

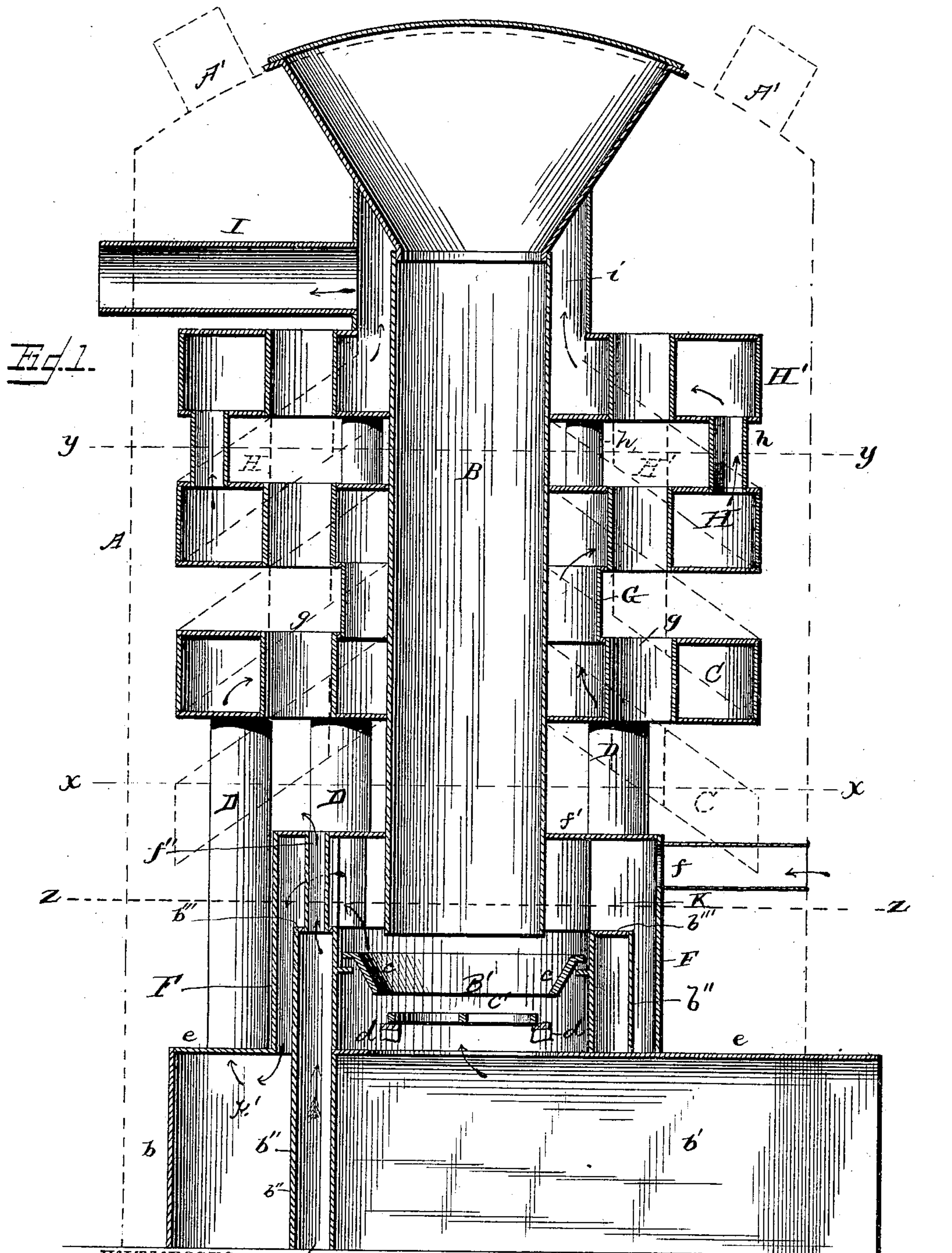
(No Model.)

3 Sheets—Sheet 1.

W. SUTLIFF.
HEATING FURNACE.

No. 377,279.

Patented Jan. 31, 1888.



