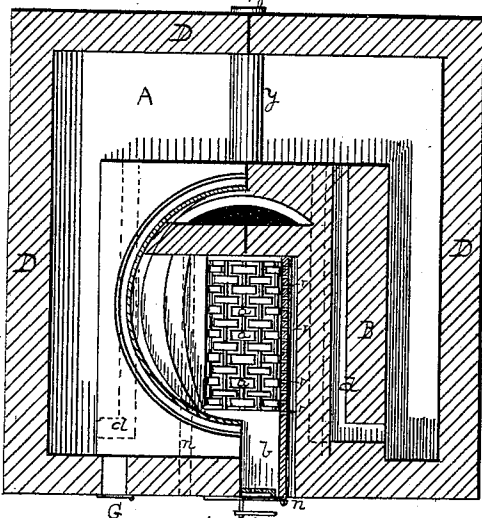
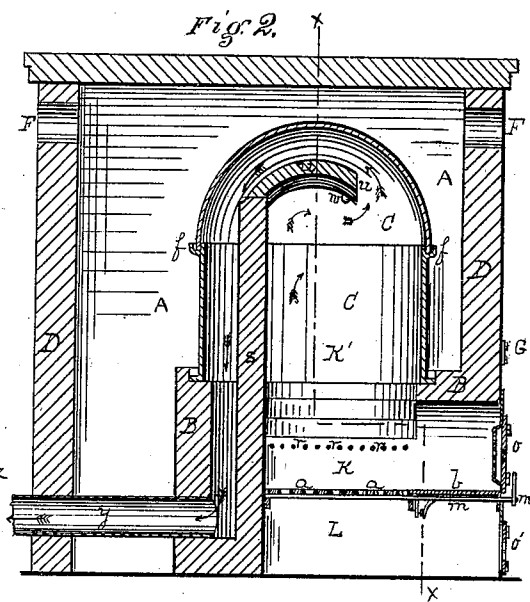
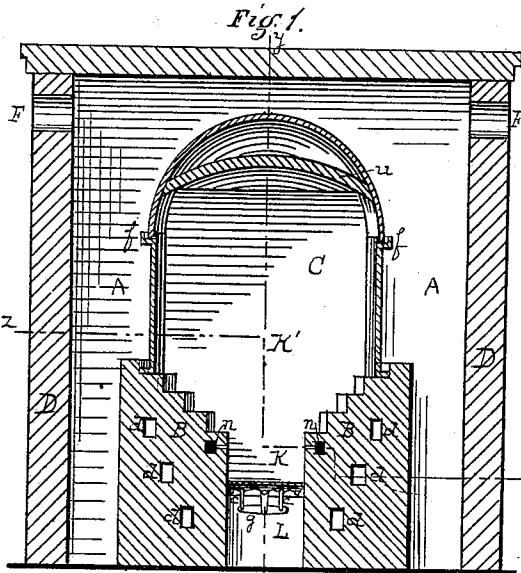


L. PETERSON, Jr., & W. H. IRWIN.

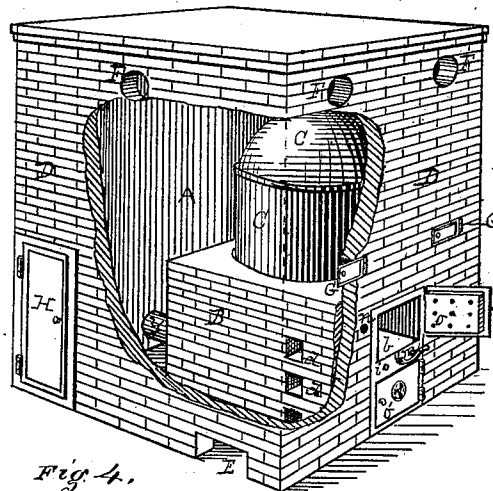
HOUSE-HEATING FURNACE.

No. 177,076.

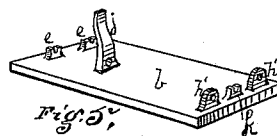
Patented May 9, 1876.



