

A. & J. RUBEL.  
Hot-Air Furnaces.

No. 156,065.

Patented Oct. 20, 1874.

Fig: 6.

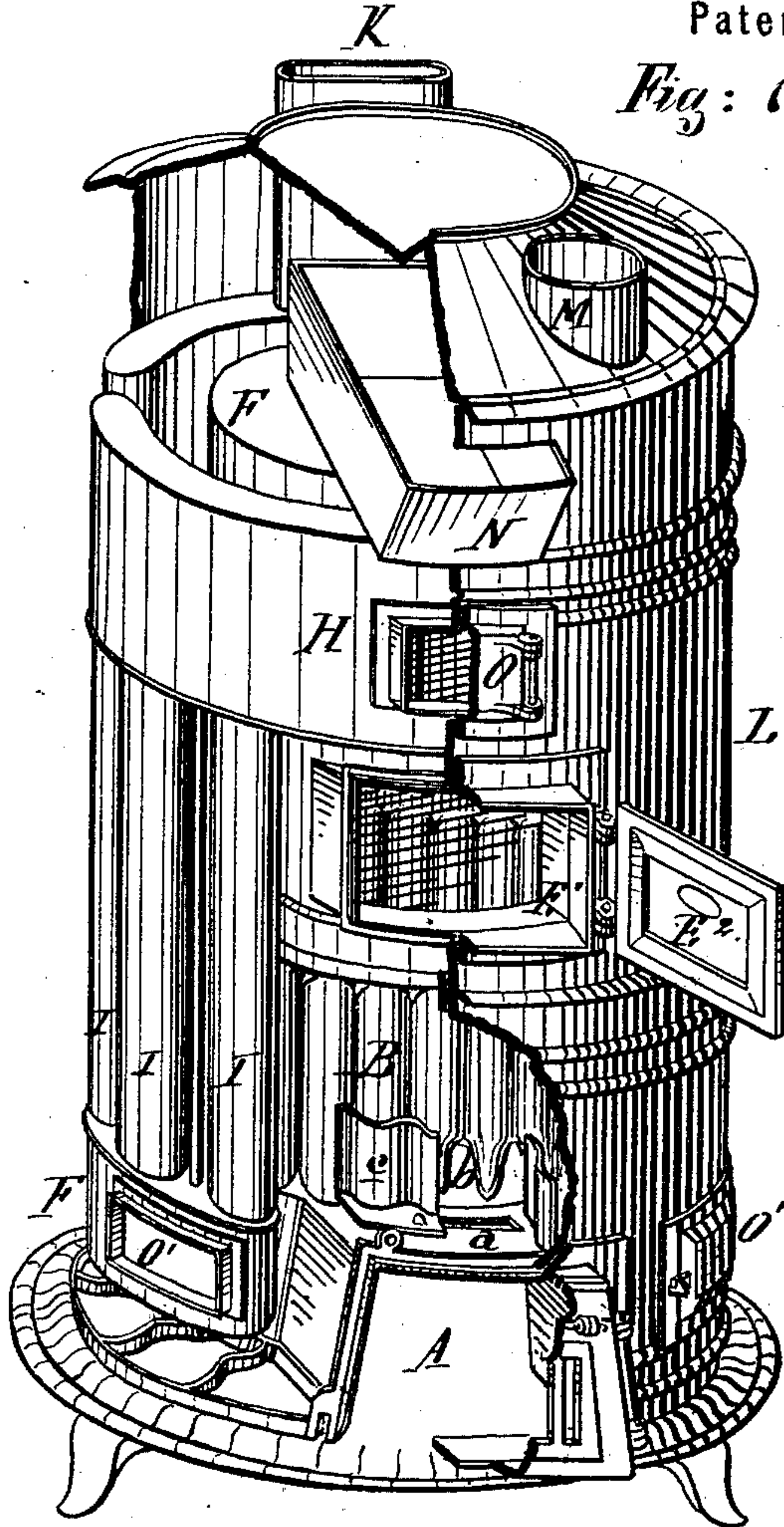


Fig: 2.