WITNESSES
J. L. Ourand
E. M. Johnson

INVENTOR
Warren Sutliff
[Signature]
Attorney

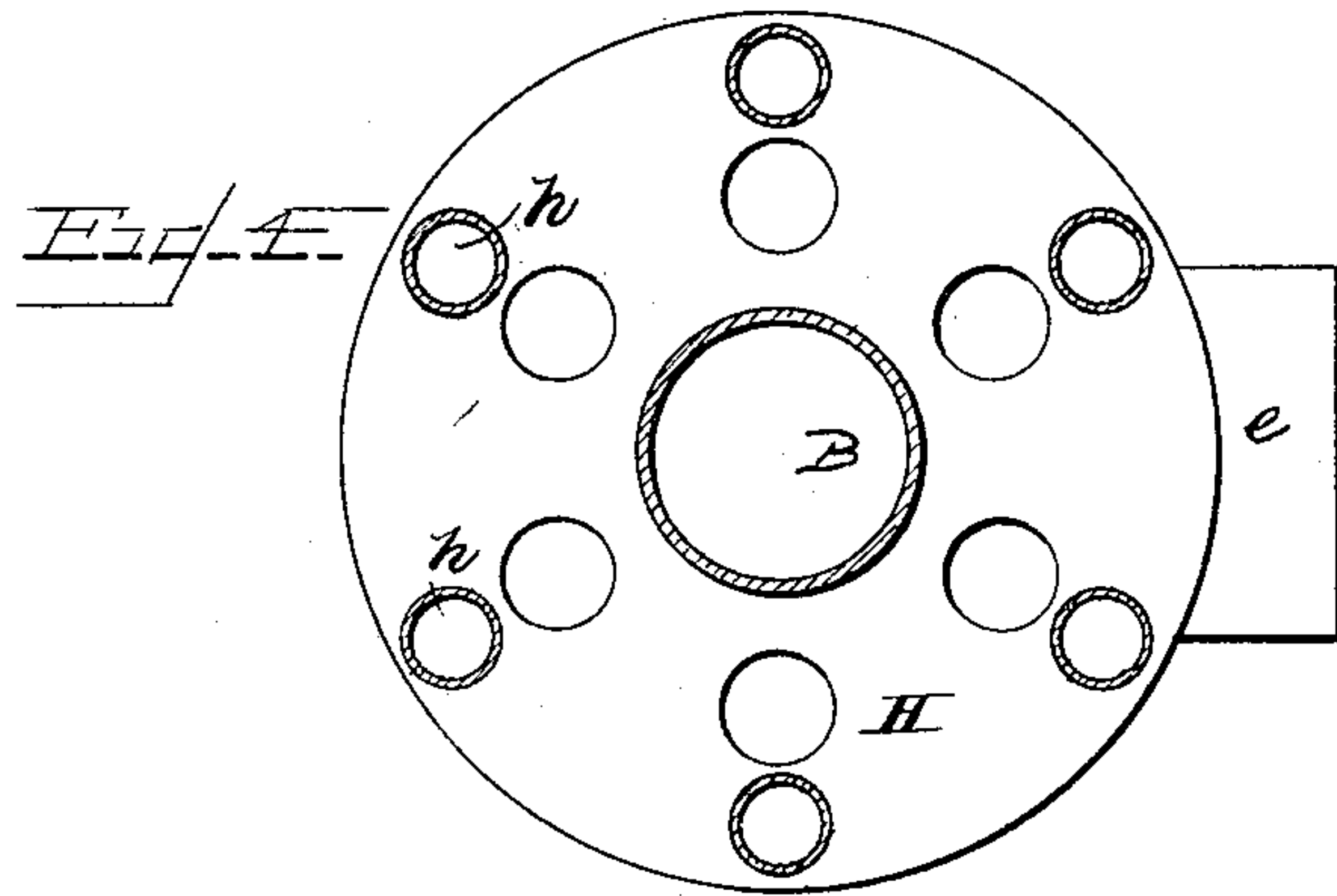
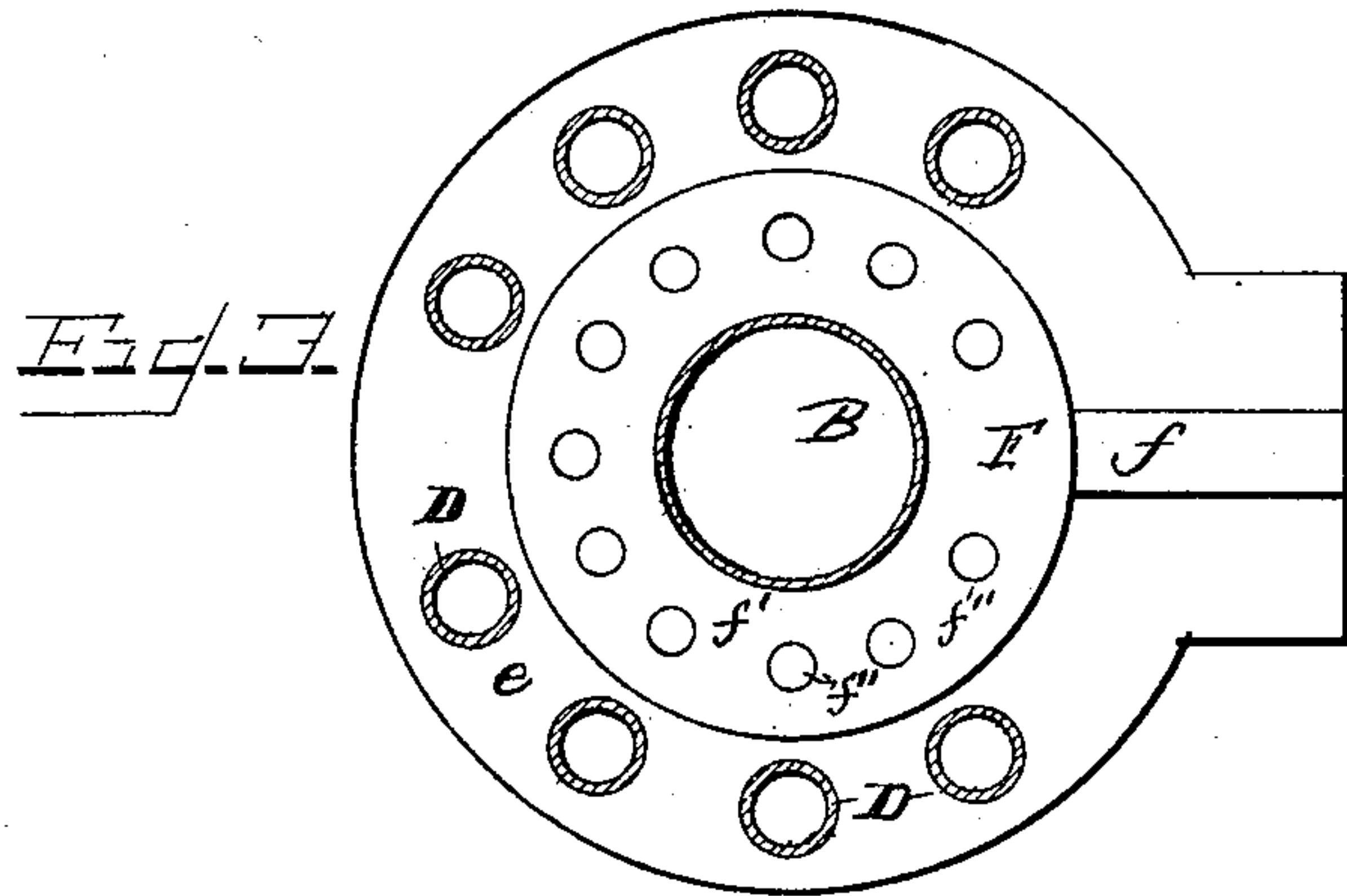
