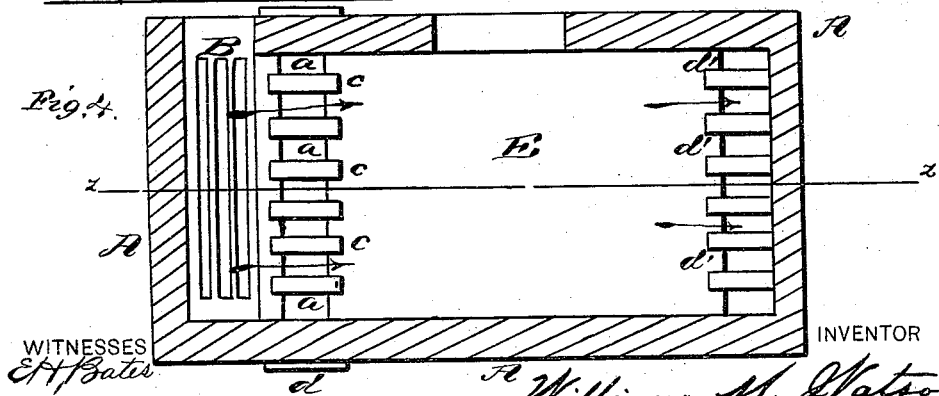
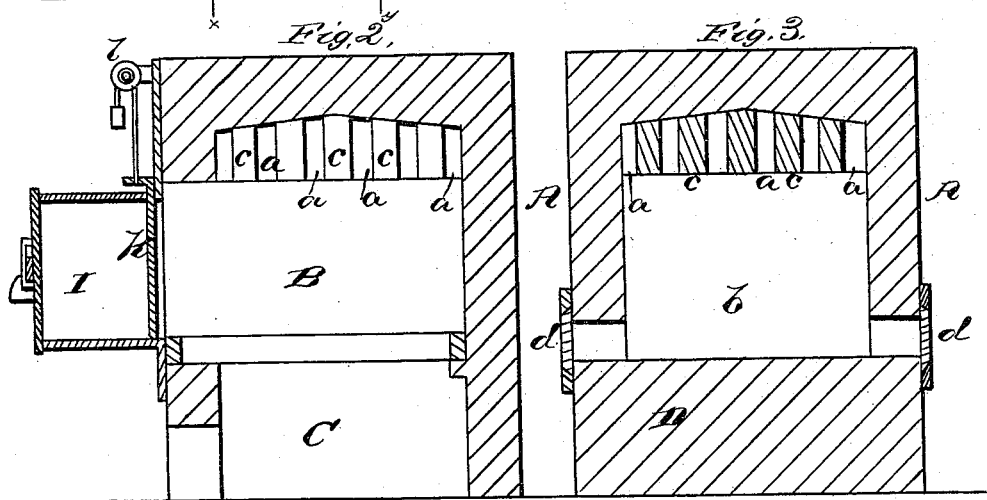
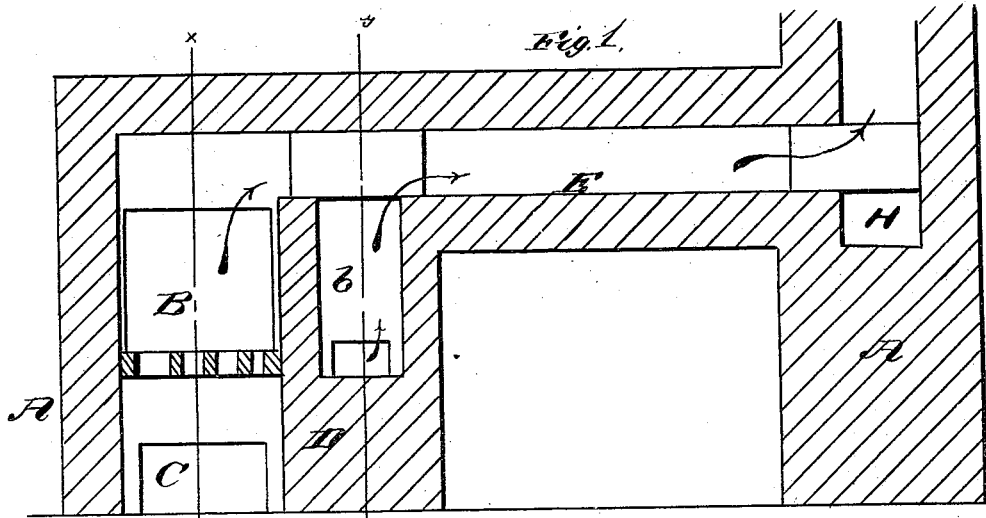


W. M. WATSON.
METALLURGIC-FURNACE.

No. 191,209.