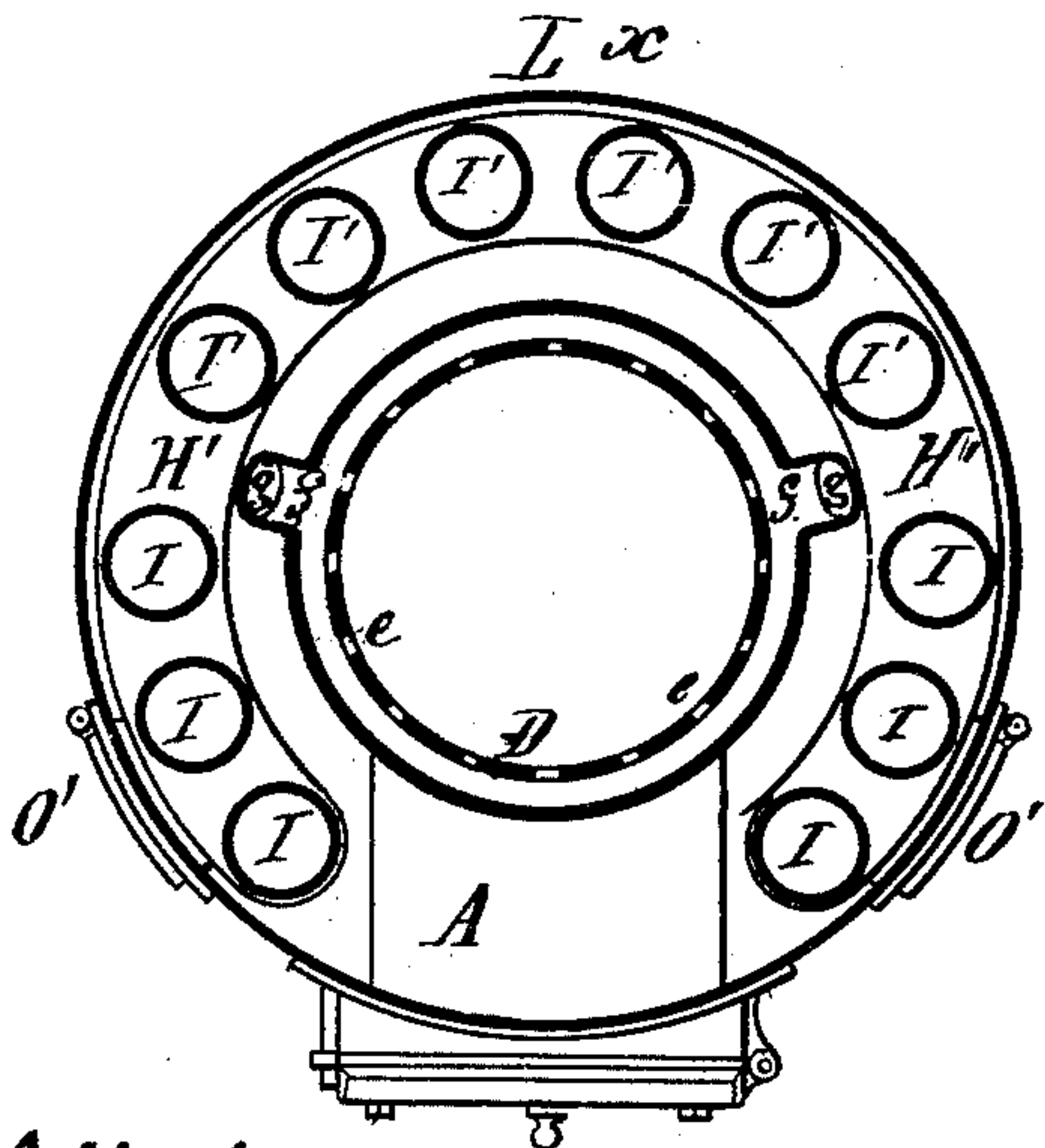
