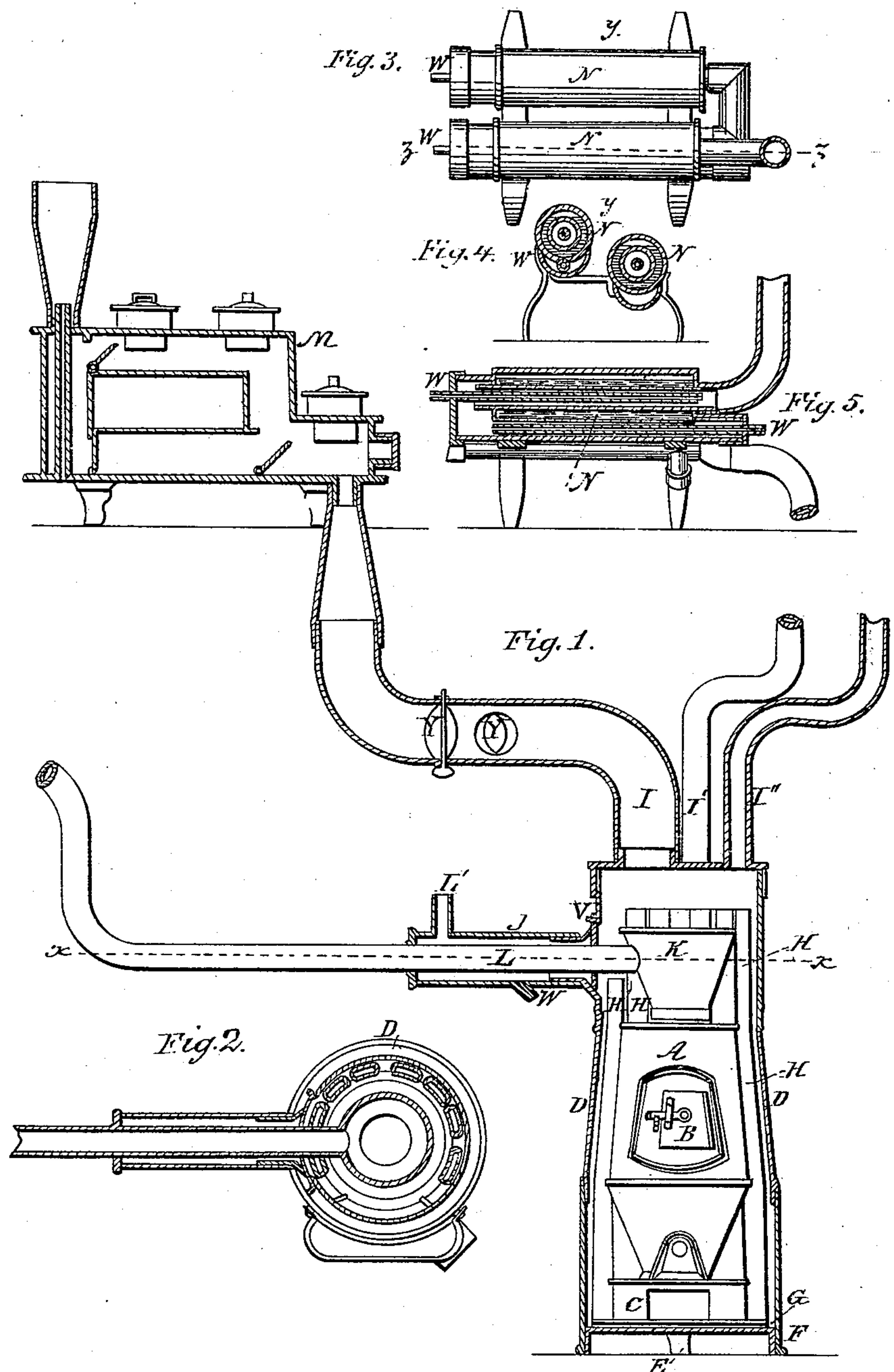


S. BENNETT.

Apparatus for Utilizing Heat from a Furnace.

No. 50,551.

Patented Oct. 24, 1865.



Witnesses.  
 C. D. Smart.  
 W. F. Hall.

