

(No Model.)

N. A. BOYNTON.
HOT AIR FURNACE.

No. 471,095.

Patented Mar. 22, 1892.

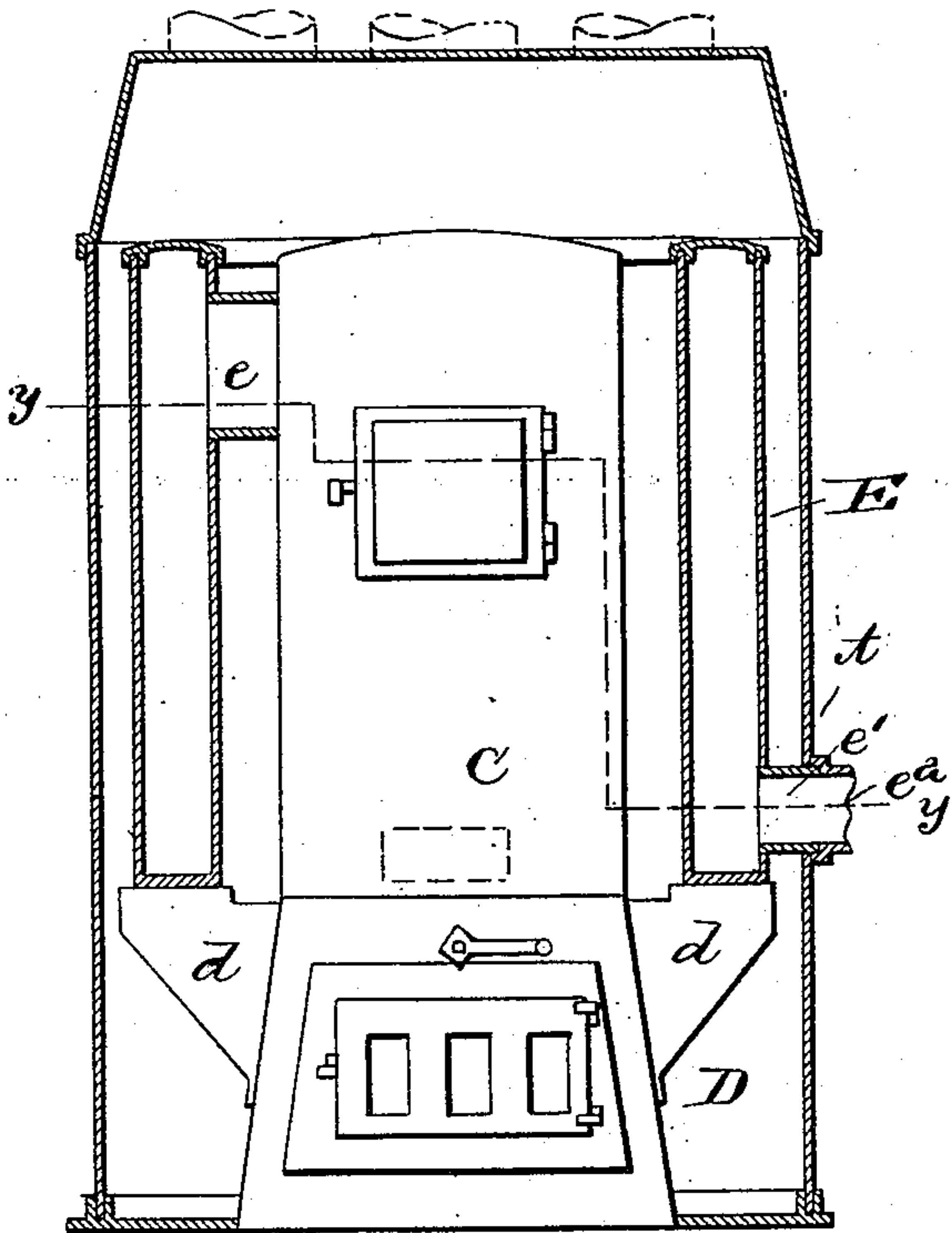


Fig. 1.

