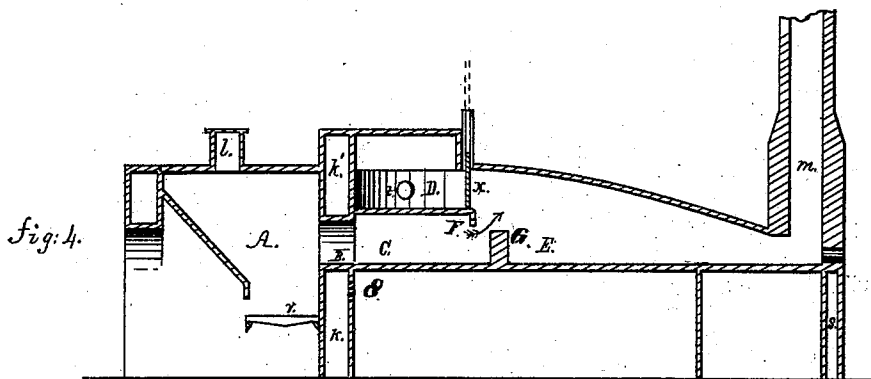
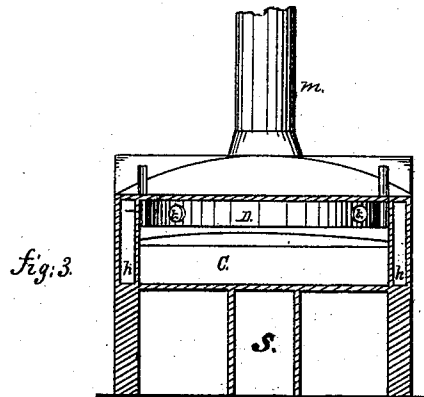
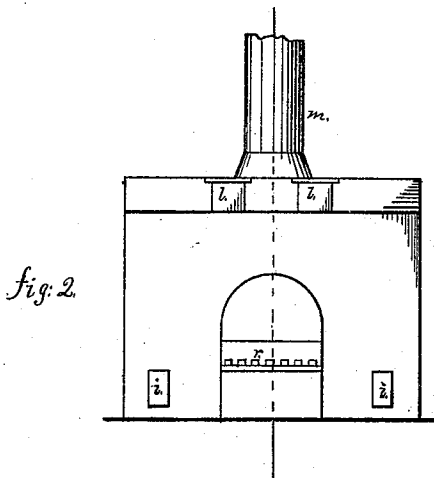
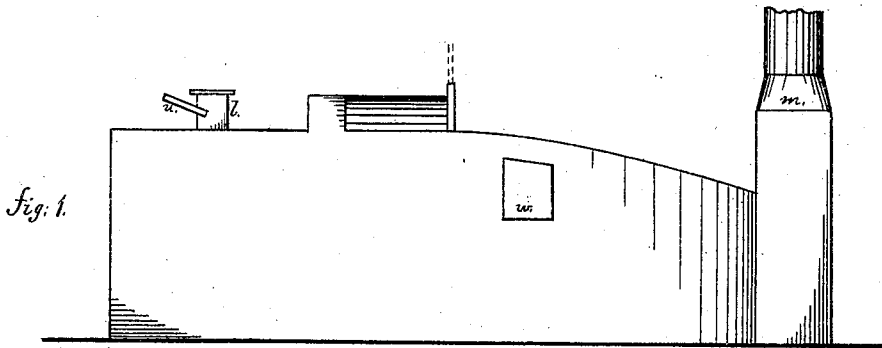


W. SILVESTER & H. KIRK.
METALLURGIC FURNACE.

No. 179,072.

Patented June 20. 1876.



Witnesses.

James L. Johnston
James E. Weaver

Inventors.

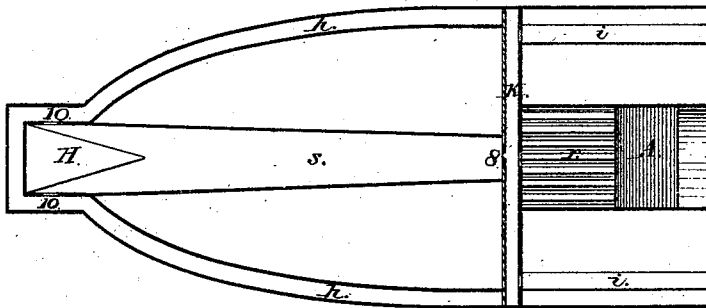
Inventors.
William Silvester
Henry Smith.

