2 Sheets--Sheet 1.

C. J. SHEPARD.

Hot-Air Furnaces.

No. 143,851. Patented Oct. 21, 1873.

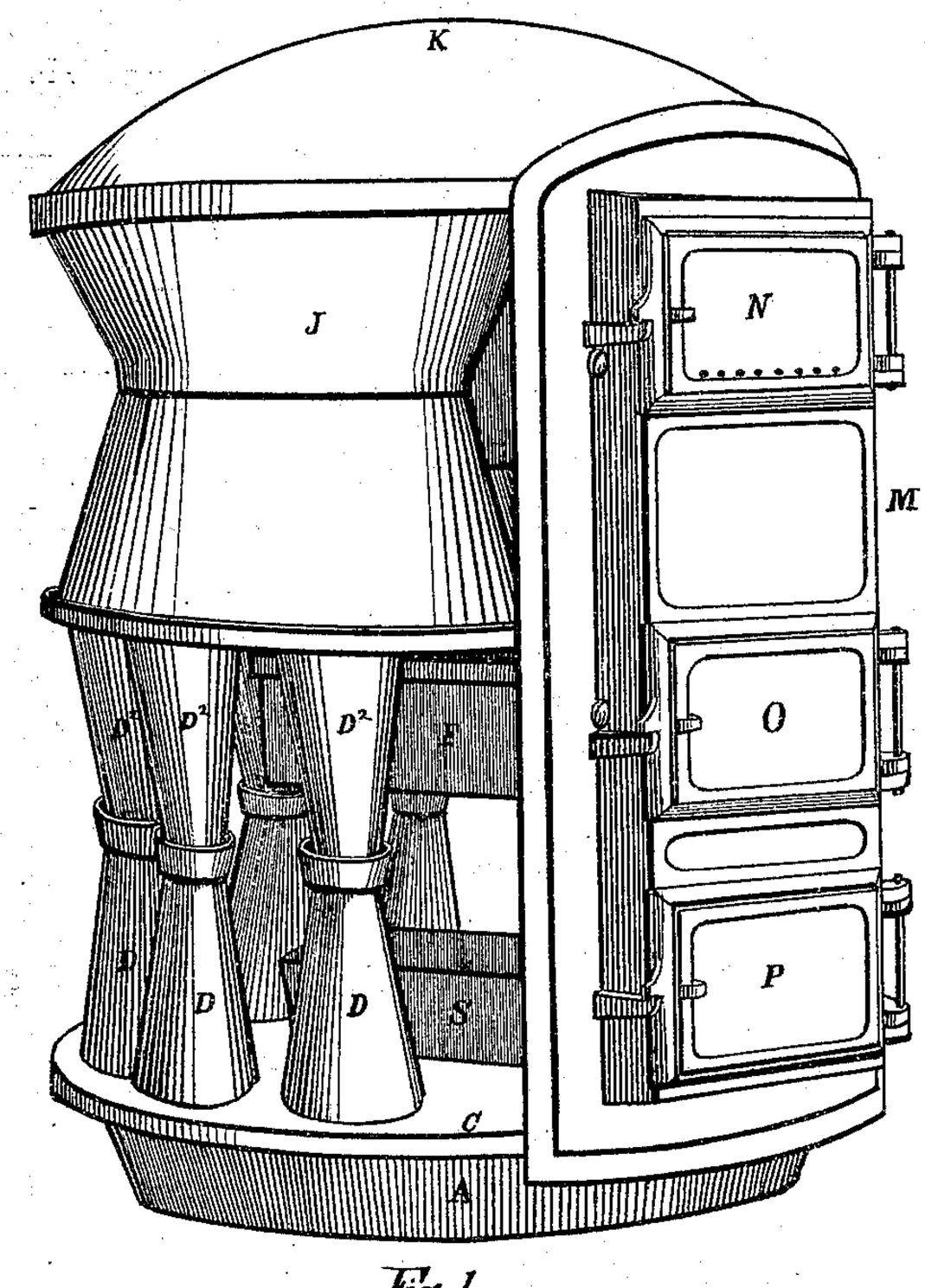


Fig. 1.

Witnesses

H. W. Henley.

Michael Cook.

Inventor.