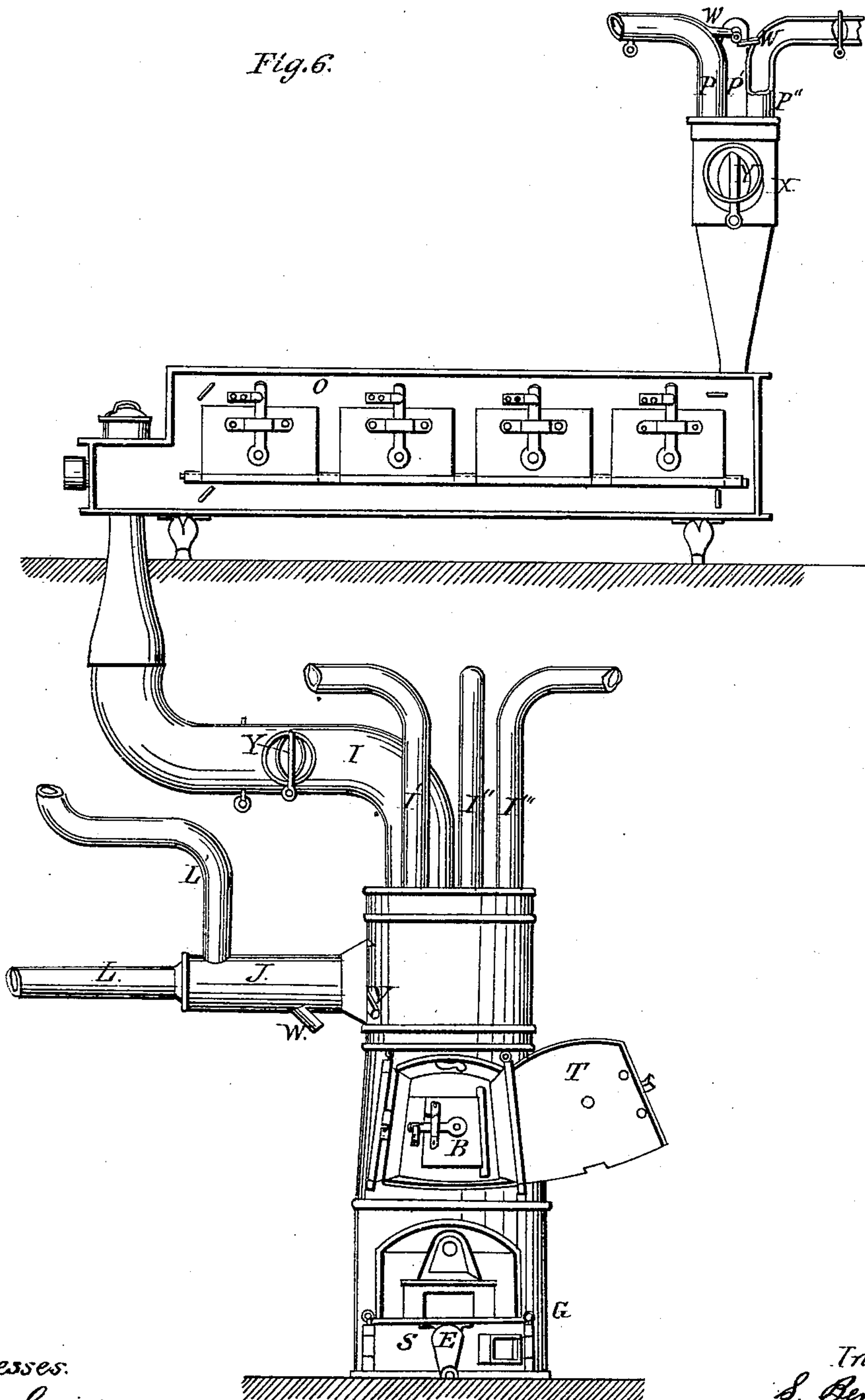
Inventor.  
 S. Bennett  
 By *Munn & Co.*  
 Attys.

S. BENNETT.

Apparatus for Utilizing Heat from a Furnace.

No. 50,551.

Patented Oct. 24, 1865.



Witnesses:

C. D. Smith.  
W. F. Hall.

Inventor:  
S. Bennett.  
By Munn & Co.  
Atty.



# UNITED STATES PATENT OFFICE.

SILAS BENNETT, OF NEW CASTLE, PENNSYLVANIA.

## APPARATUS FOR UTILIZING HEAT FROM A FURNACE.

Specification forming part of Letters Patent No. 50,551, dated October 24, 1865.

*To all whom it may concern:*

Be it known that I, SILAS BENNETT, of New Castle, in the county of Lawrence and State of Pennsylvania, have made new and useful Improvements in Apparatus for Utilizing Heat from a Furnace; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a vertical sectional view of the heating-furnace and a cook-stove on an upper floor, receiving heated air from the furnace below. Fig. 2 is a horizontal section on the line  $x x$ , Fig. 1. Fig. 3 is a plan or top view of the chambers, in which air from without is admitted by tubes to mingle with circulating heated air within. Fig. 4 is a vertical transverse section on the line  $y y$ , Fig. 3. Fig. 5 is a longitudinal vertical section on the line  $z z$ , Fig. 3. Fig. 6 is an elevation of the heating-furnace below and a bake-oven on the floor above, the heat from the flue of the latter being again distributed by pipes to other chambers.