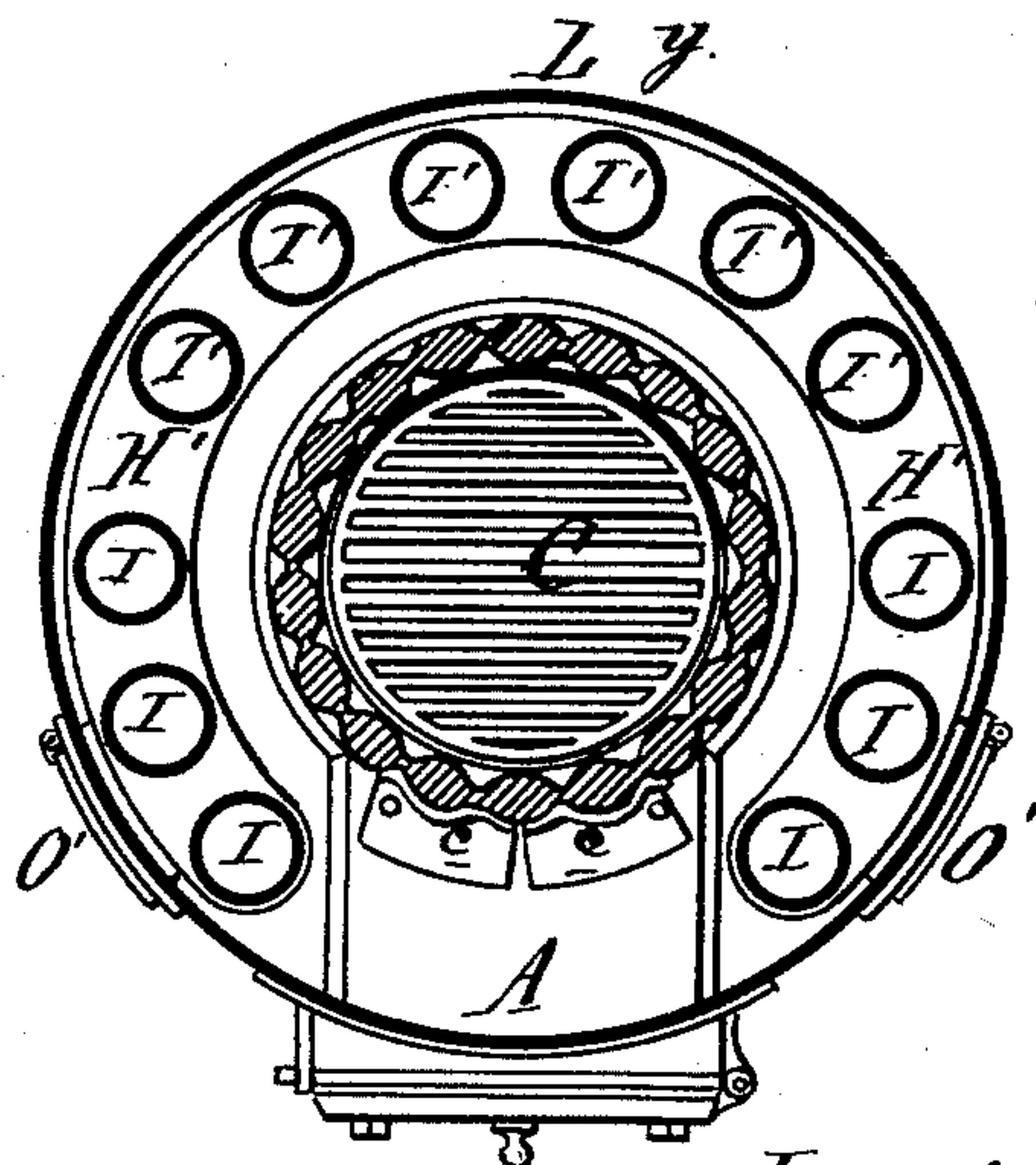