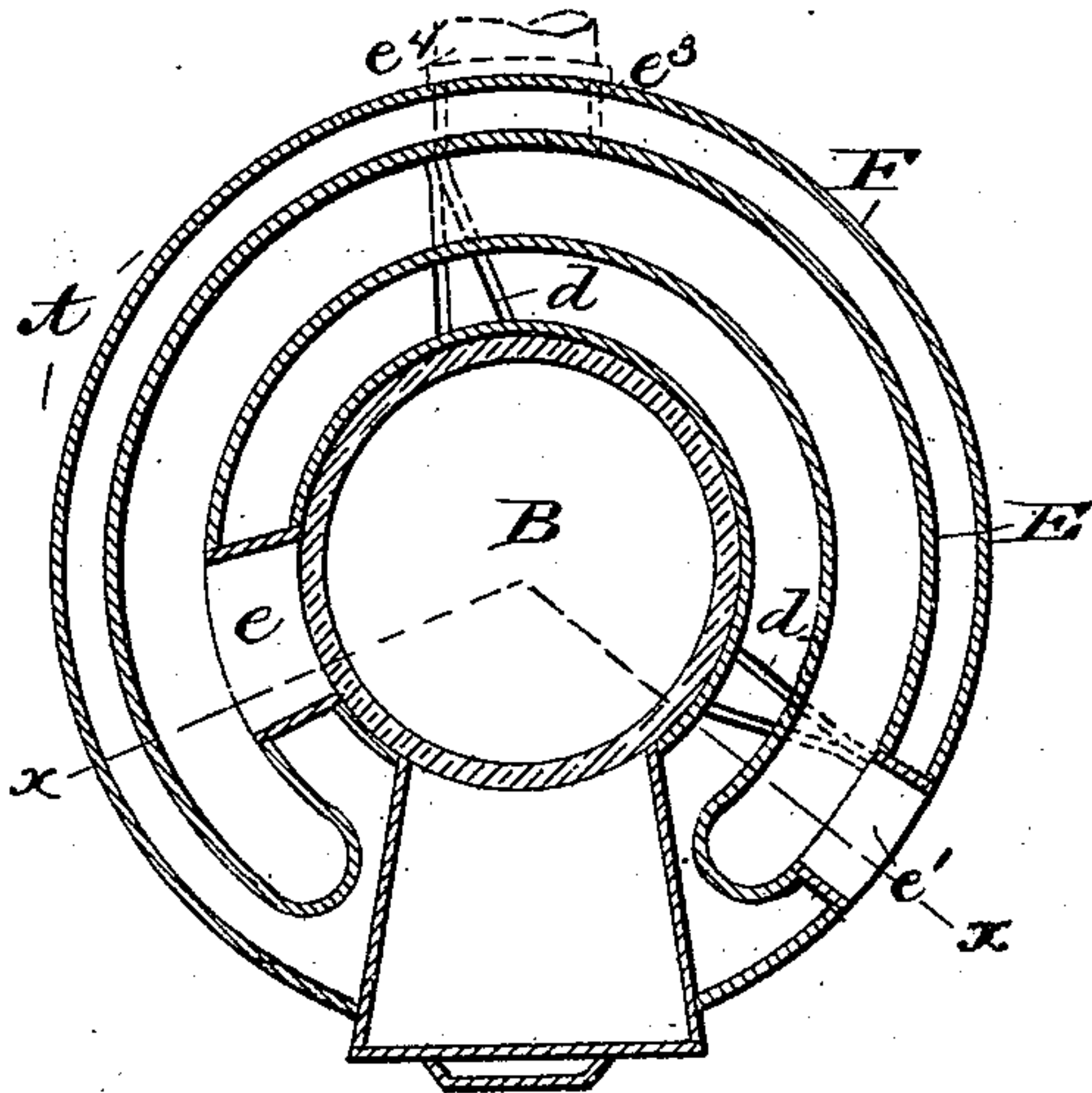
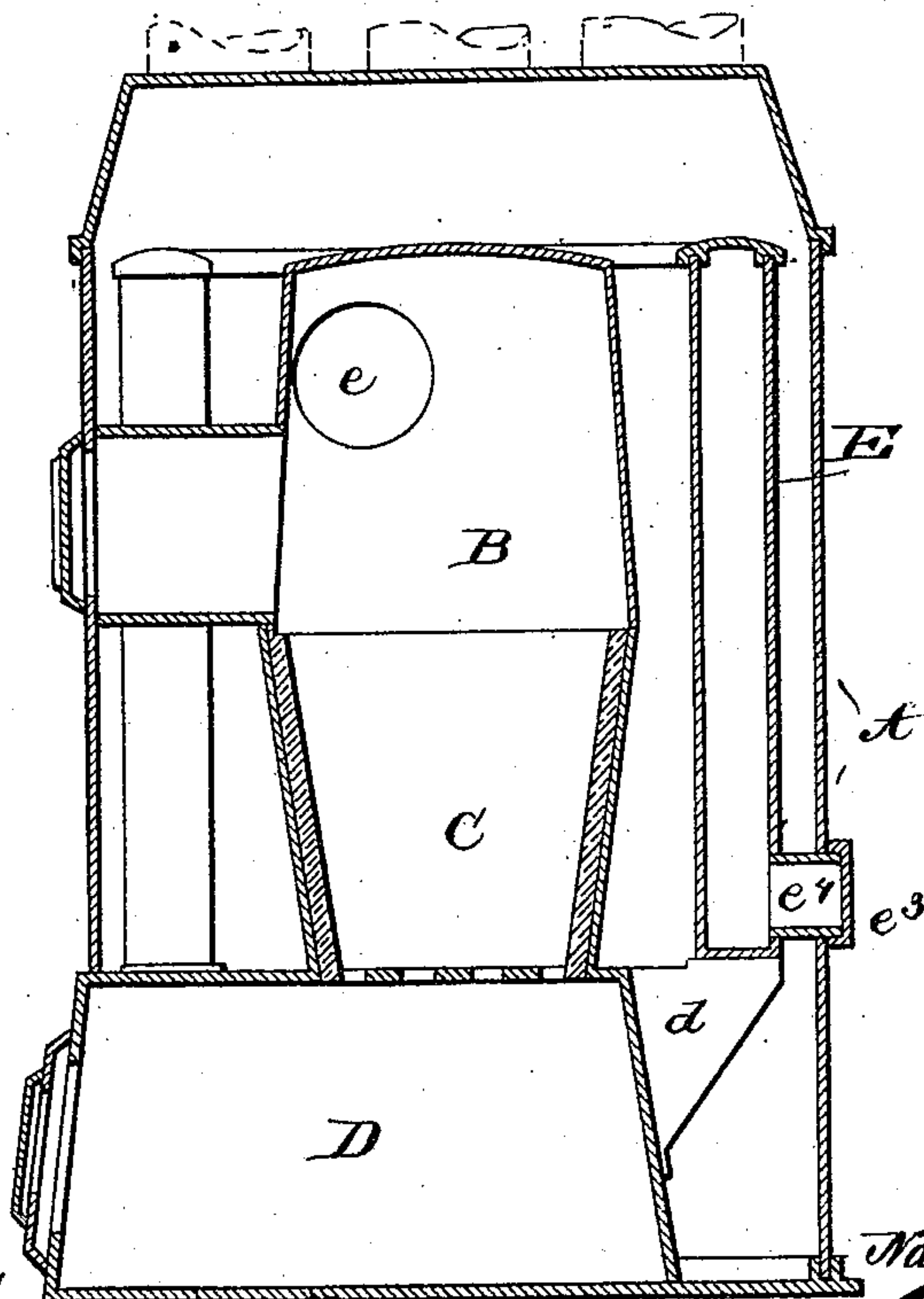


