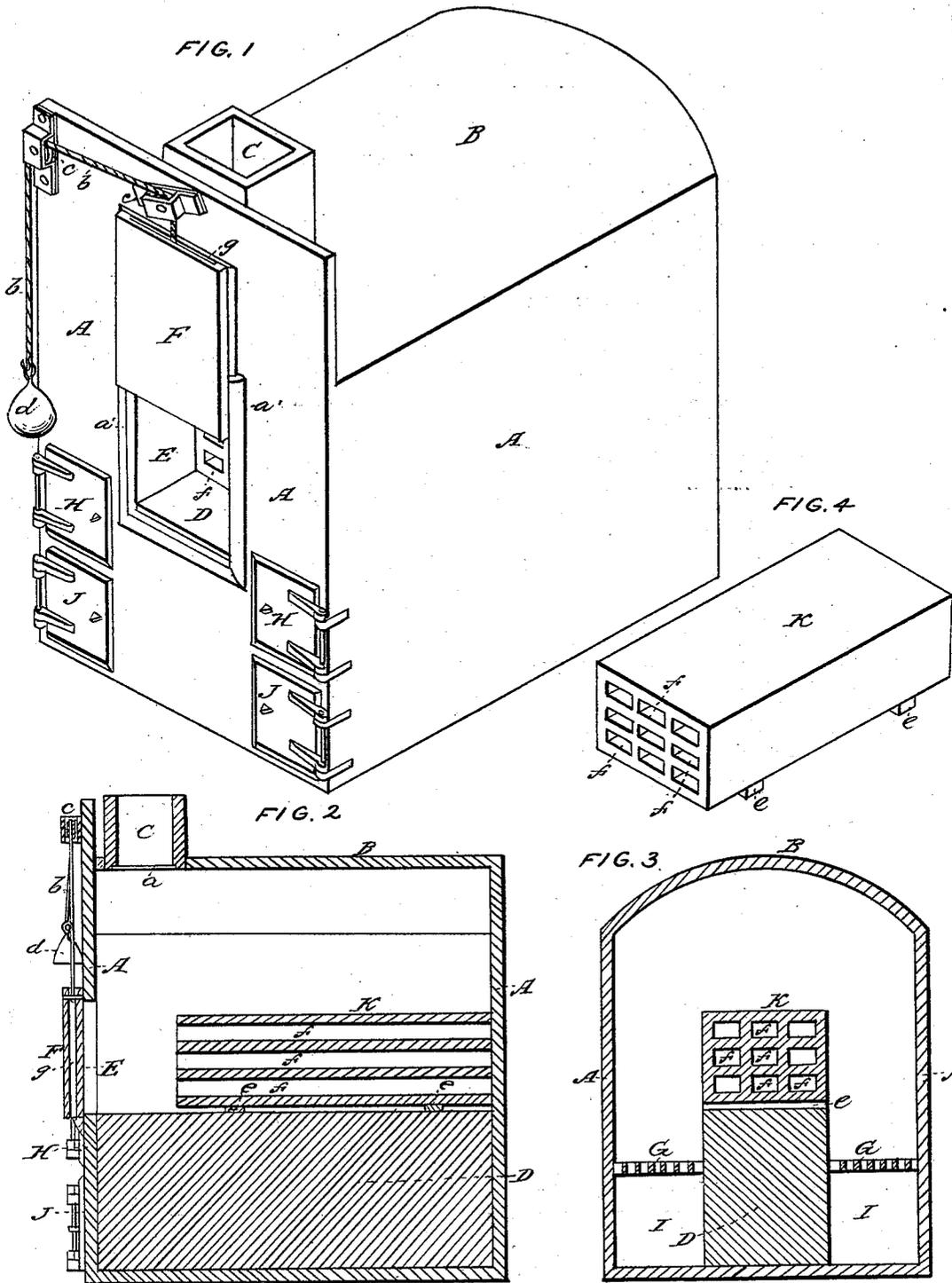


B. S. STOKES.
Tempering Steel.

No. 65,516.

Patented June 4, 1867.



WITNESSES:

J. W. Stearns
J. B. Johnson

INVENTOR:

Benjamin S. Stokes

United States Patent Office.

BENJAMIN S. STOKES, OF MANCHESTER, NEW HAMPSHIRE.

Letters Patent No. 65,516, dated June 4, 1867.

