

N. A. BOYNTON.  
Hot Air Furnace.

2 Sheets—Sheet 1.

No. 89,549.

Patented May 4, 1869.

Fig. 1

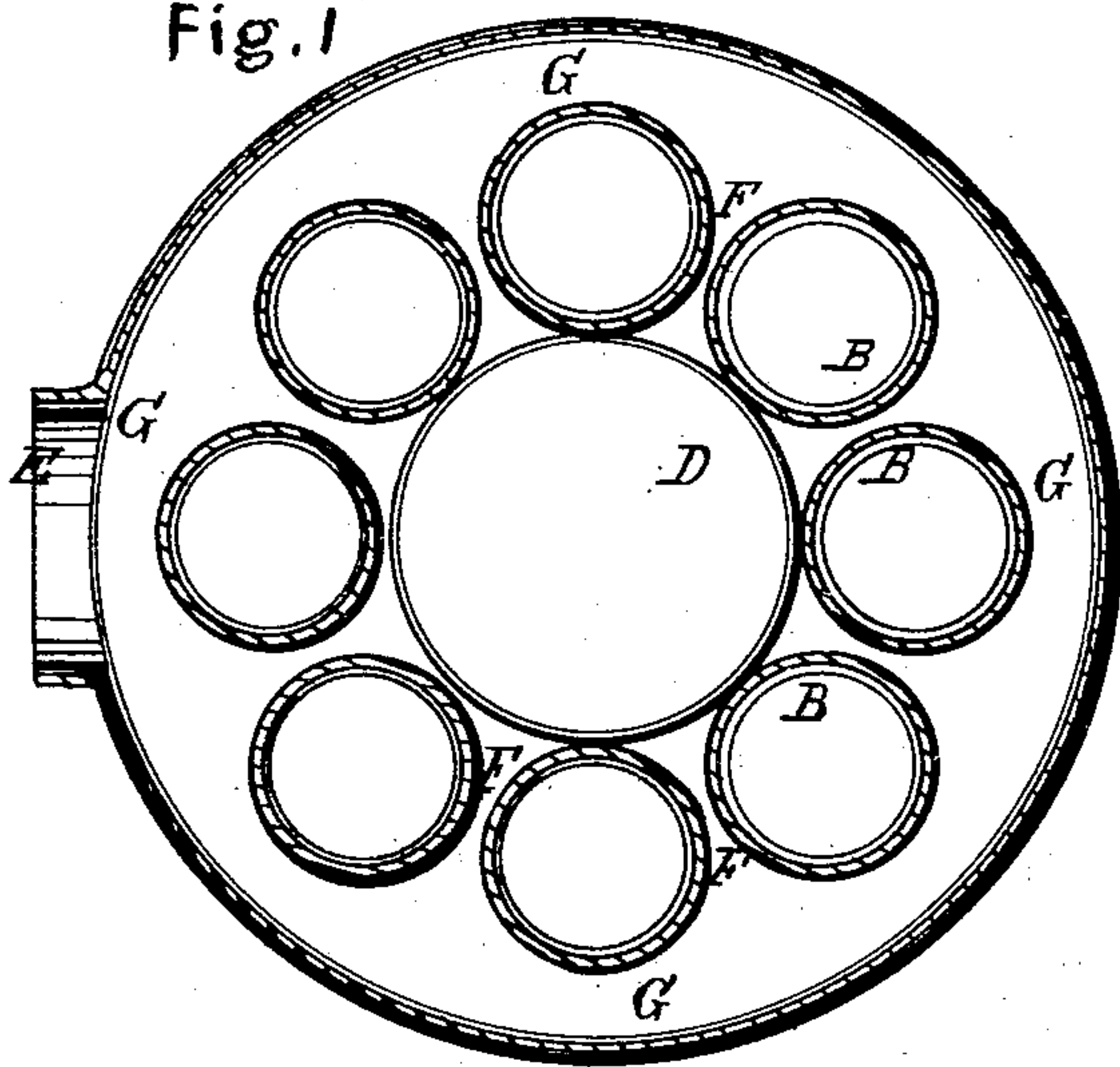
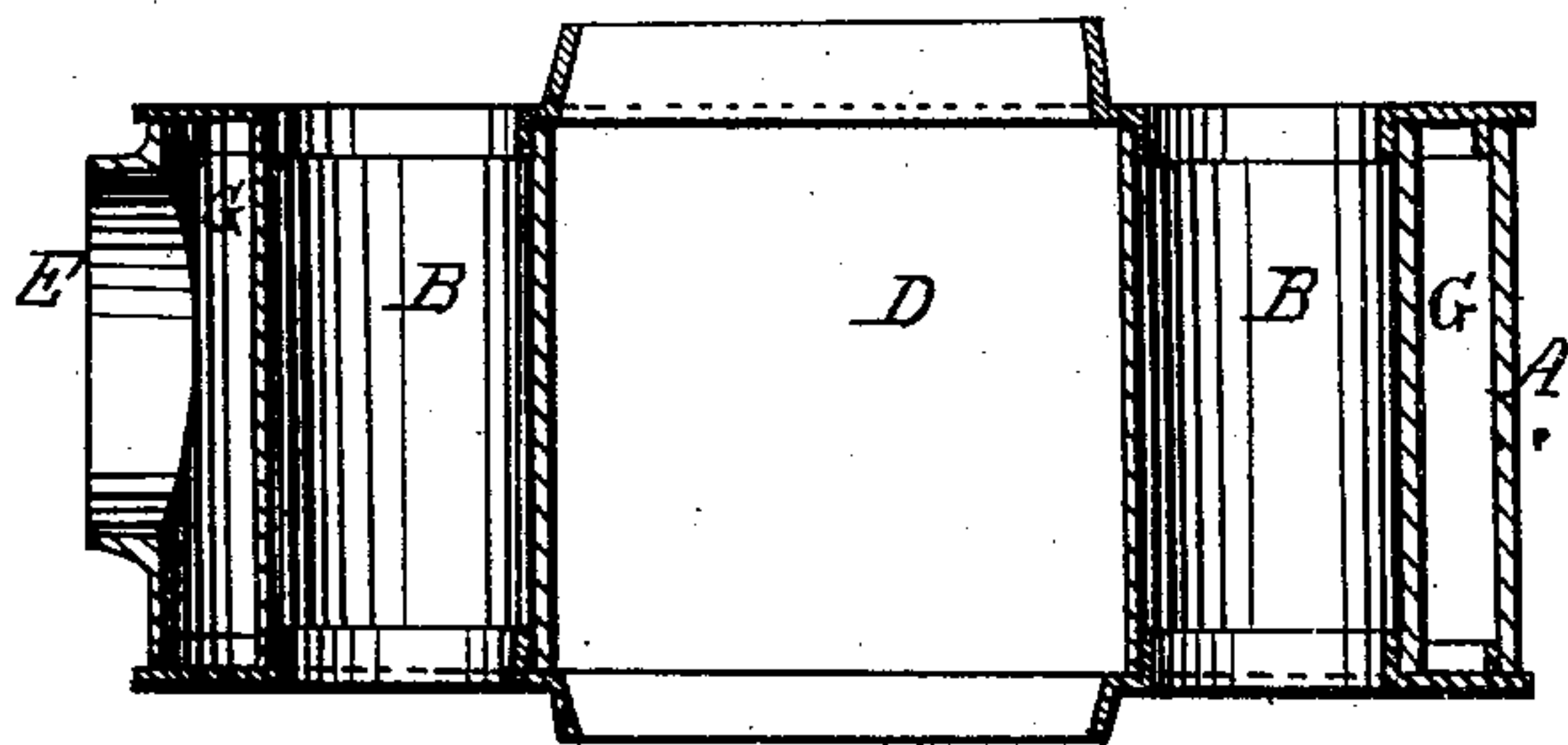