Fig: 3.



Attest.  
C. E. Huestis  
Wm. P. Halding

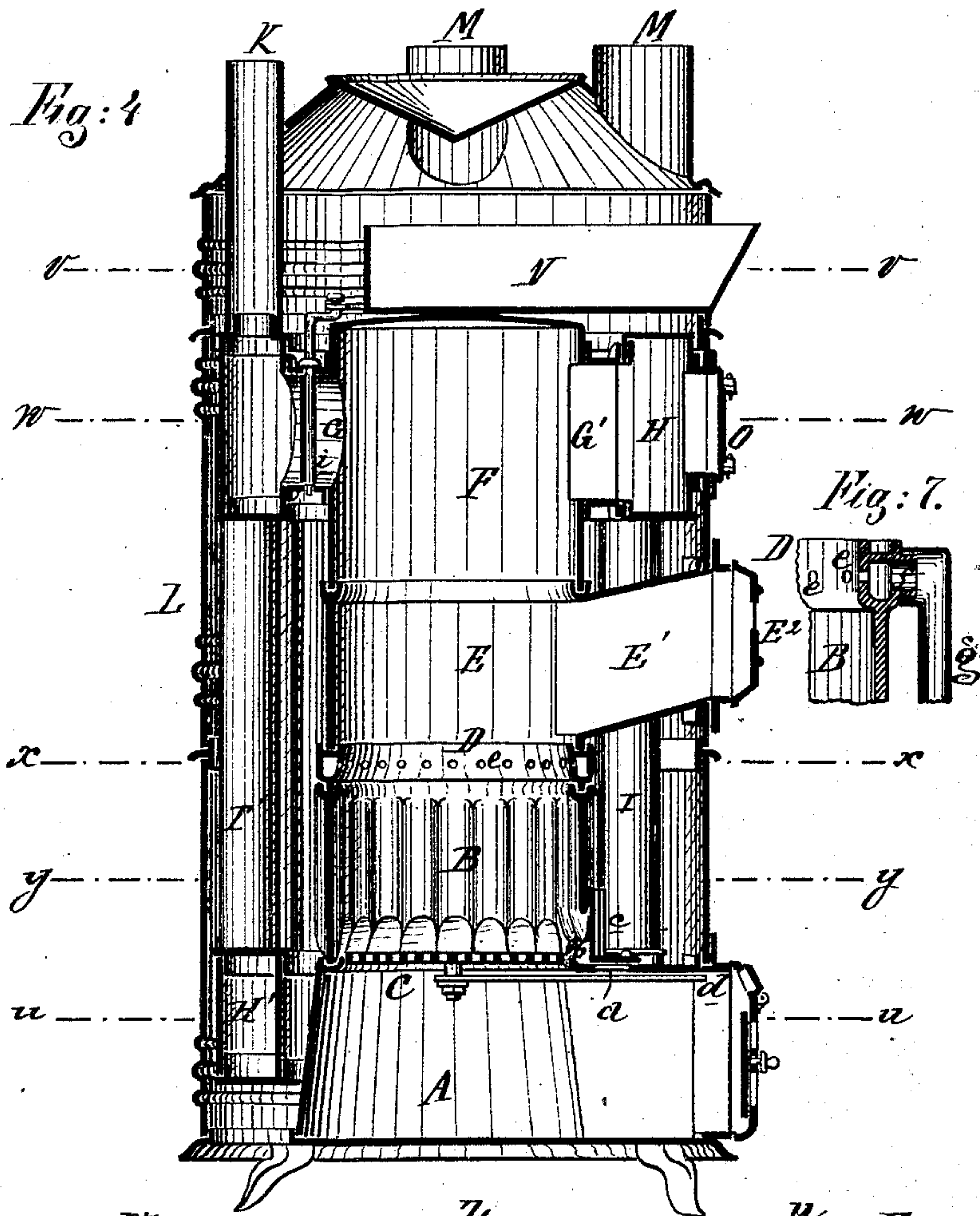
Inventor.  
A. & J. Rubel  
Per attorney  
Phos. S. Sprague