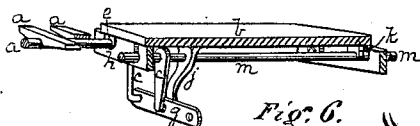
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



*Fig. 6.*

Witnesses

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# UNITED STATES PATENT OFFICE.

LEWIS PETERSON, JR., AND WILLIAM H. IRWIN, OF ALLEGHENY, PA.

## IMPROVEMENT IN HOUSE-HEATING FURNACES.

Specification forming part of Letters Patent No. **177,076**, dated May 9, 1876; application filed March 17, 1876.

*To all whom it may concern:*

Be it known that we, LEWIS PETERSON, Jr., and WILLIAM H. IRWIN, of Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in House-Heating Furnaces; and we do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which, like letters indicating like parts—

Figure 1 is a vertical transverse sectional view of our improved furnace, in the line *x x*, Fig. 2. Fig. 2 is a vertical section through the line *y y*, Fig. 1. Fig. 3 is a horizontal sectional view through the line *z z*, Fig. 1. Fig. 4 is a perspective view of our improved furnace or heater, a part of the outer wall being broken away. Fig. 5 is a detached view of the coking-plate, shown in position at *b*, Figs. 2, 3, and 4; and Fig. 6 is a detached view of such plate, showing its connection with the grate-bars.

Our improved furnace is designed for warming houses and other buildings, or parts thereof, by means of heated air. A hot-air chamber, A, Fig. 4, is constructed outside of and around the furnace-wall B and dome-shaped combustion-chamber C by the inclosing walls of masonry D. Cold air is admitted to this chamber A through flues or openings at or near the bottom of the outer wall, as at E, and when heated is conducted to any desired point by pipes connected with the flues F; at or near the top of the outer wall.

In the furnace-wall B we construct a series of air-flues, *d*, Figs. 1, 3, and 4, which extend into and through the length of the furnace-wall, and as the walls B are heated, the air which may circulate freely through these flues will also become heated; and we consider it desirable to increase the number of these air-flues *d* as much as possible, for air heated in contact with mason-work is not deoxidized as much as when heated in contact with a metallic surface; but, as such mason-work is a poor conductor of heat, we prefer to make the dome C, which incloses a combustion-chamber, K', of metal; and, by means of this metallic surface C and the flues *d*, we are enabled to secure the bene-

fit of nearly or quite all the heat generated in the furnace. We also provide doors G in the outer wall, through which water may be introduced to the air-chamber A and placed in suitable pans on the furnace-top. A door, H, is also provided, through which admittance may be had to the chamber A, if at any time it may be desired.

The fire-chamber is constructed as follows: A rectangular space, K L, Fig. 1, is inclosed by the walls B. Within this space are the grate-bars *a*, Figs. 1 and 3, which may be of any suitable construction and secured in any convenient way. Immediately above the grate-bars *a* is the fire-place K, which may extend up within, or open into, the combustion-chamber K' within the dome C. We prefer to make the dome C cylindrical at its base, and the form of the space K is changed as it extends upward from a rectangular form until it assumes the form of the base of the dome C, as shown in Figs. 1 and 3.

The dome C is constructed in two parts. The lower or cylindrical part rests upon the furnace-walls B. On the upper edge of the cylindrical part is a flange or socket, *f*, which receives the upper or spherical part of the dome; and this socket *f* is made large enough so that space may be left for filling in sand or other luting, to secure a tight joint, and we also prefer to fill in sand about the base of the dome, as in this way we can secure a joint that will prevent any gases escaping from the fire-chamber into the air-chamber, and at the same time sufficient freedom is left for the parts of the dome to expand or contract.