Chas. J. Shepard

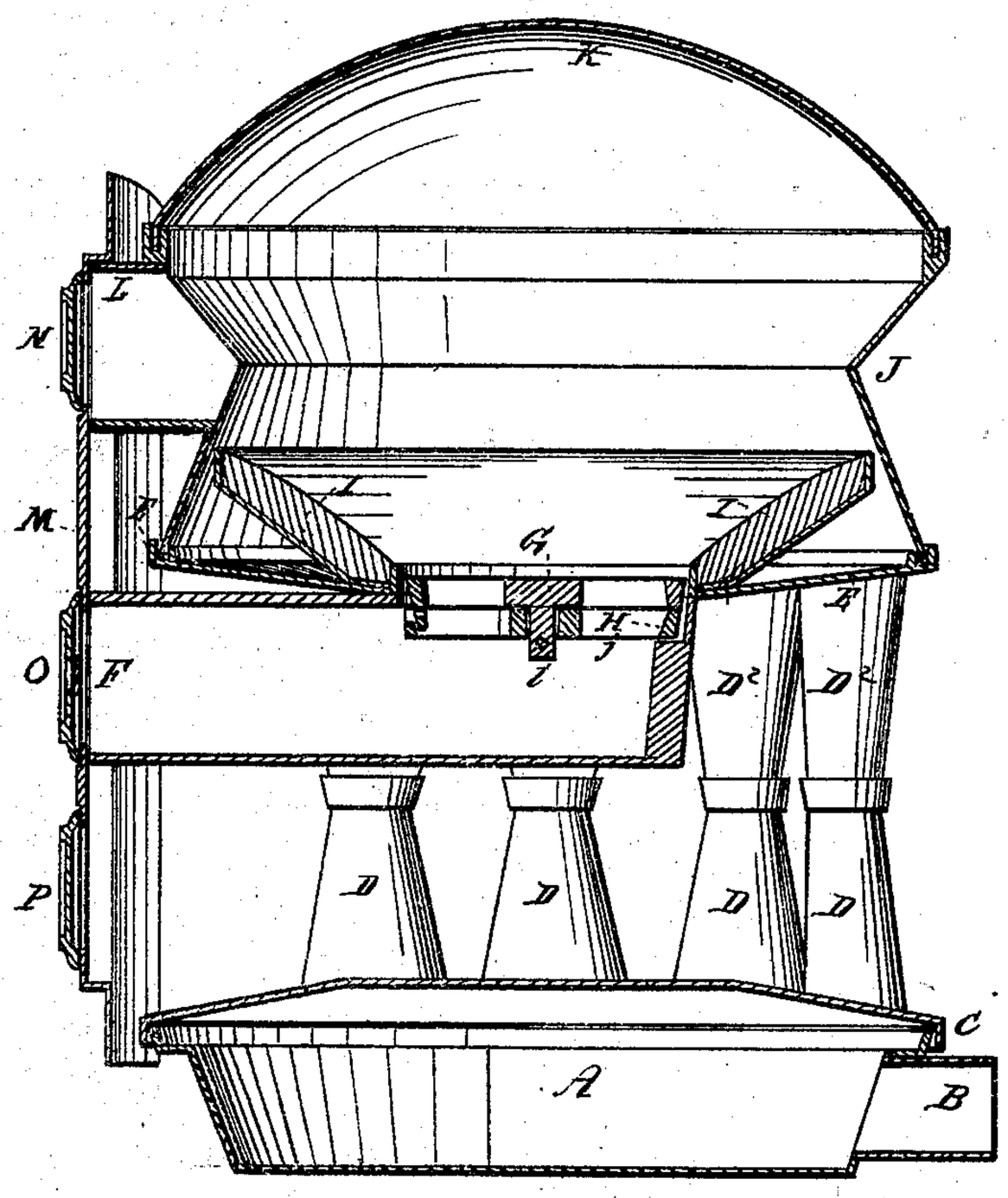
2 Sheets--Sheet 2.

C. J. SHEPARD.

Hot-Air Furnaces.

No. 143,851. Patented Oct. 21, 1873.

Fig. 2.



Witnesses

H. W. Henley

Michael Cook

Inventor

Charles J. Shepard

UNITED STATES PATENT OFFICE.

CHARLES J. SHEPARD, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **143,851**, dated October 21, 1873; application filed January 16, 1872.

To all whom it may concern:

Be it known that I, CHARLES J. SHEPARD, of Brooklyn, Kings county, New York, have invented, made, and applied to use certain Improvements in the Construction of Heating-Furnaces; and that the following is a full, clear, and correct description of the same, reference being had to the accompanying drawings making part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a side elevation of my improved heating-furnace. Fig. 2 is a vertical section of my furnace.