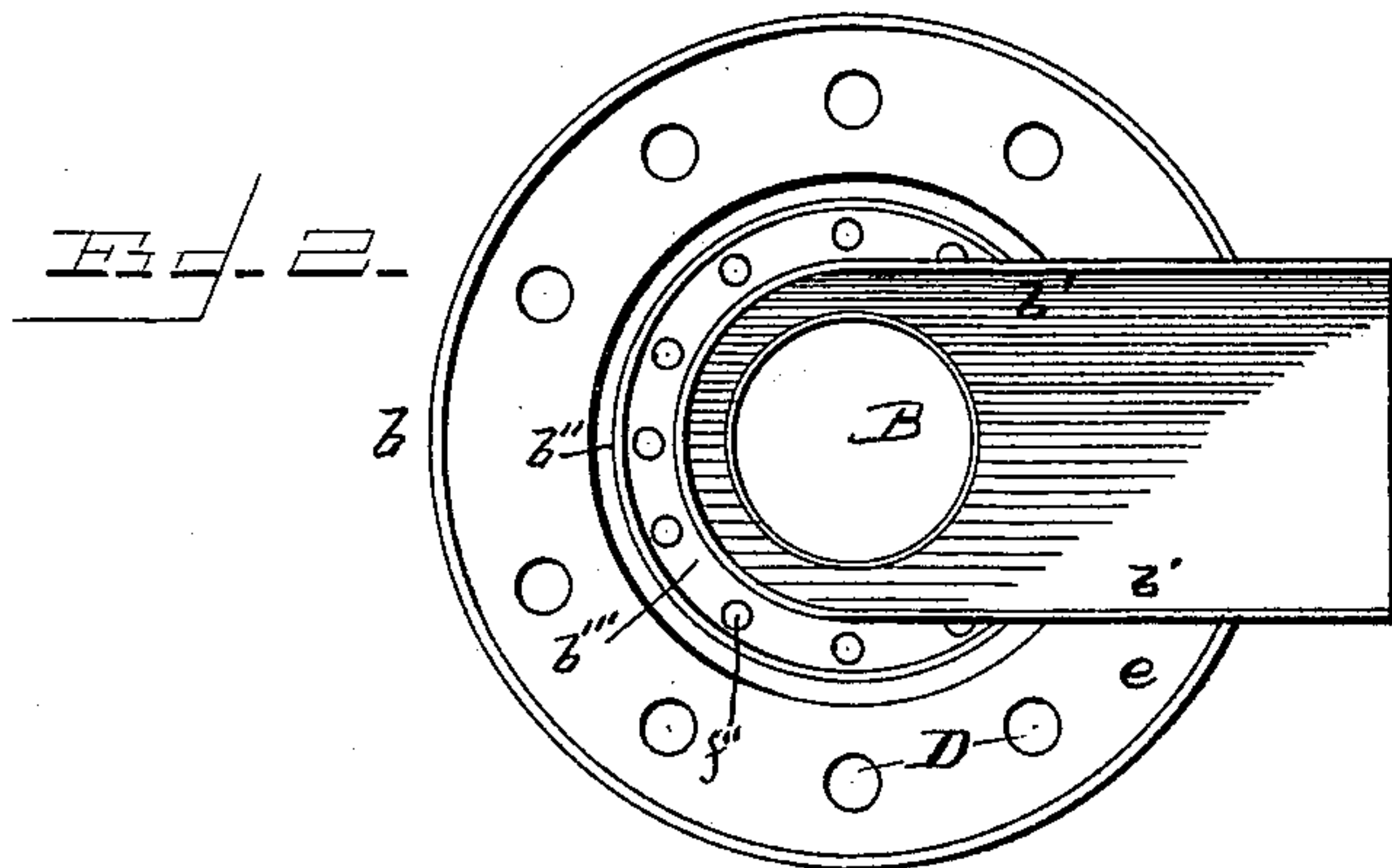
(No Model.)