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Fig. 5.



Witnesses:
James J. Johnston
James C. Weaver

Inventors
William Silvester
Henry Kirk

UNITED STATES PATENT OFFICE

WILLIAM SILVESTER AND HENRY KIRK, OF PITTSBURG, PA., ASSIGNORS OF
ONE-THIRD THEIR RIGHT TO JAMES T. McHUGH, OF SAME PLACE.

IMPROVEMENT IN METALLURGIC FURNACES.

Specification forming part of Letters Patent No. **179,072**, dated June 20, 1876; application filed
March 23, 1876.

To all whom it may concern:

Be it known that we, WILLIAM SILVESTER and HENRY KIRK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metallurgic Furnaces; and we 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.

Our invention relates to an improvement in metallurgic furnaces; and consists in the combination of a combustion-chamber, air-chamber, fire-chamber, air-heating flue, and bridge-walls, arranged and operating with relation to each other substantially in the manner hereinafter described.

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

In the accompanying drawings, which form part of our specification, Figure 1 is a side elevation of our improvement in furnaces. Fig. 2 is an end view of the same. Fig. 3 is a transverse section of the same. Fig. 4 is a vertical and longitudinal section of the same. Fig. 5 is a horizontal longitudinal section of the furnace.

Referring to the drawings, A represents the fire-chamber of the furnace, provided with a supply-hopper, *l*, furnished with a valve with a lever, *u*, through which the fuel is fed to the fire-chamber. B is a flue leading from the fire-chamber, through which the products of combustion are conveyed into the gas-chamber C. D is an air-chamber, placed over the gas-chamber, which communicates with a system of hot-air flues, through the openings *t*, hereafter described. E is the working-chamber. The air-flues *i i* communicate with the chamber *k*, which communicates with the air-duct *s* through the opening 8, and this latter communicates with the side flues *h h* in the walls of the furnace, that lead to the chamber *k'* and the hot-air chamber D, communicating with the latter by means of the openings *t*. F and G are bridge-walls.

The hot-air chamber D is provided with an adjustable gate, *x*, by which the opening leading to the working-chamber, for the passage of the hot air, can be increased or diminished.

The air-chamber being situated directly above the one in which the hot and partially-consumed furnace-gases are circulating, has its temperature and that of the contained air considerably increased thereby. As a consequence, the air passes from beneath the regulating-gate *x*, and mixes with the furnace-gases with much more efficiency and intensity.

The grate *r*, the stack *m*, and the charging-door *w*, are all of ordinary construction.

The operation of our invention is as follows: The exterior air enters the flues *i i*, is conveyed into the chamber *k*, and from thence passes through the opening 8 into the duct *s*. From here it is deflected by the deflector H into the side flues *h h* through the openings 10, and by these flues it is conveyed to the chamber *k* and hot-air chamber D. The air as it passes in proximity to the fire is increased in temperature, and in its passage through the duct *s* and flues *h h* absorbs heat from the walls of the furnace, and when it reaches the place where it enters the chamber D, its temperature is quite high, sufficiently so to support the combustion of the gases. The hot air passes from the chamber D, induced by the draft of the furnace, and comes in contact with the products of combustion, which pass from the gas-chamber C under the hanging bridge-wall F, in the direction of the arrow, and at the point of contact the intense heat of the air produces a perfect combustion of the gases and other unconsumed results from the fire-chamber, and a clear white flame passes over the bridge-wall G into the working chamber, possessing an intense reducing-power.

What we claim, and desire to secure by Letters Patent, is—

1. In a metallurgic furnace, the combination of the induct-flues *i i*, the chamber *k*,

the duct *s*, the return side flues *h h*, and air-chamber D, with the fire-chamber and working-chamber, substantially as described.

2. In a metallurgic furnace, the combination of the fire-chamber A, flue B, gas-chamber C, bridge-walls F and G, and hot-air chamber D, with the working-chamber, substantially as described.

3. The combination of the fire-chamber A, flue B, gas-chamber C, with the air-chamber D, substantially as described.

WILLIAM SILVESTER.
HENRY KIRK.

Witnesses:

JAMES J. JOHNSTON,
A. H. JOHNSTON.