Fig. 2.



Witnesses:

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Fig. 3.

per *[Signature]* atty.

UNITED STATES PATENT OFFICE.

NATHANIEL A. BOYNTON, OF NEW YORK, N. Y., ASSIGNOR TO THE BOYNTON FURNACE COMPANY, OF SAME PLACE.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 471,095, dated March 22, 1892.

Application filed March 7, 1891. Serial No. 384,064. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL A. BOYNTON, a citizen of the United States, residing in the city of New York, in the county of New York, in the State of New York, have invented a new and useful Hot-Air Furnace, of which the following is a description.

The object of the invention is to provide an air-warming furnace of simple and inexpensive construction, in which the heat evolved from combustion shall be effectually utilized with the minimum degree of care and attention on the part of the attendant.

With this object in view the invention consists in the novel parts and combinations of parts, which will now be described in detail, and then distinctly indicated in the concluding paragraphs of this description.

In the accompanying drawings, which constitute a part of this specification, Figure 1 represents a view looking toward the parts of the furnace, the central portion being seen in elevation and the side portions being represented in vertical section in the irregular line *xx* of Fig. 2. Fig. 2 is a sectional plan of the parts seen in Fig. 1, the plane of section being indicated by the irregular line *yy* in Fig. 1. Fig. 3 represents a vertical longitudinal central section of a slightly-modified form of the furnace and its casing.

The base or ash-pit section D of the furnace A may in transverse section be of the downwardly and outwardly flaring form represented in elevation in Fig. 1, and the fire-pot section C and the combustion-chamber section B, together with the grate, may be of any ordinary or approved form.

From the outer surface of the ash-pit section D at the sides and at the rear thereof project brackets *d d d* in suitable number, upon which is seated the segmental or horseshoe-shaped radiator E, which, as will be seen, is preferably in its vertical dimensions coextensive with the fire-pot section and the combustion-chamber section combined.