3 Sheets—Sheet 2.

W. SUTLIFF.
HEATING FURNACE.

No. 377,279.

Patented Jan. 31, 1888.



WITNESSES
F. L. Ourand
E. M. Johnson

Warren Sutliff
INVENTOR
[Signature]
Attorney

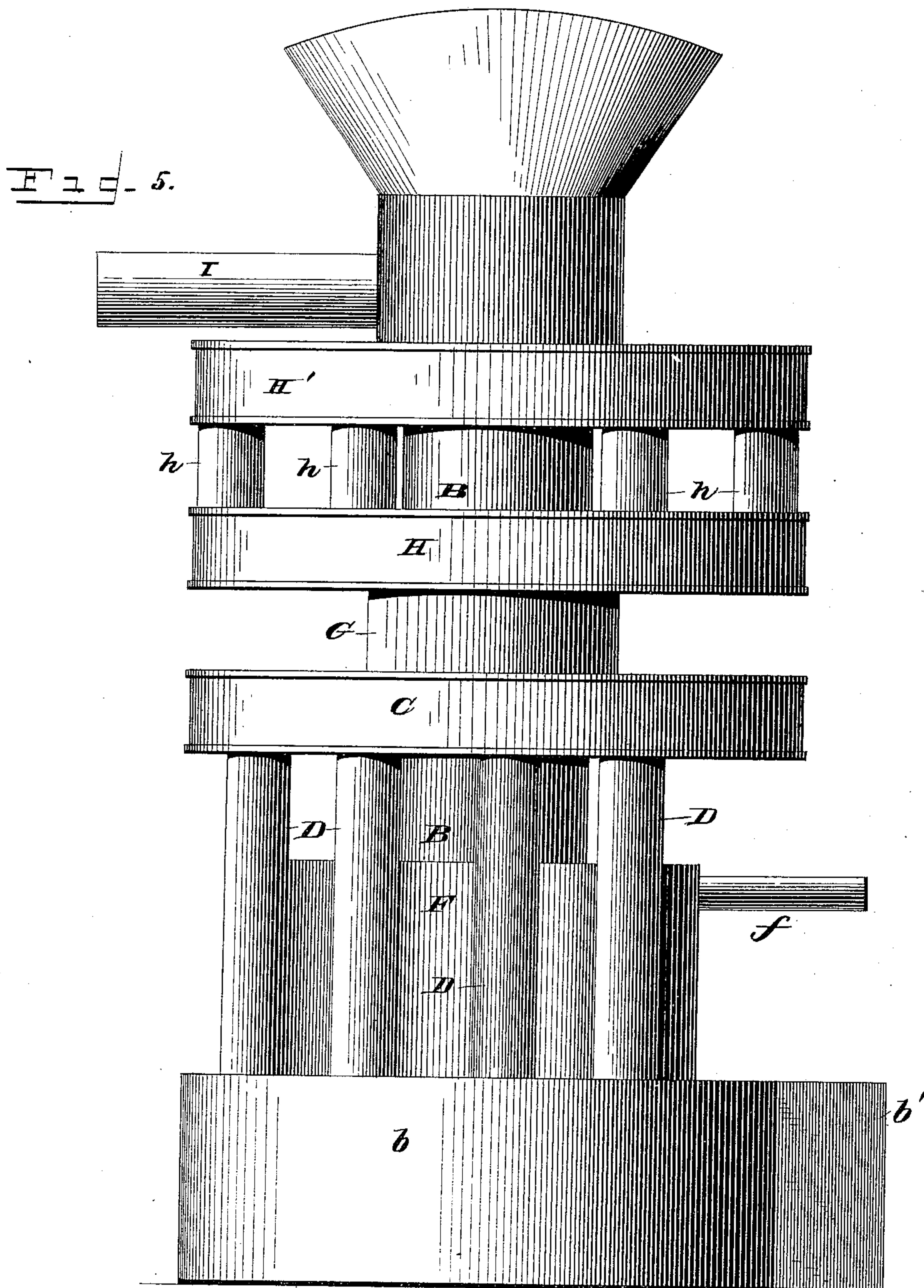
(No Model.)

3 Sheets—Sheet 3.

W. SUTLIFF.
HEATING FURNACE.

No. 377,279.

Patented Jan. 31, 1888.



WITNESSES

G. S. Elliott.
M. Johnson

Warren Sutliff.

INVENTOR

[Signature]
Attorney

UNITED STATES PATENT OFFICE.

WARREN SUTLIFF, OF MINNEAPOLIS, MINNESOTA.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 377,279, dated January 31, 1888.

Application filed January 22, 1885. Serial No. 153,632. (No model.)

To all whom it may concern:

Be it known that I, WARREN SUTLIFF, a citizen of the United States of America, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Heating-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in heating-furnaces; and it consists in the construction and combination of the parts, as will be hereinafter fully set forth, and specifically pointed out in the claim.

In the accompanying drawings, which illustrate my invention. Figure 1 is a vertical sectional view, and Figs. 2, 3, and 4 are transverse sections. Fig. 5 is an elevation showing the exterior of the furnace proper.