**A. & J. RUBEL.**  
**Hot-Air Furnaces.**

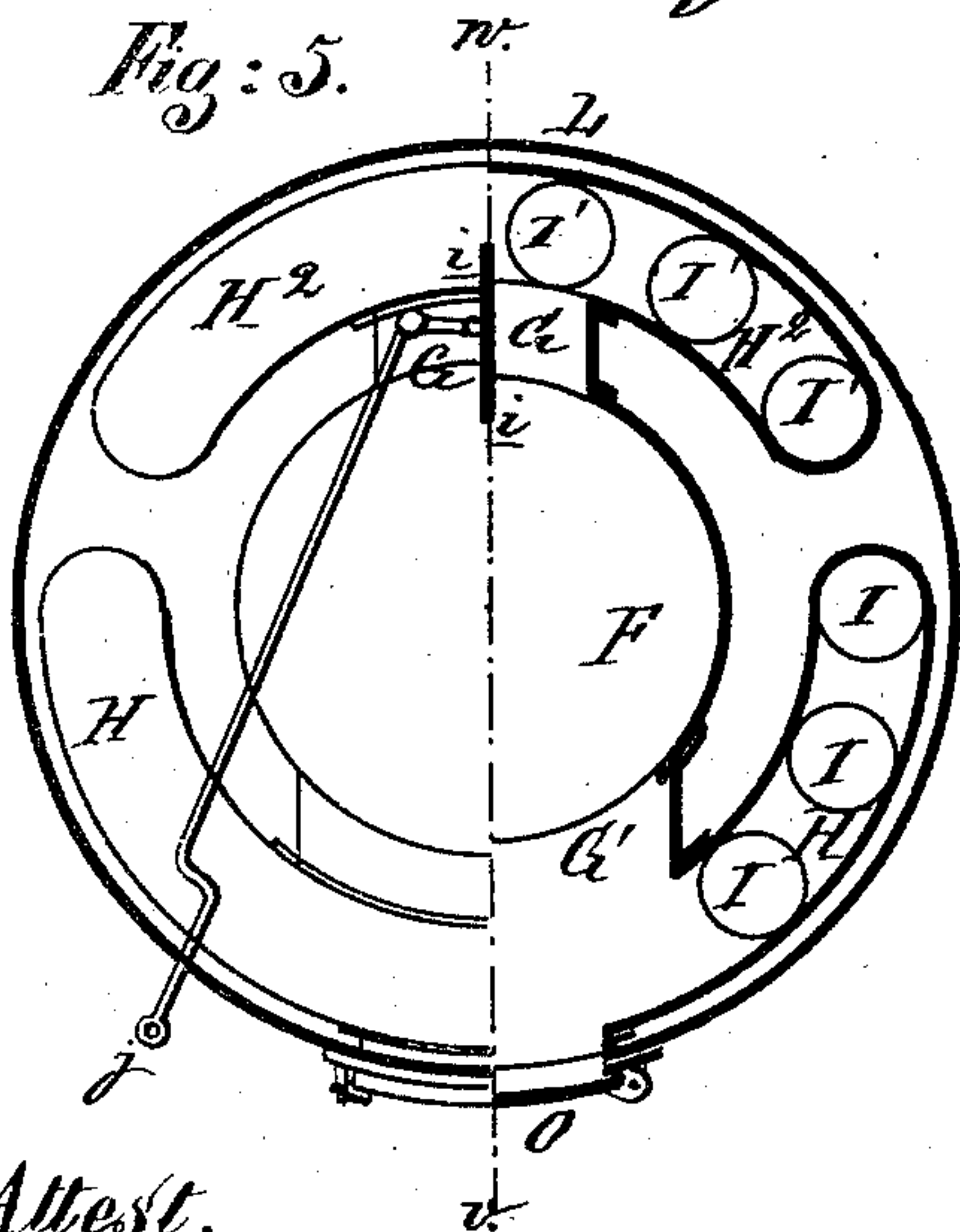
No. 156,065.

Patented Oct. 20, 1874.