Fig. 2



Witnesses:

*E. J. Kastenhuber*  
*Chas Wählers*

Inventor:

*N. A. Boynton*  
*per*  
*Jas. S. ...*  
*Att'y*

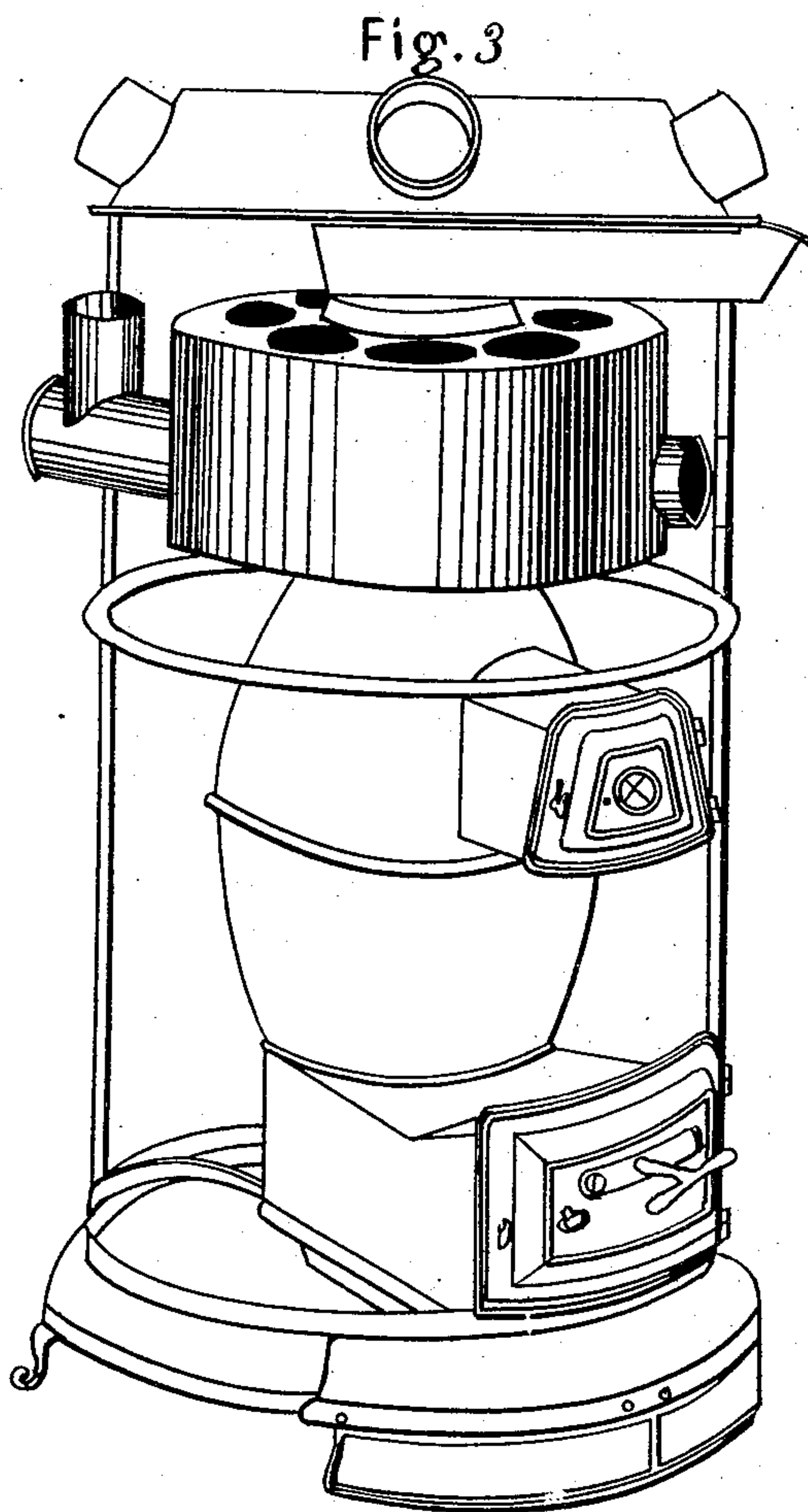
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Witnesses:

*Ernest F. Kastenhuber  
& W. H. W. W. W. W.*

Inventor:

*N. A. Boynton  
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# UNITED STATES PATENT OFFICE.

