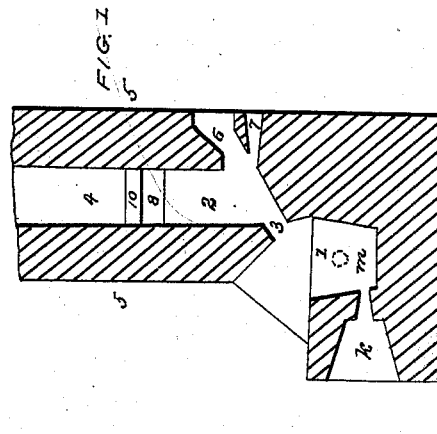
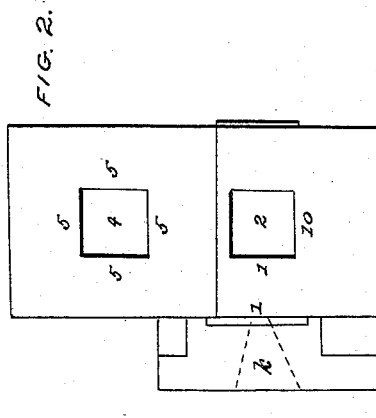
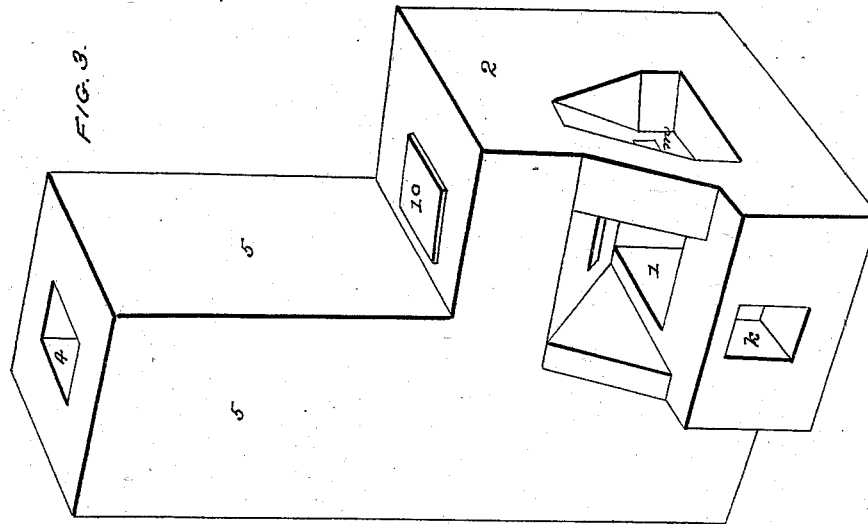


S. GUILFORD.
Smelting Furnace.

No. 3,390.

Patented Dec. 27, 1843.



UNITED STATES PATENT OFFICE.

SIMEON GUILFORD, OF LEBANON, PENNSYLVANIA.

IMPROVEMENT IN BLOOMERY-FORGES EMPLOYED IN THE MANUFACTURE OF WROUGHT-IRON.

Specification forming part of Letters Patent No. 3,390, dated December 27, 1843.

To all whom it may concern:

Be it known that I, SIMEON GUILFORD, of the borough and county of Lebanon, in the State of Pennsylvania, have invented a new and useful Improvement in Bloomery-Forges; and I do hereby declare that the following is a full and exact description thereof, reference being had to the annexed drawings, making part of this specification, similar figures referring to the same parts in the several representations.

My improvement consists in combining with the forge-fires, as they are usually constructed for blooming, an additional fire-room, which I call a "cupola." This fire-room is elevated above the forge-fire, and the combustion of the fuel used therein is kept up by the draft or rush of heated air up the chimney-flue, with which the cupola is connected at Figure 8. The two fires are connected by the ascending flue at Fig. 3. This slope serves to support and give an easy egress to the materials which are to pass from the upper into the lower fire in the management of the fires.

No. 1 is a vertical longitudinal section in the annexed drawings, and No. 2 is a horizontal section. No. 3 is a perspective view.

In these drawings, Fig. 1 is the forge-fire or crucible, which in all its parts is constructed in the usual manner of bloomery-forges. Fig. 2 is the cupola fire-room, which should be about fifteen inches square and two feet in height from Fig. 3 to Fig. 8, for common purposes.

The combustion of the fuel and the heating of the minerals take place in the lower part of the cupola—viz., from Fig. 3 to 8—the top of cupola being kept covered at Fig. 10. Fig. 6 is an opening through the wall of the cupola, with a door or stopper to keep it closed, except when it is used to inspect and stir up the materials in the cupola. At Fig. 7 a hole is left in the wall for the purpose of admitting a

blast of air, if the working of the cupola should at any time require it. The draft of the chimney (the walls of which are represented at Fig. 5, and the flue Fig. 4) causes the heat and flame of the lower or forge fire to rush in at Fig. 3 and pass up through the coal in the cupola to Fig. 8, where it enters the main flue of the chimney.

The main walls of the stack and chimney may be of brick or stone. All the interior parts, which are exposed to a high heat, must be constructed with fire-proof materials. In blooming ore and other materials by the improved forge, the lower fire is managed in the usual way, except that the mineral which is used, instead of being thrown onto that fire with the coal, is thrown with a suitable proportion of coal into the cupola at Fig. 10. This becomes gradually heated in its descent to Fig. 8, where the coal becomes ignited and the smelting process commenced. The materials gradually pass down to the bottom of the cupola and into the lower or forge fire at Fig. 3, when, by the operation of the coal and blast in the forge-fire, the metal is brought to the nature of wrought-iron.

The different varieties of mineral coal, as well as charcoal, can be used as fuel in either of the two fires, though charcoal answers the best for refining the metal in the lower fire, and the blast of air may be cold or heated.

What I claim as my invention and improvement, and wish to secure by Letters Patent, is—

The mode of constructing and using what is herein described as the "cupola-fire" in combination with a forge-fire, commonly called a "bloomery-forge," for converting iron ore, forge-cinder, or metal into wrought-iron, substantially as herein described.

SIMEON GUILFORD.

Witnesses:

J. C. GOODHART,
JOEL GOODHART.