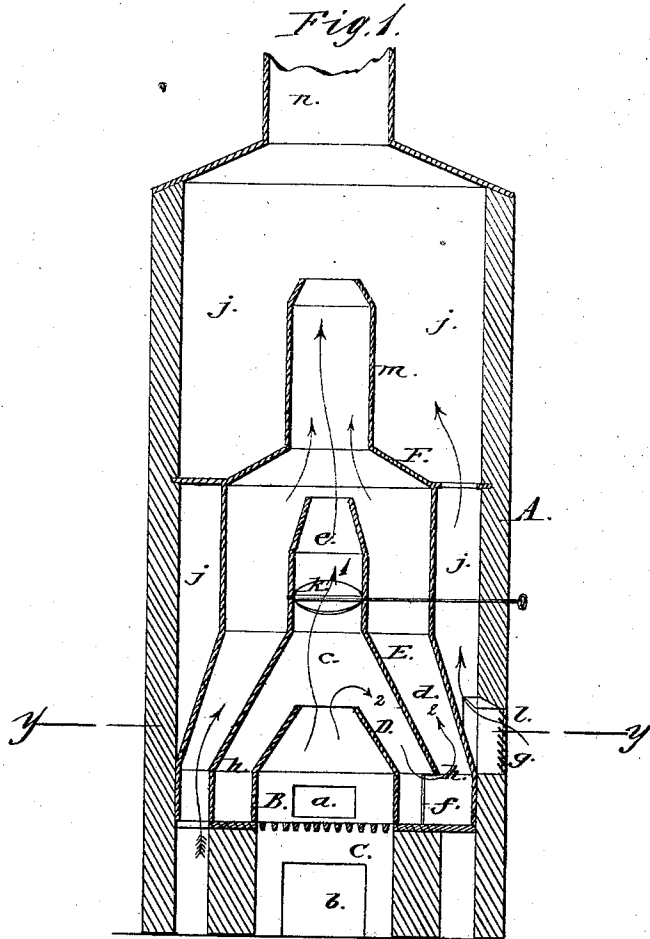


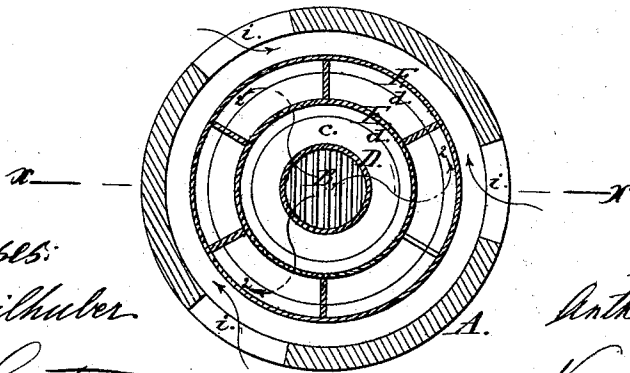
**A. PFUND.**  
**Hot-Air Furnaces.**

No. 144,355.

Patented Nov. 4, 1873.



*Fig 2.*



*Witnesses:*  
*Ernst Bilhuler*  
*Henry Gentner*

*Inventor:*  
*Anthony Pfund*  
*Van Santvoord & Rank*  
*ATTY*

# UNITED STATES PATENT OFFICE.

ANTHONY PFUND, OF NEW YORK, N. Y.

## IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 144,355, dated November 4, 1873; application filed October 2, 1873.

*To all whom it may concern:*

Be it known that I, ANTHONY PFUND, of the city, county, and State of New York, have invented a new and useful Improvement in Air-Furnaces for Drying Malt or other Articles; 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 represents a vertical central section of this invention in the plane  $x x$ , Fig. 2. Fig. 2 is a horizontal section of the same in the plane  $y y$ , Fig. 1.

Similar letter indicate corresponding parts.

This invention relates to an improvement in furnaces; and consists in arranging within an outer shell or casing three bonnets placed in respect to each other so as to form a smoke and an air chamber, said bonnets being combined with a fire-chamber, an ash-chamber, and a suitable controlling valve or damper, an additional air-chamber being formed between the third bonnet and the furnace-wall, so that said air-chamber and the air-chamber between the bonnets are made to communicate with the external atmosphere in such a manner that the cold external air admitted to said air-chamber is prevented from reacting on the fire, and the heated gases rising from the fire are freed from impurities, while at the same time the temperature of the gases and air can be regulated, and a complete and economical combustion of the fuel is effected.

In the drawing, the letter A designates the outside wall of my furnace, which is circular, square, or in any other desirable form or shape, and in the center of which is situated the fire-place or grate B, to which access is had through a door,  $a$ , Fig. 1. Beneath the grate is the ash-chamber C, to which access is had through a door,  $b$ . The grate B is covered by three bonnets, D E F, one within the other. Between the bonnets D E is formed a smoke-chamber,  $c$ , which communicates with an air-chamber,  $d$ , formed between the bonnets E and F through a pipe,  $e$ , rising from the bonnet E, as indicated by arrow 1 in Fig. 1, and also through apertures  $f$  in the bottom of said bonnet, as indicated by arrows 2 in Figs. 1

and 2. The air-chamber  $d$  between the bonnets E F communicates with the outside atmosphere through channels  $g$ , which are situated opposite the closed portions of the bonnet E, so that the cold air which enters through said channels will not pass through the apertures  $f$  into the smoke-chamber  $c$  between the bonnets D and E. To effect this purpose partitions  $h$  are inserted into the air-chamber  $d$ , which rise up to such a height as may be required to produce the desired result. In the outside wall A are apertures  $i$ , through which cold air can be admitted into an air-chamber,  $j$ , formed between the outer bonnet F and the outside wall. The smoke-pipe  $e$  of the second bonnet E is provided with a damper,  $k$ , and in the apertures  $i$  of the outer wall are fitted dampers  $l$  for the purpose of regulating the quantity of cold air which is to be admitted to the air-chamber  $j$ . When the fire is lighted the damper  $k$  is opened, so as to obtain a good draft; but after the fire is burning said damper is partially or wholly closed, and the products of combustion take the course indicated by the arrows 2 in Fig. 1. The light ashes mixed with the products of combustion are deposited in the bottom of the smoke-chamber  $c$ , and as said products of combustion enter the air-chamber  $d$  they mix with the cold air admitted into said air-chamber through the channels  $g$ . This air becomes heated by its contact with the heated sides of the bonnet E F, and it produces a good draft, whereby the combustion of the fuel is fully kept up, while the air has no chance to descend upon the fire and to stop the draft. The air and the products of combustion become intimately mixed, and they rise up through a pipe,  $m$ , which extends from the top of the bonnet F. On leaving this pipe the air and gases enter the outer chamber  $j$ , whence they escape to the drying-room through a pipe,  $n$ . If the temperature of the air and gases should be too high, cold air is admitted through the dampers  $l$ , and the temperature of the air and gases admitted to the drying-room can be regulated with the greatest nicety without interfering in any way with the draft of the fire requisite to keep up a complete combustion of the fuel.

It must be remarked that the cold air admitted through the dampers  $l$ , on passing up

through the air-chamber *j*, becomes warmed, and acquires a certain velocity, which depends upon the height of said air-chamber, and which is requisite to prevent said air from interfering with the draft of the fire.

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

The combination in a furnace of the bonnets D E F, smoke and air chambers *c d*, fire-chamber B, ash-chamber C, case or wall A,

and a controlling damper or valve, substantially as herein shown and described, for the purpose specified.

This specification signed by me this 24th day of July, 1873.

ANTHONY PFUND.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.