In the drawings, like parts of the invention are pointed out by the same letters of reference.

The nature of the present invention consists in certain improvements, as more fully set forth, in the construction of heating-furnaces, the object of the invention being to provide for the more thorough consumption of the fuel employed, by a complete combustion of the gases evolved from the same, thus obtaining a greater amount of heat from a given quantity of fuel than has heretofore been possible.

To enable those skilled in the arts to make and use my invention, I will describe the same.

A shows a hollow section, provided with an exit-flue, B, upon which section rests the lower flue-section C, in which the lower ends of the tubes D are received. The upper ends of said tubes D receive the lower ends of the tubes D^2, and the upper ends of the tubes D^2 terminate in the upper flue-section E, which forms the floor or base of the flue immediately beneath the fuel. From this upper flue-section is suspended an ash-pit, F; and, in the construction of this ash-pit, provision is made for bearings for the ring-frame H that supports the grate G. G shows the grate constructed as is usual, the extent of the movement of the grate being governed by the extent of the opening or slot in the ring-frame H. The grate, constructed as shown, rests upon or is supported by the ring-frame H. I shows the fire or fuel bed-plate, which consists of a plate of metal surrounding the grate, which curves outward and gradually rises, and may be filled or lined with plaster-of-paris or any suitable material. J shows the combustion-chamber resting upon the upper flue-section E. This combustion-chamber is composed, in the present case, of two bodies of metal, the lower body rising from the flue E and projecting inward, while the upper body projects inward and downward from the dome K until it meets the lower body; and upon the face of the combustion-chamber is cast a mouth-piece, L, by which the combustion-chamber is connected to the front M of the heater. K is the dome placed upon the upper section of the combustion-chamber, the use of which is more fully described hereinafter. M is the front of the heater secured to the ash-pit, and to the combustion-chamber, and provided with doors N, O, and P, giving access to the combustion-chamber, ash-pit, and evaporating-pan; or the door P may be used to admit fresh air to the heater, when so desired. Directly beneath the ash-pit F is placed an evaporating-pan, S, to which access is had through the door P, which pan is supplied with water, as required. The heater should, when set up ready for use, be inclosed in a metallic case or the brick-work, as is ordinarily done.

Such being the construction, the operation is as follows: The fuel is placed upon the grate, and the fire lighted; the products of combustion rise upward, impinging upon the interior of the dome, and turn therefrom and pass down the inclined sides of the upper section of the combustion-chamber centrally over the fire, revolving and mixing thoroughly with the fresh products of combustion.

As already stated, the object of the present invention is to provide for a thorough consumption of the gases arising from the products of combustion, and thus to obtain a greater amount of heat from a given quantity of fuel than has heretofore been accomplished.

The peculiar construction of the combustion-chamber, provided with the dome, causes the gases rising from the fire to be thrown down and back upon the face of the fire, and to be revolved over the surface of the same. The lower section of this chamber is also so constructed that it shall overlap the flue E, thus preventing the fuel from choking up or reaching the flue. The products of combustion, which pass under the bed-plate I, operate to clothe or envelope the fire or that portion of

the fuel projecting from the grate, which is, usually, about two-thirds of the fire-surface. The fuel which thus projects has no upright draft passing through it, but the gases evolved from it by the products of combustion enveloping it, pass upward to the dome, affording, thereby, a fire of great brilliancy and intensity without the rapid consumption of fuel which attends the grate-bar fire or that portion of the fuel supported by the grate. The lower flue-section C, extending, as it does, beneath the entire structure, adds greatly to the heating-capacity; and the suspended ash-pit, located as shown, receives the radiant heat and warms the air supplied to the combustion-chamber. It will further be observed that the products of combustion pass downward while the air heated for distribution is passing upward, and that a large percentage of generated heat is withdrawn from the heater and utilized, which, in the ordinary construction of heaters, passes off through the chimney.

Having now set forth my invention, what I claim as new is—

1. The combination of the grate G and fire-bed I, located as described and shown, with the dome K, for the purposes stated.

2. The suspended ash-pit F placed between the flues D^2, substantially as shown.

CHARLES J. SHEPARD.

Witnesses:

A. SIDNEY DOANE,

WM. HASTINGS.