The radiator or smoke-drum, which, as will be seen, embraces the body of the furnace at a suitable distance therefrom, is provided in its inner face near one of its front extremities and near its top with an opening, which is connected with a similar opening in the

body of the combustion-chamber near its upper extremity by a short pipe or smoke-flue *e*, which extends through the annular or horseshoe-shaped air-space between the furnace and the radiator. At its opposite extremity upon the other side of the furnace the radiator is provided at its lower extremity in its outer wall with an exit-opening *e'*, which is provided with a collar or with a short pipe *e²* to receive a pipe for conduction of the smoke to the uptake. In its rear lower extremity at the center thereof the radiator has a clearing-opening *e³*, from which a pipe *e⁴* may extend to a similar opening in the air-casing F of the furnace. It will be observed that the inlet opening or flue *e* is of much greater diameter than the outlet-opening *e'*.

It will be understood that the interior of the horseshoe-formed radiator is wholly without flue-plates, deflectors, or obstructions of any kind, and that from its point of admission at the upper extremity of the radiator at one side of the furnace to its point of discharge at the lower extremity of the radiator at the opposite side of the furnace the progress of the smoke-currents through the radiator is entirely free and unrestricted, except as it is retarded by the difference in elevation and the difference in capacity of the inlet and outlet openings. In these differences is found the essential novelty of the invention.

Persons skilled in the art to which the invention relates and who are familiar with the laws which govern the movements of aeriform bodies will readily understand that by reason of the greater area of the inlet-opening the admission of the smoke-currents will be free, that by reason of the smaller area of the outlet-opening the discharge of the smoke-currents will be greatly retarded, and that in addition to this restriction the flow of the products of combustion through the radiator will be still further checked by reason of the location of the inlet-opening in a much higher plane than the outlet-opening. Through the tendency of heated air and gases to ascend to a higher level the hot currents received from the combustion-chamber will remain within the upper inverted pocket-like portion of the radiator until the heat thereof shall have been

conveyed to and absorbed by the cooler air outside, and this tendency will be aided by the restricted area as well as by the depressed location of the exit-opening. As a consequence, thorough utilization of the heat evolved from the burning fuel is secured, and this utilization continues so long as fuel is supplied. Under all ordinary conditions the apparatus will continue to operate automatically in the manner described and the employment of a damper or any other appliance for manual control of the products of combustion will be wholly unnecessary.

Although the inclosing radiator has been represented as of the same vertical extent and in the same horizontal plane as the furnace proper, it will be understood that slight variation from the construction will be within the scope of the described invention.

In many residences the basement-story is so low that the use of a furnace which is surmounted by a radiator is wholly impracticable because of lack of vertical space sufficient to permit the requisite inclination of the hot-air flues; but in a low-down or dwarf furnace, like that herein shown and described, the elevation of the casings is so slight that no difficulty is found in inclining the air-conducting pipes sufficiently to insure rapid and free discharge of the heated currents into all the apartments of the building.

The invention having been thus described, what is claimed is—

1. In an air-warming furnace, a segmental or horseshoe radiator or smoke-drum which embraces the body of the furnace, which is interiorly wholly unobstructed, which is provided with an inlet-opening in its inner wall near the top thereof at or near one of its

front extremities, and which is provided with an outlet-opening in its outer wall near the bottom thereof at or near its opposite front extremity.

2. In an air-warming furnace, a segmental or horseshoe radiator or smoke-drum which embraces the body of the furnace, which at one end near the top thereof is provided with a smoke-inlet opening, and which at its opposite end near the bottom thereof is provided with a smoke-outlet opening which is of much smaller area than the inlet-opening.

3. In an air-warming furnace, a segmental or horseshoe radiator or smoke-drum which embraces the body of the furnace and is of like vertical extent, which at one end near the top thereof is provided with a smoke-inlet opening, and which at its opposite end near the bottom thereof is provided with a smoke-outlet opening which is of much smaller area than the inlet-opening.

4. The described damperless air-warming furnace, embracing the combustion-chamber B and the segmental radiator E, nearly encircling the combustion-chamber and provided at one side near the upper extremity thereof with the relatively large smoke-inlet passage *e*, extending from the combustion-chamber to the inner opening of the radiator, and provided at its opposite side near the lower extremity thereof with the relatively small smoke-outlet passage *e'*, extending outwardly from the outer wall of the radiator, the radiator being operatively closed at all other points.

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