IMPROVED FURNACE FOR HEATING ARTICLES OF STEEL IN THE PROCESS OF TEMPERING.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, BENJAMIN S. STOKES, of Manchester, in the county of Hillsboro, and State of New Hampshire, have invented certain improvements in Furnaces for Heating Articles of Steel in the Process of Tempering, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a furnace with my improvements applied thereto.

Figure 2 is a longitudinal vertical section; and

Figure 3 is a transverse vertical section through the same.

Figure 4 is a perspective view of the "muffle" or receptacle for the reception of the articles while being heated.

In the method of tempering files, and various kinds of cutlery and edge tools, such as knives, plane-irons, &c., it is customary to immerse the article within a metallic bath, the temperature of which corresponds to that required for the article to be tempered. The action of the intense heat on the crucible containing the metallic bath is either liable to destroy the crucible or render the iron of which it is made so porous as to allow the lead of which the bath is composed to leak through and be lost in the fire. The crucible has also been placed within a jacket, and a space left between them for the reception of sand to prevent the crucible from being oxidized by contact with the fire. This method answered a better purpose than that above mentioned, but the jacket was expensive, and a liability still existed of a portion of the lead being wasted.

To overcome the above-mentioned difficulties is the object of my invention, which consists in a cellular "muffle" or receptacle, into which are placed the articles to be heated, the heat being allowed to circulate freely entirely around the "muffle," which, although rendered porous by the expansion and contraction resulting from different temperatures, still retains its form, and is more durable than the crucible, while at the same time the expense and inconvenience of using the "metallic bath" are avoided.

My invention also consists in placing the flue in a position not far from and above the door, in order that the heat may be concentrated at this point to counteract the effect produced by the entrance of the cold air from without when the furnace door is opened for removing articles from and placing others within the "muffle," which would otherwise in a measure cool those already therein and prevent them from being properly tempered.

My invention also consists in constructing the door of the furnace with a double casing, forming an air-space, whereby the operator is not affected by the direct radiation of the heat which would otherwise occur.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the walls of the furnace, B the top, and C the flue, which is commanded by a damper, *a*. Within the furnace is formed a bed, D, of fire-brick, or other suitable material, the upper surface of which is on a level, or nearly so, with the bottom of the opening E, which is closed by the door F, which slides vertically in guides *a'*, and has attached to its upper end a chain, *b*, which runs over pulleys *c*, and carries a weight, *d*, by which the door is balanced and held open at the required height. On each side of the bed D is placed a furnace, G, (fig. 3), which is supplied with fuel through the door H; and beneath each furnace is an ash-pit, I, provided with a door, J. K is a cellular "muffle" or receptacle, formed of fire-brick, cast iron, or other suitable material, (seen detached in fig. 4,) in which are placed the articles to be heated, the muffle being raised a little above the surface of the bed D by means of transverse projections *e* on its under side, so as to allow the flame and heat from the furnaces to circulate freely around it. The articles to be heated, previous to being placed in the cells *f* of the "muffle" K, are coated with a suitable mixture of flour or meal, ground anthracite coal, and salt, to protect them from oxidization and scaling. The flue C is placed at the front end of the furnace and almost immediately over the opening E, so as to counteract the effect produced by the entrance of cold air when the door F is opened for the purpose of removing articles from and placing others within the "muffle" K, which would otherwise cool those already in the cells *f*. The door F is made double, with an air-space, *g*, so as to protect the operator from the direct radiation of heat which would otherwise occur. An opening may be formed in the top B of the furnace instead of at E, and the "muffle" inserted in a vertical

position, its upper end being exposed to the air, and forming a portion of the top of the furnace; or a furnace may be constructed in which the "muffle" can be inserted in a horizontal position and form a portion of the top of the furnace, its cells or receptacles being left open at the top for convenience of inserting or withdrawing the articles to be heated, which will be found to answer a good purpose when only the lower portion of the article requires to be heated.

Claim.

What I claim as my invention, and desire to secure by Letters Patent, is—
The cellular "muffle" K, substantially as and for the purpose set forth.
I also claim placing the flue C at or near the front of the furnace, for the purpose described.
I also claim forming an air-space, *g*, within the door F, substantially as and for the purpose set forth.
I also claim the cellular "muffle" K, in combination with a furnace provided with a flue, C, and a double door, F, constructed and operating substantially as described.

Witnesses:

N. W. STEARNS,
P. E. TESCHEMACHER.

BENJAMIN S. STOKES.