NATHANIEL A. BOYNTON, OF NEW YORK, N. Y.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 89,549, dated May 4, 1869.

*To all whom it may concern:*

Be it known that I, NATHANIEL A. BOYNTON, of the city, county, and State of New York, have invented a new and useful Improvement in Radiators; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 is a horizontal central section of my improved radiator.

Figure 2 is a vertical section of the same.

Figure 3 shows an elevation of my improvement applied to a hot-air furnace.

The opening shown in the additional drawing, on the right-hand side of the drum, is for the purpose of enabling one to clean out the drum, and remove therefrom ashes, dust, soot, &c., without being compelled to take the radiator and furnace to pieces.

Similar letters indicate corresponding parts.

This invention relates to radiators containing air-tubes, through which currents of air are caused to flow, and against which tubes the products of combustion and hot gases from the fire are made to pass, for the purpose of imparting heat to them. This radiator is designed for use in hot-air furnaces.

It has been common, in such radiators, to place the exit-pipe in the top of the apparatus, and to use deflectors, or winding partitions to compel the said products and gases to go between and around the air-tubes on their way to the exit-pipe.

In my invention, I place the exit-pipe in the side of the radiator, extending therefrom horizontally. This could not be done before my invention without, at the same time, preventing the products of combustion and hot gases from acting upon the tubes, and upon such parts of the radiator as are on the opposite side from the place of exit.

My invention is designed to cause the said products and hot gases to act upon all parts of the radiator, and to pass around and heat all the air-pipes, as well those on the side of the radiator opposite to and farthest away from the exit-pipe, as those adjacent thereto.

This result I accomplish by forming a con-

tinuous combustion-chamber around the series of air-pipes, between their outer sides and the enclosing cylinder, in combination with an arrangement of the air-pipes in close order, so as to leave very narrow interspaces between them, by which arrangement and combination I prevent the said products and gases from going out past one portion only of the air-pipes, and cause them to pass between and go around all the air-pipes, and enter into the said combustion-chamber on their way to the exit-pipe, thereby distributing the said products and gases, and consequently, the heat imparted by them equally to all the pipes, and to all parts of the radiator.

In this example of my invention, I have shown a radiator of cylindrical form, whose exterior wall, A, encloses the air-pipes B.

The letter D designates a central space, above and in connection with, or forming a portion of the fire-box where the fuel is burned.

The products of combustion ascend the space D, which, in practice, is closed at top, and pass thence through the interspaces F F, &c., between the adjacent sides of the several air-pipes into the large annular combustion-chamber G.

The said combustion-chamber G communicates directly with the exit, or draught-pipe E, so that the contents of said chamber G are readily carried off through said exit, and a partial vacuum is created in said chamber throughout its whole circuit, or extent.

This partial vacuum is supplied from the central space D, through the narrow channels F, whose area is so small in comparison with the area of the chamber G that the partial vacuum in the latter cannot be fully supplied through a part only of such channels F, but can be fully supplied only through or by means of all or nearly all the channels, wherefrom it results that the products of combustion and hot gases will pour into said chamber G, at all points, through said channels F, and the heat therefrom will be diffused to all parts of the outside cylinder A.

Furthermore, the area, or size of the channels F is not sufficient to allow all the products of combustion, and gases in space D, to reach the exit by going through those only of the said channels F which are adjacent to said

exit, and consequently the said products and gases are compelled to enter the rest of said channels F in order to gain entrance to said chamber G, and to reach the exit E.

My invention enables me to place the exit E at one side of the radiator, instead of at the top, without thereby compelling all the products of combustion and hot gases to take the short route to the exit, and so preventing their circulation, and the diffusion of heat about the other parts of the radiator.

This radiator, as will be seen from the foregoing, is not of that class containing tubes around the body, or immediately over the fire-pot,

but to be placed above the main combustive chamber, and designed more especially for hot-air furnaces.

Having thus described my invention,

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

The radiator A B E F G, when constructed substantially as set forth, and arranged and combined with a hot-air furnace, in the manner herein described.

NATHL. A. BOYNTON.

Witnesses:

CHAS. WAHLERS,

E. F. KASTENHUBER.