*Fig: 4*

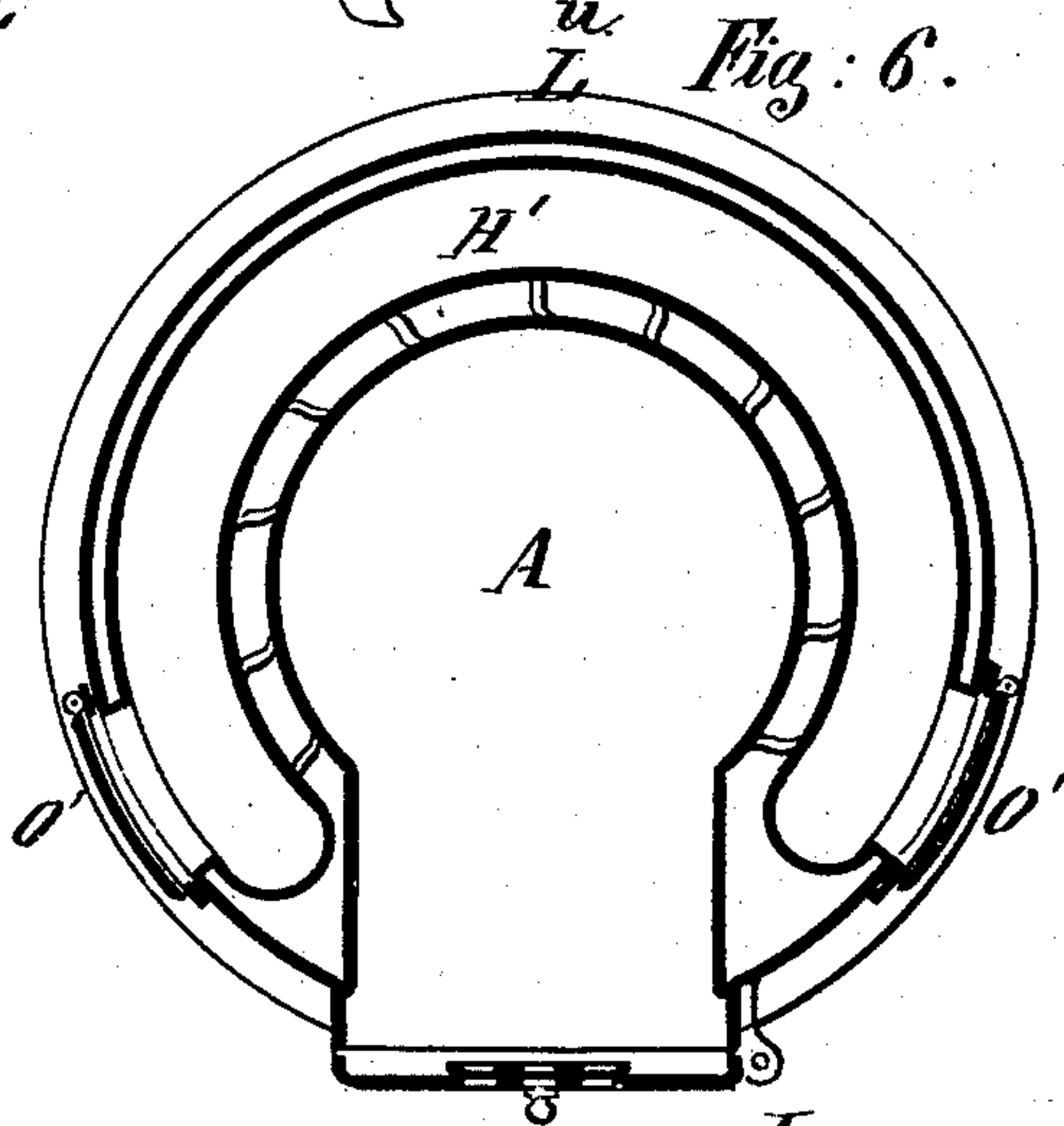


*Fig: 5.*



*Attest.*  
*Edward Barthel*  
*C. E. Huestis*

*Fig: 6.*



*Inventor:*  
*A. & J. Rubel*  
*per Attorney*  
*Philo S. Sprague*



# UNITED STATES PATENT OFFICE.

ABRAHAM RUBEL AND ISAAC RUBEL, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **156,065**, dated October 20, 1874; application filed August 7, 1874.

*To all whom it may concern:*

Be it known that we, ABRAHAM RUBEL and ISAAC RUBEL, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Hot-Air Furnace, of which the following is a specification:

The nature of our invention relates to certain improvements in air-heating furnaces, of that class wherein the draft may be reverted, through diving-flues arranged outside the fire-pot, into a chamber surrounding the ash-pit; thence up through other flues to the smoke-chamber, whereby a very large radiating-surface may be obtained in a comparatively small space; and, further, this combination of flues and chambers is inclosed within a casing, whereby the heated gases are withheld until more heat is evolved and the efficiency of the furnace is increased.

The invention consists in the combination of a peculiar gas-ring, having apertures and pendent pipes, with a fire-pot having an opening in its front lower edge communicating with an opening in the top plate of the ash-pit, said openings being covered by a pair of peculiarly-shaped doors, and being used for the purpose of raking out clinkers and slag from the grate into the ash-pit; and, further, in combination with a dome, a series of segmental chambers, and drop, and rising flues, as is hereinafter more fully explained.