The grate-bars *a* are pivoted at their ends, so as to be free to rock, and thus clear the fire upon the bars of ashes, which fall to the ash-pit L, and to give such rocking motion to all the grate-bars at once, we connect them on the under side by wrists *c* and link *g*, Figs. 1 and 6, and extend a rod, *m*, from one of the grate-bars—as the middle one—out to the front of the furnace, to which a rocking-crank may be attached. The coking-plate *b* is made to fit tightly in the rectangular space K L, between the grate-bars and door of the furnace. At its inner end it may rest upon a supporting-bar, *h*, just above the grate-bars, and lugs *e* extend down from the under side of the plate

*b*, and rest upon or from a bearing for the axes or shafts of the grate-bars, as seen in Fig. 6. The front end of the plate *b* is secured to the face-plate of the furnace by the lugs *h'*, Fig. 5, and bolts *i*, Fig. 4. The arm or lug *j*, Fig. 5, is so placed as to press against the link *g*, Fig. 6, and keep it to its place upon the wrists *c* without additional fastening. The lug *k* forms a bearing for the rock-shaft *m* at its outer end. The lugs or bearings *c* and plate *b* hold the grate-bars in place, and as the plate *b* is secured by the bolts *i*, the plate may be readily removed, if desired, and after it the grate-bars, without disturbing the inclosing walls. The plate *b* is fitted to the rectangular space *K*, so as to exclude the air from the under side, and a limited supply of air may be introduced through the door *o*; but the supply at this point should be limited, so as better to coke the fuel placed on the plate *b* before it is fed back to the fire on the grate-bars *a*. A supply of air may be admitted to the under side of the grate-bars through a flue in the door *o'*, or the door *o'* may be left ajar for this purpose; but the main supply of air we prefer to introduce through the flues *n* on each side of the furnace, Figs. 1, 4. These flues *n* pass back to the rear of the grate-bar *a* and discharge air through the openings *r*, Figs. 2 and 3, which are arranged, preferably, a little above the level of the burning fuel.

The flues *n* may be of any desired size, and the quantity of air which they admit may be regulated by a suitable damper. At the rear of the grate-bars *a* we construct a bridge-wall, *s*, Fig. 2, which extends up to within a short distance of the crown of the dome *C*, leaving sufficient space between the bridge-wall *s* and rear side of the dome *C*, for the escape of the products of combustion. Upon the top of the bridge-wall *s* we place a reverberatory tile or deflector, *u*, which may be arched, as represented in Fig. 2, or a plane surface. The rear edge of this deflector *u* may rest upon the bridge-wall *s*, and the front edge upon lugs *w*, cast upon the inner surface of the dome *C*. The purpose of the deflector *u* is to reflect back and retard the escape of the ascending gases until they are more completely burned; and also the bridge-wall *s* and deflector *u* combine to direct the escaping gases against the sur-

face of the dome *C*, so that the heat generated from them is better conducted to the air in the chamber *A*. In practice we find that such a deflector serves its purpose very efficiently, for, though the heat between it and the adjacent parts of the dome may be very great, yet the escape-flue *y* is comparatively cool.

The operation of our furnace is as follows: Fire is kindled upon the grate-bars *a*, and draft may be admitted to it, either through the door *o*, or from the under side through the door *o'*, or through the flues *n*, one or all of them, as desired. By placing fuel upon the coking-plate *b* and limiting the supply of air, it will become roasted or coked by the heat of the fire and better prepared for charging the fire, as desired. The air supplied through the flues *n* furnishes oxygen for burning the gases which rise from the surface of the burning fuel, and these gases, as they rise, being reflected back by the tile *u*, are longer detained in the chamber *K'*, and directed against the inner surface of the dome *C*, and the heat generated is conducted to the air in the surrounding chamber *A*. The products of combustion ultimately escape along the back of the bridge-wall *s* and through the flue *y*.

We claim herein as our invention—

1. A house-heating furnace having a foundation of masonry for supporting the fire-grate and combustion-chamber, with air-heating flues *d* and air-supply flues *n* therein, in combination with a metallic cylindrical dome-topped combustion-chamber, *C*, and bridge-wall *s*, and deflector *u* within the cylindrical chamber, substantially as and for the purposes set forth.

2. The cylindrical combustion-chamber *C*, made with a bridge-wall, *s*, and deflector *u* within the chamber, substantially as set forth.

3. The combination of coking-plate *b*; grate-bars *a*, air-supply flues *n*, and close combustion-chamber *C*, substantially as set forth.

In testimony whereof we have hereunto set our hands.

LEWIS PETERSON, JR.  
WILLIAM H. IRWIN.

Witnesses:

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CLAUDIUS L. PARKER.