Patented May 22, 1877.



WITNESSES
E. H. Bates

INVENTOR

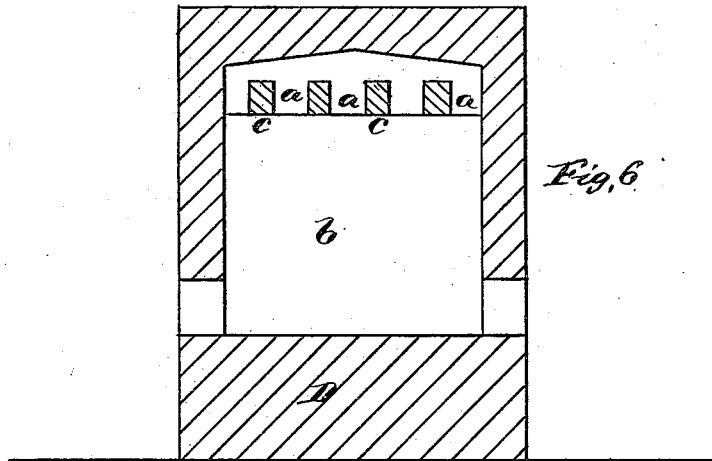
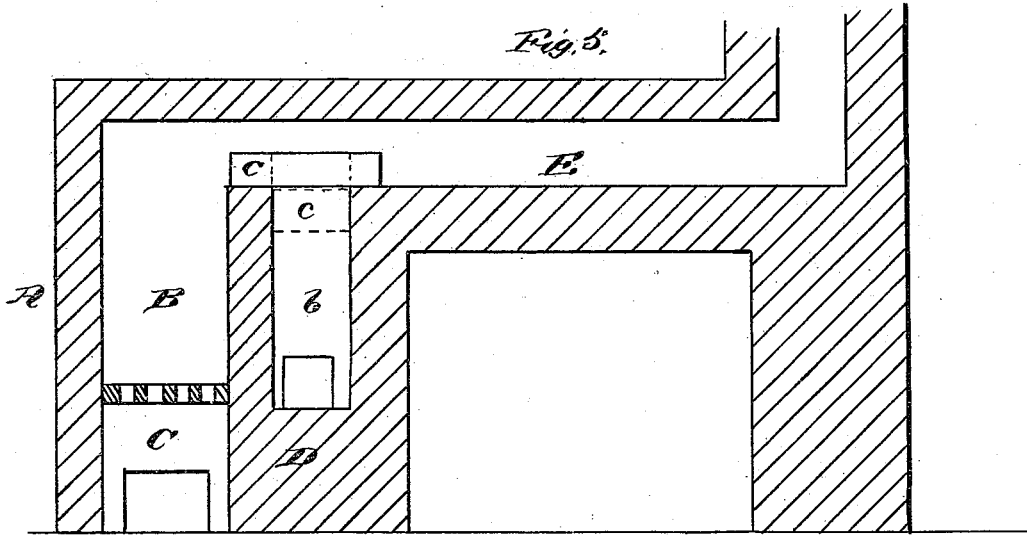
William M. Watson.
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 ATTORNEYS.

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UNITED STATES PATENT OFFICE

WILLIAM M. WATSON, OF TONICA, ILLINOIS.

IMPROVEMENT IN METALLURGIC FURNACES.

Specification forming part of Letters Patent No. 131,209, dated May 22, 1877; application filed February 17, 1877.

