

D. BOYD.  
HOT-AIR FURNACE.

No. 177,679.

Patented May 23, 1876.

Fig: 1.

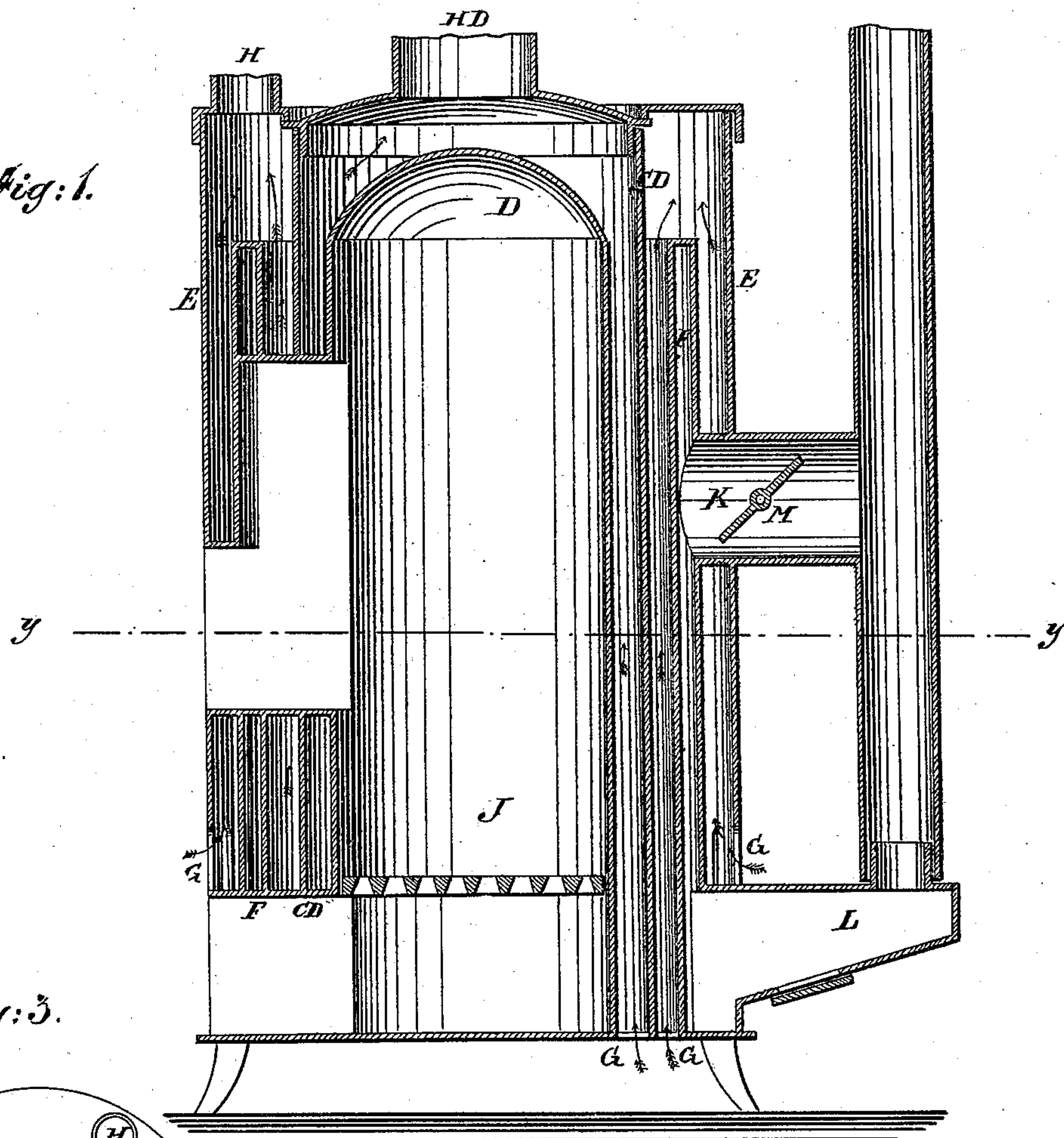


Fig: 3.

