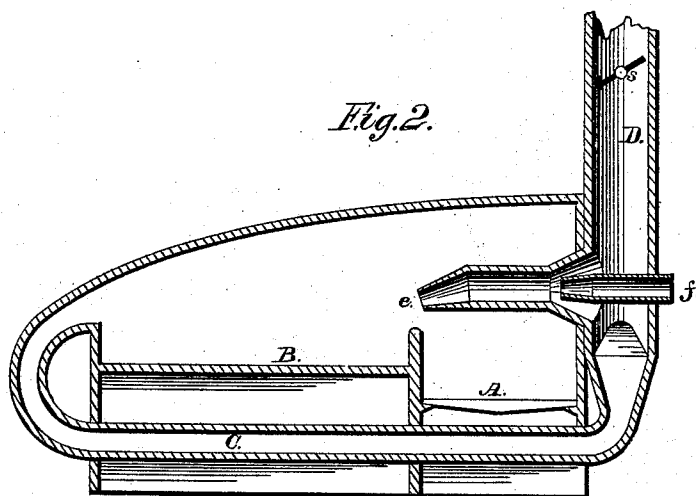
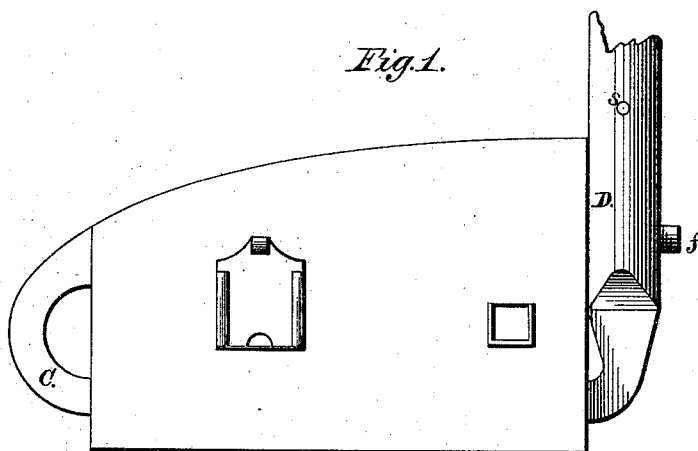


J. WILLIAMS.
METALLURGIC FURNACE.

No. 174,100.

Patented Feb. 29, 1876.



Witnesses:

B. L. Johnston
D. J. K. Rice

Inventor:

Joseph Williams
By A. C. Johnston.

UNITED STATES PATENT OFFICE.

JOSEPH WILLIAMS, OF SHARPSBURG, PENNSYLVANIA.

IMPROVEMENT IN METALLURGIC FURNACES.

Specification forming part of Letters Patent No. **174,100**, dated February 29, 1876; application filed January 24, 1876.

To all whom it may concern:

Be it known that I, JOSEPH WILLIAMS, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metallurgic Furnaces; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

In metallurgic furnaces the gases, after performing their office in the working-chamber, are usually carried off through the stack.

Now, the object of my invention is to utilize the heat which is usually carried off by conveying the heated gases back, through the medium of a flue, to a stack, which is placed at the end of the furnace having the fire-chamber, and connecting the working-chamber with the stack through the medium of a flue, in which is placed an injecting device, which serves the double purpose of transmitting the gases from the stack over the fire-place to the working-chamber, commingling said gases with air, steam, or gas, and discharging them directly upon the working-bed.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the accompanying drawings, which form part of my specification, Figure 1 is a side elevation of my improvement in metallurgic furnaces. Fig. 2 is a vertical longitudinal section of the same.

In the drawings, A represents the fire-chamber of the furnace; B, the working-chamber; C, the flue leading to the stack D, which communicates with a flue, *e*, passing over the fire-chamber to the working-chamber. Within the stack and flue *e* is an ejecting-pipe, *f*, for directing the ascending gases in the stack back through the flue *e* into the working-chamber B, by forcing, through the medium of a fan or other suitable device, a current of air,

steam, or gas through the pipe *f*, which currents of air, steam, or gas will draw the gases from the stack D, which, commingling with the currents of steam, air, or gas, will be discharged directly upon the bed in the working-chamber, thereby greatly adding to the heat within the furnace, and thus utilizing the heat of the gases usually carried off through the stack. The stack is furnished with a damper, *s*, which may be utilized in controlling the volume of gas passing from the stack—that is to say, when the damper is closed a greater volume of gas from the stack will pass through the flue *e* into the working-chamber, and when the damper is opened a less volume will pass through the flue *e* into the working-chamber.

It will be seen that as the flue *e* is placed directly over the fire-place it will be highly heated, restoring to the gases the heat lost during their passage through the flue C. It will also be seen that the mixed gases are discharged directly upon the working-bed B before having any opportunity to combine with the gases rising from the fire-place.

I do not claim the combination of a furnace and pipes or flues arranged to combine other gases with those from the furnace and return the mixed gases to the furnace; but

I claim—

1. The combination, in a furnace, of the fire-place A, working-bed B, stack D, injecting-pipe *f*, and flue *e*, arranged to convey the gases above the fire-place from the stack to a point above the working-bed, as set forth.

2. The combination, with the fire-place, working-bed, and stack, of the injecting-pipe *f* and flue *e*, whereby the gases passing from the stack to the working-bed are reheated without being mingled with the gases rising from the furnace, as described.

JOSEPH WILLIAMS.

Witnesses:

A. C. JOHNSTON,
D. I. K. RINE.