To all whom it may concern:

Be it known that I, WILLIAM MEDD WATSON, of Tonica, in the county of La Salle and State of Illinois, have invented a new and valuable Improvement in Metallurgic Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a vertical sectional view of my improved furnace. Fig. 2 is a vertical transverse sectional view taken through line *x x*. Fig. 3 is a similar view taken through line *y y*. Fig. 4 is a plan view with the top removed. Figs. 5 and 6 are detail modifications of my improved furnace.

The object of this invention is for the purpose of controlling at will a reducing, a neutral, or an oxidizing flame for heating the hearth of the furnace for tempering metals, and for other purposes, while securing the greatest economy of fuel compatible with the kind of flame required. I cause the gaseous products of the primary combustion of the fuel in the fire-chamber to pass therefrom to the heating-hearth through a series of passages, in which atmospheric air is mingled with the blaze in regulated proportions to stimulate their oxidation to the degree that will produce the kind of flame which the work to be tempered on the hearth requires, some kinds of work being best tempered with a reducing-flame, others with a neutral flame, and others with an oxidizing-flame, the due admixture of air and gases to produce the required flame being always effected in the passage before the flame enters the hearth, thereby preventing the injurious effect upon the objects being heated; and the nature of my invention consists in certain improvements upon furnaces, as will be hereinafter more fully set forth.

In the annexed drawings I have shown a reverberatory furnace embodying my invention.

The letter A represents the walls of the furnace; B, the fire-chamber, with ash-pit C underneath. D is the bridge-wall, with central passage *b*; and E the hearth, which latter

may be either stationary or revolving, as may be desired.

The bridge-wall D is provided with a series of horizontal passages, *a*, formed by means of partitions *c*, which latter extend to the roof of the furnace, as fully shown in Figs. 1, 2, and 3 of the drawings.

The passage *b* of the bridge-wall D extends entirely across the furnace, and through the side walls thereof, and at its ends it is provided with sliding doors or dampers *d*, to regulate the admission of cold air into the furnace.

The blaze of the fire is divided, and passes through the horizontal passages *a* in the bridge-wall. Here the atmospheric air that is drawn into the passage *b* comes in direct contact with the smoke and blaze, and assists in burning the inflammable parts. These elements are thence passed over and across the hearth containing the article or articles to be annealed or tempered, and finally through similar passages *d'*, similarly divided at the rear end of the furnace, into the smoke-stack.

The rear wall of the furnace is provided with a well or pit, H, for the collection of the unconsumed products of combustion, and for greater ease of cleaning the chimney.

The letter I represents a fuel box or magazine, attached in front of the furnace-door for the purpose of supplying the fire-chamber. This fuel-box is designed to be a little inclined toward the furnace, so that the fuel can be easily fed to said fire-chamber. Arranged between the entrance of the fire-chamber and the fuel-box is a vertically-sliding metallic door, K, having attached at its upper end a chain and weight, the former passing over a pulley, *l*, journaled in a frame secured near the upper end of the furnace. The ordinary fulcrum and lever with their connections may be used in lieu of the pulley, chain, and weight, to operate the sliding door.

The fuel-box is provided with an outer door, having a hole for the handle of a feed-hoe to project through.

The feed-hoe is placed in the fuel-box and the outer door closed, the handle of the hoe projecting through the door; then the vertically-sliding inner door is opened and the furnace charged with fuel.

The object of the fuel-box with its connections is to have the fuel at hand, and to exclude the admission of cold air during the operation of feeding the furnace.

When the draft of the chimney is not strong enough a blast will be used to aid combustion. The air may be forced into the openings of the passage *b*, and thence upward through the passage *a* in the bridge-wall, where it will mingle and combine with the flame or blaze and gases of the fire-chamber, and accomplish the effect above set forth.

Figs. 5 and 6 of the drawings show modifications of the partition-blocks *c*, as indicated by full and dotted lines.

What I claim as my invention is—

In a furnace, the combination, with the fire

and hearth chambers, of a series of intermediate flues or passages and a hollow fire-bridge, situated below and in direct communication therewith, the arrangement of parts being such that air admitted through the hollow bridge is commingled with the divided currents of gas and flame prior to their entry into the hearth-chamber, substantially as shown and described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM MEDD WATSON.

Witnesses:

E. W. WOOD,

I. A. VANDEVERT.