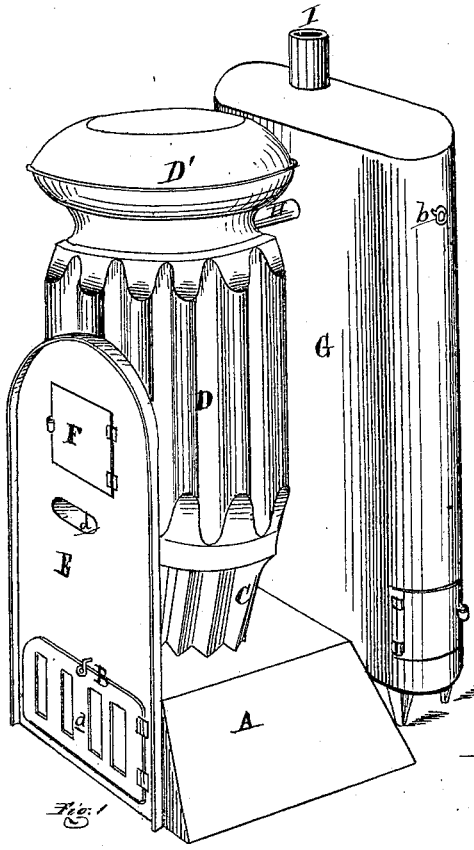

Fig. 1

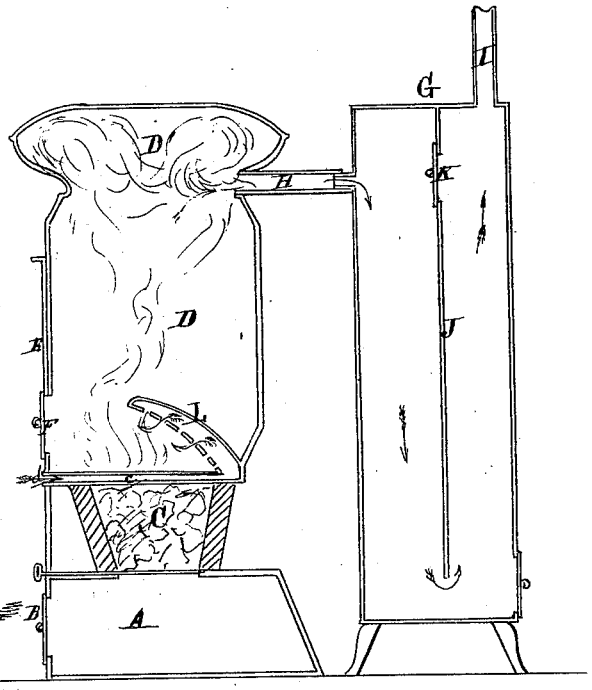

Fig. 2

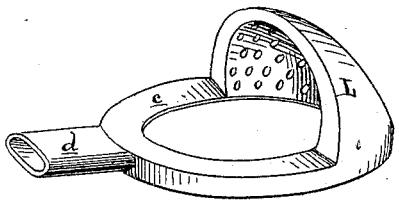

Fig. 3

ATTEST

H. A. Eberts

Myron H. Church

INVENTOR

A. L. Pfau

per Atty

Thos. S. Symmes

UNITED STATES PATENT OFFICE.

JOHN L. PFAU, JR., OF QUINCY, ILLINOIS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **114,035**, dated April 25, 1871.

To all whom it may concern:

Be it known that I, JOHN L. PFAU, Jr., of Quincy, in the county of Adams and State of Illinois, have invented a new and useful Improvement in Hot-Air Furnaces; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon and being a part of this specification, in which—

Figure 1 is a perspective view of my heater and radiator.

Figure 2 is a vertical section of the same on the line *x x* in fig. 1.

Figure 3 is a perspective view of the fire-pot and gas-burner.

Like letters indicate like parts in each figure.

The nature of this invention relates to an improvement in air-heating furnaces wherein bituminous coal is used as fuel.