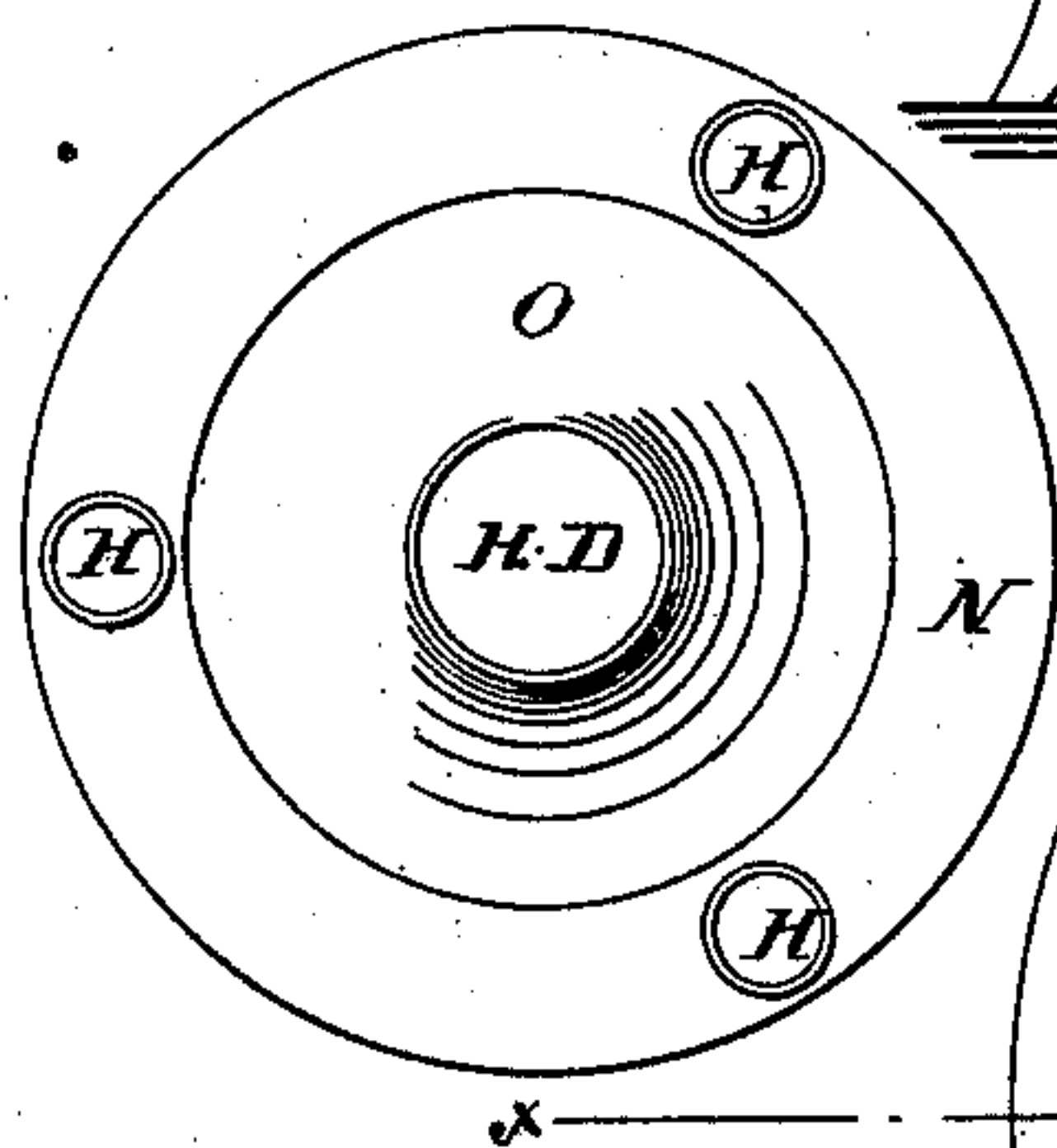
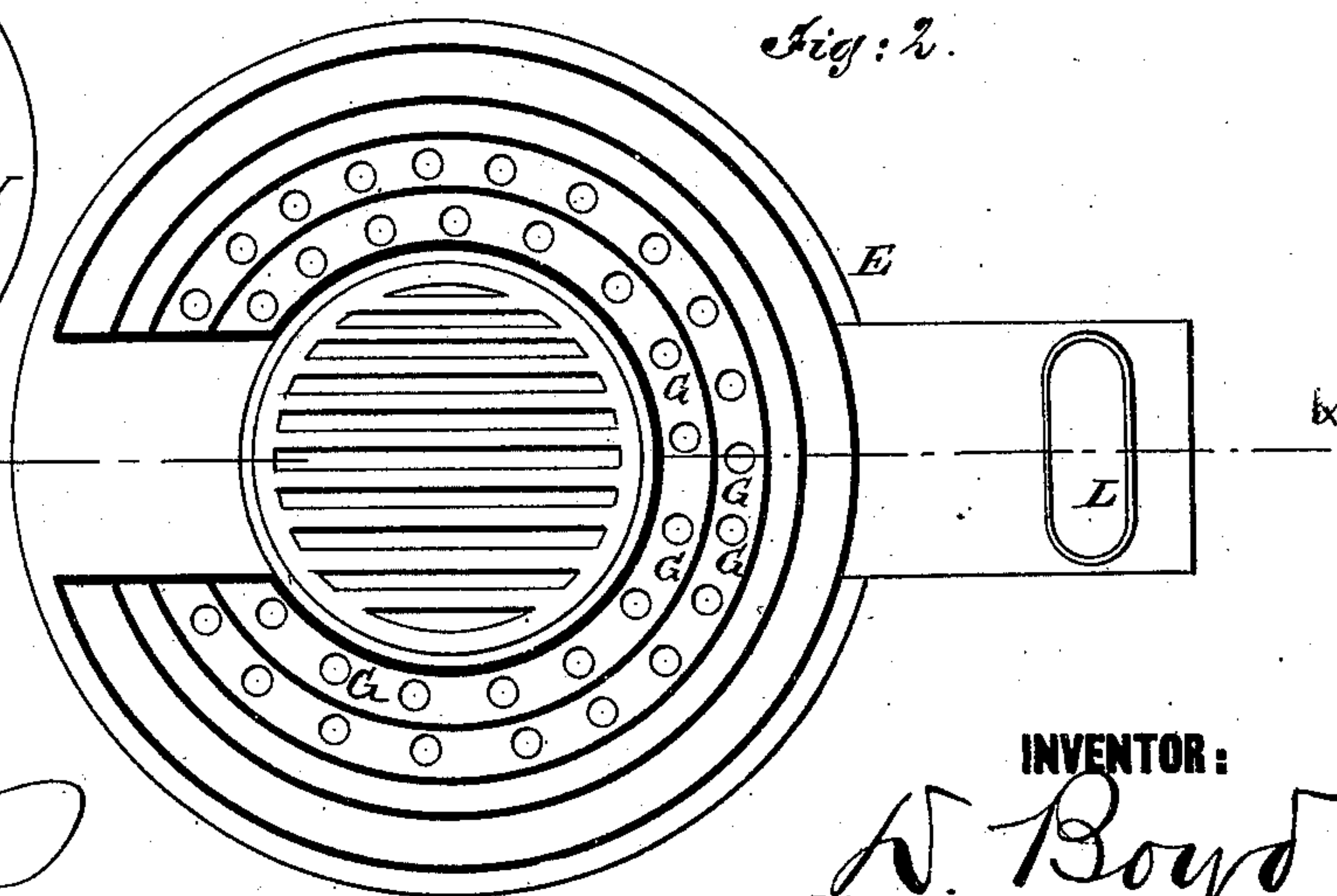


