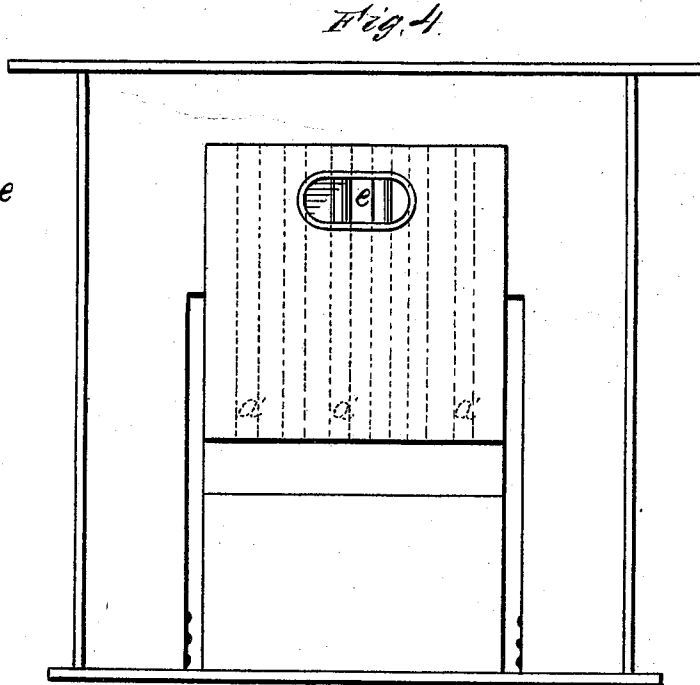
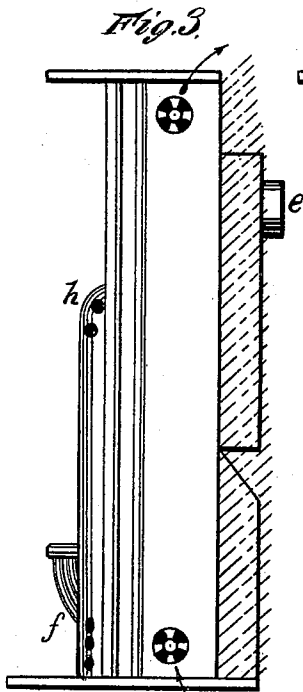
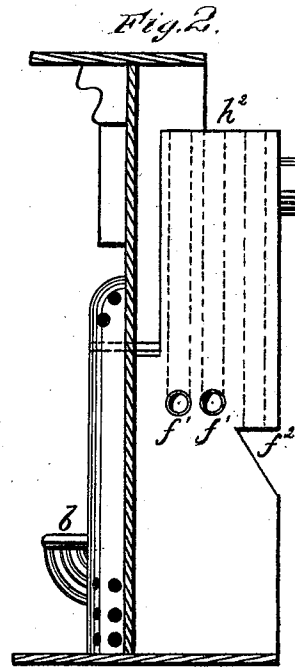
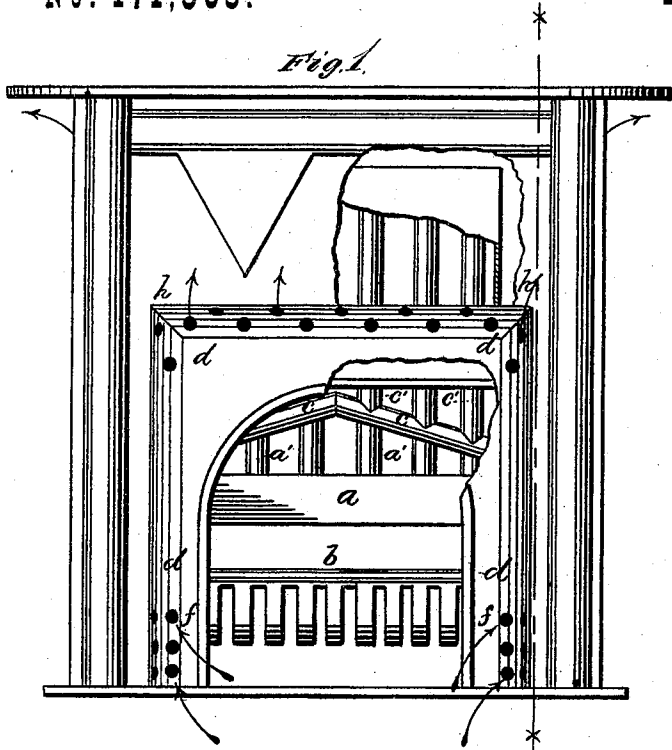


D. HAYES.
FIRE-PLACE.

No. 171,565.