The same letters in different figures refer to corresponding parts.

The invention consists, first, in the insertion of air-tubes into the heating-chamber of an air-furnace so that each apartment is supplied separately and directly with heated air from the said chamber; secondly, the introduction of additional air-tubes of comparatively small diameter into the tubes in which the heated air is circulating, the said smaller tubes introducing air from the outside of the apparatus to mingle with the air within to increase its volume and draft; thirdly, the application of the heated air from the furnace to the purposes of generating steam, cooking, drying, or other culinary purposes, after which, if required, it may be again conducted to other spheres of usefulness.

To enable one skilled in the branch of manufacture to which my invention appertains to construct and use the same, I will proceed to describe it.

A is the fire-chamber of a heating-furnace, of which B is the fire-door; C, the ash-pit opening, through which the air is admitted to the fire. The fire-chamber A is inclosed by a drum, D, which sets upon the floor, the furnace being supported by legs E, which project through the

plate F, which may be called the "floor of the drum," and divides the air which enters beneath the hearth-plate G into two portions, one passing over the plate F to fill the space inside the drum and around the tubes H, while the portion of air passing below the plate enters the tubes H, which, at their lower ends, are inserted into the said plate, which has openings to correspond. The body of air thus divided by the plate and passed to the jacket and tubes respectively, unitedly enters the tubes I I' I'', &c., to be conducted to other apartments or duties, except such as may be diverted into the tube J, Fig. 6, for the use of the room in which the furnace is placed.

The truncated inverted conical chamber K over the fire-chamber communicates with the chimney by the flue L, which forms the exit-passage for the volatile products of combustion. The heated air passing up the tubes H acquires a determinate draft in a vertical direction, and assists the other heated air which is inclosed within the drum in passing into the tube I I', &c., which, as has been remarked, may communicate, as in Fig. 1, with a cooking-stove, M, on an upper floor, with a boiler, N, Figs. 3, 4, 5, or with a bake-oven, O, Fig. 6, from either of which the heated air may be again conducted, as in Fig. 6, by pipes P P' P'' to other places where the heat is to be utilized.

S is the door which, when open, exposes the space below the hearth, and it is provided with an opening, which may be connected by a pipe, if so desired, with the air outside of the apartment or house.

T is a supplementary door closing up the fire-door and a portion of the furnace around it, and diminishing exterior radiation therefrom.

V is a damper, which is used to close the annular opening J, Fig. 6, around the flue L.

The small slide U regulates the opening leading from the space between the doors T and B to the jacket-space of the furnace.

The boiler N (shown in Figs. 3, 4, and 5) need be of no determinate form, and the remark will apply to the cooking-stove M and bake oven O; but I will describe the said boiler, as there is one peculiar feature of my invention which is as clearly represented there as in any other of the devices represented. This feature consists of a pipe, W, which communicates at one end with the air exterior to the flue or pipe in which it is placed, and at the other end opens



into the interior of said pipe. Its purpose, in whatever place it may be fitted, is to introduce a supply of exterior air into the circulation, which I find to increase the draft, and the consequent heat, as affecting the lively combustion of the fuel.

The application of the pipe W in various positions is shown in Fig. 1 entering the pipe J; in Figs. 3, 4, 5, entering the chambers, which are surrounded by a water-jacket and constitute a boiler, the hot air circulating below and through them. It is also shown at the upper end of Fig. 6, where the branch pipes from the chamber X above the oven have entering pipes W, as described above.

The various portions of the apparatus are provided with dampers Y, for the purpose of closing the approach to certain passages and limiting the flow of the heated air to such portions as may be required.

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

1. The vertical air-tubes H, located in the air-heating chamber of the furnace, and used to assist the draft of heated air into the distributing-tubes I I', &c., which lead from the

furnace to the place where the heated air is to be utilized.

2. So inserting the air-tubes into the air-heating chamber, in connection with and immediately beneath the distributing-pipes above them, that the apartments of the house may be supplied directly and separately with air from the cold-air duct, substantially as described and represented.

3. The additional air-tubes W, for the introduction of exterior air into the circulation, as described and represented.

4. The arrangement, as described and represented, for conducting the heated air from the furnace to appliances or apparatus for generating steam, culinary or drying operations, baking, &c., whether or not the same be previously or subsequently used for warming apartments.

To the above specification of my improved apparatus for utilizing heat from a furnace I have signed my hand this 25th day of May, 1865.

SILAS BENNETT.

Witnesses:

C. D. SMITH,  
ALEXR. A. C. KLAUCKE.