Fig: 2.



WITNESSES:

*Cnas. Nida*  
*A. J. Terry*

INVENTOR:

BY *D. Boyd*  
*mm*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

DAVID BOYD, OF NEW YORK, N. Y.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **177,679**, dated May 23, 1876; application filed May 15, 1875.

*To all whom it may concern:*

Be it known that I, DAVID BOYD, of the city, county, and State of New York, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a specification:

The invention will first be fully described in connection with drawing, and then pointed out in the claim.

In the accompanying drawing, Figure 1 represents a vertical section of the heater, taken on the line *xx* of Fig. 2, showing the general arrangement of the parts. Fig. 2 is a horizontal section of Fig. 1, looking down from the line *yy*. Fig. 3 is a top view.

Similar letters of reference indicate corresponding parts.

By this invention the heater is divided into two longitudinal compartments, one of which contains the pipes and flues that carry off the smoke and heated products of combustion, and the other compartment contains the fire-pot and heating parts of the furnace, thus making two separate and perfect radiators. Each chamber or compartment is properly supplied with air to be heated, so that the whole capacity of both is most thoroughly utilized, and the vast quantity of heat that ordinarily escapes by the chimney is saved. J is the fire-pot. D is the dome or space above the fire, forming a central heater, with an annular flue surrounding the whole furnace, extending from the bottom plate of the heater to the top of the dome, leaving an open space between the annular flue F and the furnace for the admission of cold air to pass up, and, as fast as heated, pass out of tube-opening H at the top of the casing. The products of combustion will pass off from the furnace through the fire-flue into the flue F, from thence (by a circuitous route) will pass out at K, or by closing the damper M all the smoke will pass down and around the annular flue into the outer base which surrounds the furnace; from thence out at the discharge-flue L.

It will be seen that the annular flue F is wholly separated from the more intense heating parts of the furnace by the concentric dia-

phragm CD, which divides the furnace into two separate longitudinal compartments. This diaphragm is consequently extended from the bottom to the top of the casing. At the top it connects with the cap N, thereby connecting it with the outer casing E, and forming a separate apartment for the annular flue F, so that the heated products are carried through and beyond the diaphragm C D, and there flattened so as to spread the heated gases into broad layers, and force them into direct contact with heat-radiating surfaces.

The diaphragm C D, as here employed, wholly obviates the general defect in hot-air furnaces—that is, heated surfaces uselessly reflecting the heat from and to each other. This continued action of superheated surfaces affects the very flues that are intended to radiate heat.

Furthermore, the heat obtained from the annular flue will be free from contact with red-hot surfaces, and may be used separate from that obtained from the furnace part of the heater.

The air to be heated enters at G, and is discharged through the tubes H.

O is the cap, which covers the furnace part of the heater. H and H D are hot-air tubes.

This improved apparatus is designed to be used both as a heater for apartments where it may be located, and as a furnace for heating other parts of the building to which heated air may be economically and conveniently conveyed by means of pipes or tubes.

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

The combination, with fire-pot J, of a surrounding flue, F, separated from the heating parts of furnace by diaphragm C D, extending from the bottom to the top of case, and connected through cap N with outer casing E, as and for the purpose specified.

DAVID BOYD.

Witnesses:

C. SEDGWICK,  
ALEX. F. ROBERTS.