The invention consists in the novel and peculiar construction of a gas-burner within the combustion-chamber and above the fire-pot, whereby a steady and constant supply of heated fresh air is delivered in jets to the gases evolved from the coal, and whose oxygen, mingling with them, induces their total consumption; also, in connection with the furnace, the construction and arrangement of a radiator which receives the heated products of combustion and reverts them to the bottom thereof before passing to the flue; the radiator is also provided with a valve or damper, by opening which a direct draught may be maintained.

In the drawing—

A represents a suitable ash-pit provided with a door, B, and draught-slide *a*.

On top of the ash-pit and surrounding an opening therein is erected the fire-pot C, provided with a suitable tilting or shaking-grate.

On top of the ash-pit and inclosing the fire-pot is erected the corrugated cast-iron combustion-chamber D, preferably cast in sections; it is contracted at the top and covered with an enlarged cap, D′, forming a reverberatory chamber, as shown.

E is a front to the furnace, for convenience in setting the same in masonry; the ash-door B is hung over an opening in the lower part thereof, and a feed-door, F, over an opening leading into the combustion-chamber just above the top of the fire-pot, for the introduction of fuel.

G is a sheet-metal radiator, of the form shown, standing behind the stove, and into the upper part of which the heated products of combustion are discharged through the pipe H; issuing from the contracted throat of the combustion-chamber in the back of the top of the radiator is the exit-flue I.

J is a diaphragm, transversely placed in the radiator, extending from the top nearly to the bottom.

In the upper part of the diaphragm is an opening opposite the mouth of the pipe H, which opening is closed by a sliding damper or valve, K, operated by a rod, *b*.

When a direct draught is desired, as in starting a fire, this valve may be drawn away from the opening in the diaphragm, which will allow the products of combustion to pass directly from the pipe H to the exit-flue I; if said opening be closed they will be reverted to the bottom of the radiator and impart to it their heat, which is in turn transmitted to the surrounding atmosphere.

The tendency of heated gases being to rise, it is evident that they will remain in the front part of the radiating-chamber until they have given off a great part of their caloric to the absorbing walls of the chamber, when they will sink to the bottom by virtue of their increased specific gravity on cooling, retaining enough heat, however, for all draught purposes; any excess of heat after passing to the rear side of the diaphragm will in like manner be absorbed and transmitted to the external atmosphere by the rear walls of the radiator.

To ignite and totally consume the great volume of gases evolved in the combustion of soft or bituminous coal I employ a gas-burner, whose construction and operation I will now describe.

Around the top edge of the fire-pot I place a hollow ring, *c*, into which an air-duct, *d*, enters through the fire-front.

L is a hollow fire-back or segment rising from and communicating with the ring *c*, and partially encircling the rear half of the fire-pot. It is inclined forward, as shown, and

perforated on the under side with numerous apertures for the emission of air entering it through the duct *d* and ring *c;* these heated jets of oxygen mingling with the gases evolved insure their instant ignition and total combustion in a more perfect manner than would jets of cold air mingling with said gases. The back L may be made of cast-iron or of any refractory material.

As the mingled air and gases rise directly upward the expanded cap affords them room to expand and ignite, if ignition has not been effected in the body of the combustion-chamber before making their exit through the pipe H.

At the bottom of the radiator is a suitable door, through which to remove dust, ashes, &c., deposited therein.

The furnace and radiator are intended to be set in masonry with suitable air-pipes leading to the points required, but may be inclosed in a sheet-metal chamber if desired.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The radiator G, when provided with the diaphragm J having an opening in the upper part thereof, closed by a valve, K, in connection with a stove or furnace, as and for the purpose set forth.

2. The air-duct *d*, ring *c*, and inclined perforated hollow back L, arranged and operating substantially as described, for the purpose specified.

3. The construction and arrangement of the ash-pit A, fire-pot C, front E, combustion-chamber D, cap D′, exit-pipe H, duct *d*, hollow ring *c*, and back L, with or without the radiator G, substantially as and for the purposes herein shown and set forth.

JOHN L. PFAU, JR.

Witnesses:
C. C. JAUSEN,
HENRY ROOT.