Figure 1, Sheet 1, is a perspective view of the furnace, with part of the casing broken away. Fig. 2 is a cross-section at *xx*. Fig. 3 is a horizontal section of the fire-pot at *yy*. Fig. 4, Sheet 2, is a longitudinal vertical section of the furnace. Fig. 5, one-half being a horizontal section through the dome at *vv*, the water-tank being removed, and the remainder a similar section at *ww*. Fig. 6 is a horizontal section through the ash-pit at *uu*. Fig. 7 is a partial cross-section, on an enlarged scale, through the top of the fire-pot, the gas-ring, and one of its pendent air-pipes.

In the drawing, A represents the ash-pit, having a suitable door and draft-slide in front, and surmounted by a corrugated cast-iron fire-pot, B, in the lower front part of which is a serrated opening, *b*, in front of which an opening, *a*, is made in the top plate of the ash-pit, both of which openings may be closed by a

pair of doors, *c c*, corrugated to fit the front of the fire-pot, and flanged at the bottom, to cover the ash-pit opening. The doors swing on pivots through their flanges, and, when open, permit clinkers and ashes to be raked off the grate C by a hooked poker through the openings *b a*, into the ash-pit. While open, the doors prevent the escape of dust into the air-space. The grate has also a rotary vibration imparted to it by a lever, *d*, to shake down the ashes. D is a hollow annular gas-ring, placed on top of the fire-pot. *e* are apertures cored into the interior chamber from the inner face, and *f* is a collar around an opening on the outer side, communicating with said chamber, and on which is sleeved the elbow of an air-pipe, *g*, pendent at the side of the fire-pot. At or nearly at the opposite side of the ring is a similar air-pipe.

The heat radiated from the fire-pot rarefies the air in said pipes, and insures an upward current into and through the gas-ring, the jets of heated air delivered by it mingling with the gases of combustion, to furnish the oxygen necessary to insure their ignition and combustion.

E is the combustion-chamber, surmounting the gas-ring, provided with a feed-chute, *E*<sup>1</sup>, and door *E*<sup>2</sup>. The chamber E is surmounted by a smoke-dome, F, having a flue, G, at the back, in which a damper, *i*, is pivoted, and actuated by a rod, *j*, engaging with its crank, and extending through the casing to the front of the furnace. H is a segmental flue-chamber, enveloping the front upper half of the dome, with the front of which it communicates through a flue, G'. From its bottom six diving-flues, I, communicate with a segmental base-chamber, H<sup>1</sup>, which envelopes the circular part of the ash-pit. From this chamber six up return-tubes, I', rise, and connect it with a segmental flue-chamber, H, which envelops the back half of the dome,<sup>2</sup> with which it is connected by the flue G.

When the damper *i* is open the draft is direct; but when closed, the heated currents pass into the flue-chamber H through the flue G', thence down through the diving-flues I into the base-chamber H<sup>1</sup>, then rise through the flues I' into the chamber H<sup>2</sup>, and pass out through the smoke-pipe K, rising from its top, heating

the air rising through the openings in the base around the ash-pit inside the casing L, the warmed air issuing through the pipes M, which distribute it to the apartments.

N is a water-vessel placed on top of the dome, the evaporation of the water supplying the moisture to the warmed air required for health and comfort.

Doors O O', opening into the several flue-chambers, are provided, for the purpose of giving access thereto, to remove dust and ashes accumulating or lodging therein.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The fire-pot B, constructed as described, and having the opening *b* in its front lower edge communicating with the opening *a* in the

top of the plate of the ash-pit A, in combination with doors *c c*, and with the annular gas-ring D, having the apertures *e*, openings *f f*, and pendent pipes *g g*, substantially as described and set forth.

2. In combination with the dome F, having flues G' and G, the latter provided with a damper, *i*, the segmental chambers H H<sup>1</sup> H<sup>2</sup>, the drop-flues I, and rising flues I', all inclosed within the casing L, and arranged and operated substantially as described.

ABRAHAM RUBEL.  
ISAAC RUBEL.

Witnesses:

WM. H. LOTZ,  
HERMAN A. KROESCHELL.