Patented Dec. 28, 1875.



WITNESSES
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UNITED STATES PATENT OFFICE.

DAVID HAYES, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN FIRE-PLACES.

Specification forming part of Letters Patent No. **171,565**, dated December 28, 1875; application filed March 27, 1875.

To all whom it may concern:

Be it known that I, DAVID HAYES, of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and valuable Improvement in Fire-Place 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 front view of the grate, showing a mantel attached. Fig. 2 is a side view of the same. Fig. 3 is a side view with mantel attached. Fig. 4 is a back view of same.

The object of my said improvement is to combine the advantages of a hot-air furnace with an open grate, and to make available for heating purposes the heat which in the use of the ordinary grate escapes up the chimney or absorbed in brick back. To accomplish this object I have arranged and combined air chambers and flues in such a manner as to cause flame from the fuel, and also the heated products of combustion, to come in contact with chambers and tubes containing and conveying air, so as to heat them, and the air contained in and passing through them, and discharge the air thus heated into the room to be heated.

In the accompanying drawing, Fig. 1 shows the front plate *d d d d*, connecting the grate and the mantel, which is so constructed as to contain a chamber for air, which is admitted to the chamber through openings at or near the bottom of said plate, (indicated by arrows and marked *f f*), which air is heated in such chamber by means of the fire in the grate, and passes into the room through openings at the top of said chamber, marked *h h h*, also indicated by arrows outward.

In Fig. 1, *b* represents the fire-chamber of the grate. *a* represents an inclined portion of the back of the grate, designed to throw the flame forward toward the front, that it may be heated more readily by the flame than if it were perpendicular or parallel to the front of the grate. *a' a' a' a'* represent tubes placed in the top of a recess in the back of

the grate, made by the incline of the back plate forward, represented as above stated. *c c* represent tubes or air-ducts arching over the flame-chamber, opening at the side of the grate, as shown in Fig. 2 at *f' f'*. *c' c'* represent tubes leading out of the air-ducts *c c*, conveying the heated air to the top of the grate, when it is discharged into the room through openings in the mantel. The direction and the beginning and ending of these tubes are represented by the dotted lines in Fig. 2 of the accompanying drawings.

In Fig. 4 the back of the grate is represented, showing the recess formed by the inclination of the back forward, and the entrance to the tubes *a' a' a'* is indicated by said letters.

The exit-flue for the smoke and the products of combustion is seen at *e* in Figs. 3 and 4.

The operation of this grate is as follows: A fire being kindled in the grate at *b*, the flame, smoke, and products of combustion arise and fill the chamber above, in which are located the tubes and air-ducts *a'*, *c*, and *c'*, which tubes and air-ducts become heated. A current of air then passes on through these tubes and ducts, and in its passage becomes heated by contact with their surfaces. In this manner a large volume of air is rapidly heated and discharged into the room in which the grate is placed. In addition to these tubes, the chamber formed by the front plate *d d d d*, being filled with air through the openings at the bottom, as seen at *f f*, Fig. 1, becomes highly heated, and, heating the air within it, the air arises and is discharged into the room through the openings at *h h h* at the top of said plate. In this manner the grate performs the office of a furnace and a grate combined, and becomes a powerful instrument both of heating and ventilation.

All openings for admission of cold air are marked *f f'*. All openings for the escape of heated air are marked *h h'*.

Having thus fully described the nature and operation of my said invention and improvement, I will proceed to set forth what I claim and desire to secure by Letters Patent:

In a fire-place heater, the chamber pro-

vided with the cold-air openings f f^2 at its lower end, and heated-air tubes h h^2 , in combination with the air-tubes a' c' , inclined air-tube c , and open fire-place b , having an inclined back, a , substantially as described, and for the purpose set forth.

In testimony that I claim the above I have

hereunto subscribed my name in the presence of two witnesses.

DAVID HAYES.

Witnesses:

JOEL TIFFANY,
C. C. WARREN.