A represents the outer covering of the furnace, which is provided at its upper portion with heat-exit openings A'. The base of the furnace is provided with an outer wall, b, and a U-shaped wall, b', which encircles the ash-pit and extends beyond the outer wall, b. Vertical U-shaped walls b'' are also provided, which extend upwardly above the fire-pot, as shown in Fig. 1. The front ends of this wall are secured to the sides of the wall b', while a portion extends above the same. The space between said walls b' and b'' constitutes a duct or chamber, E, through which cold air is admitted to the air-space between the shell A and the radiating-drums of the furnace.

The furnace is provided centrally with a coal-magazine, B, beneath which is suspended a fire-chamber, B', this fire-chamber being provided with a tapered fire-pot, c, under which is located the circular grate c'. This circular grate is supported above the ash-pit by arched bars d d'. The side wall, b, is provided with a top wall, e, upon which rests a cylinder, F, which is provided at its upper end with an air-duct, f, through which air passes to the fuel. This cylinder is provided with a top wall, f', which extends inwardly

to the magazine of the stove, and it is connected by a series of vertical tubes, f'', to the horizontal wall b'', which extends from the vertical wall b'' to the outside of the fire-pot.

A radiating-drum, C, encircles the coal-magazine, and is provided with a series of vertical openings, g. The base and the horizontal drum C are connected to each other by a series of vertical pipes or flues, D, and above this drum C, and supported thereon by a collar, G, is a drum, H, which is connected to a drum, H', above the same by the pipes h. Each of these drums H H' is provided with vertical openings, and above the upper drum is formed a smoke-chamber, i, to which the stove-pipe I is attached.

The operation of my invention is as follows: The heat from the coal in the fire-pot will heat the air in the annular chamber K, said air being mixed with the products of combustion. The products of combustion, owing to the draft, will rise to the rear upper portion of the chamber K, and will then be drawn downwardly and around the pipes or tubes f'', so as to enter the chamber k', the draft drawing the products of combustion from thence upwardly through the flues or tubes D, the products of combustion passing from thence into the radiating-drum C, from whence they pass into the drum H, and from thence into the drum H' into a chamber, i, which is connected with the drum h', the chamber i having a suitable exit-pipe or smoke-stack, I, through which the products of combustion will pass to the chimney. It will be noted that the products of combustion are caused to take a circuitous route and will heat the different surfaces over which they pass, so as to radiate a large amount of heat, which is collected in the casing A.

The cold-air duct f, hereinbefore described, is located near the upper portion of the chamber K, and it is connected to the outer atmosphere by the short section of pipe which extends through the outer casing, A, so that air may be supplied above the incandescent fuel in a partially-heated condition, to cause more perfect combustion. If desirable, the radiating-drums may all incline upwardly, as shown in dotted lines, Fig. 1, thus providing a greater radiating-surface within the same horizontal

area without increasing the number of radiating-arms or changing their relative arrangement.

5 Cold air from a suitable source will enter the chamber E, which surrounds the fire-pot, and will pass through the vertical tubes *f*" into the compartment A.

I am aware that prior to my invention it has been proposed to construct a heating-stove as shown in Patent No. 148,668, dated 10 March 17, 1874, and hot-air furnaces as shown in Patent No. 108,790, dated November 1, 1870, and I do not claim such construction; but

15 What I claim as new, and desire to secure by Letters Patent, is—

In a hot-air furnace, the combination of the shell, a fire-chamber, a cold-air chamber surrounding it, and a combustion-chamber above

the fire-chamber, a diving-flue communicating with the combustion-chamber and surrounding 20 the cold-air chamber, the magazine, radiating-drums surrounding the magazine and connected with the diving-flue, and smoke-exit pipes *f*", passing through the combustion-chamber and leading from the cold-air cham- 25 ber into the hot-air chamber, and a cold-air tube leading from the exterior of the shell through the hot-air chamber into the combustion-chamber, substantially as described.

In testimony whereof I affix my signature in 30 presence of two witnesses.

WARREN SUTLIFF.

Witnesses:

JAMES L. MONROE,
CRAWFORD SHELDON.