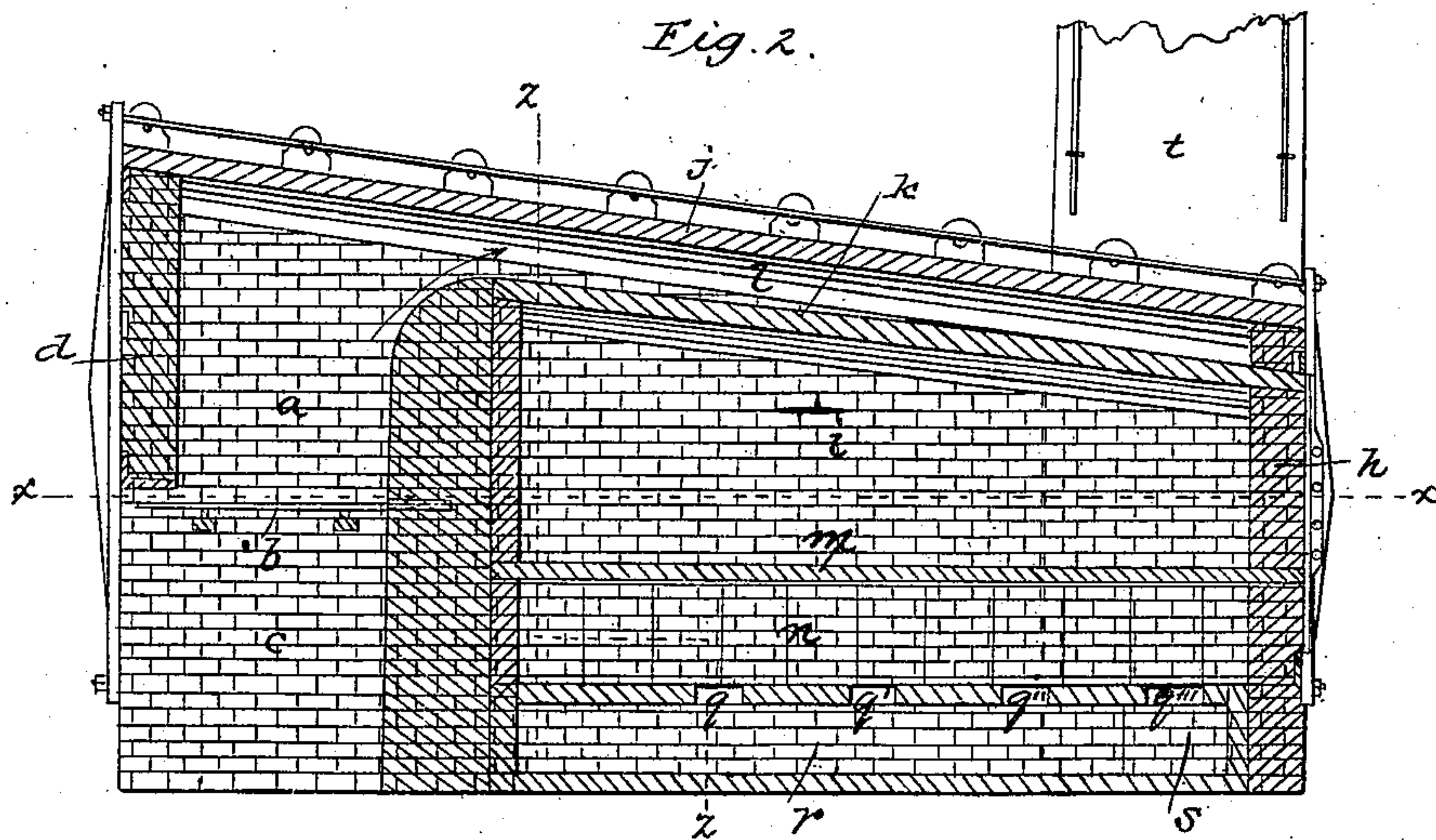
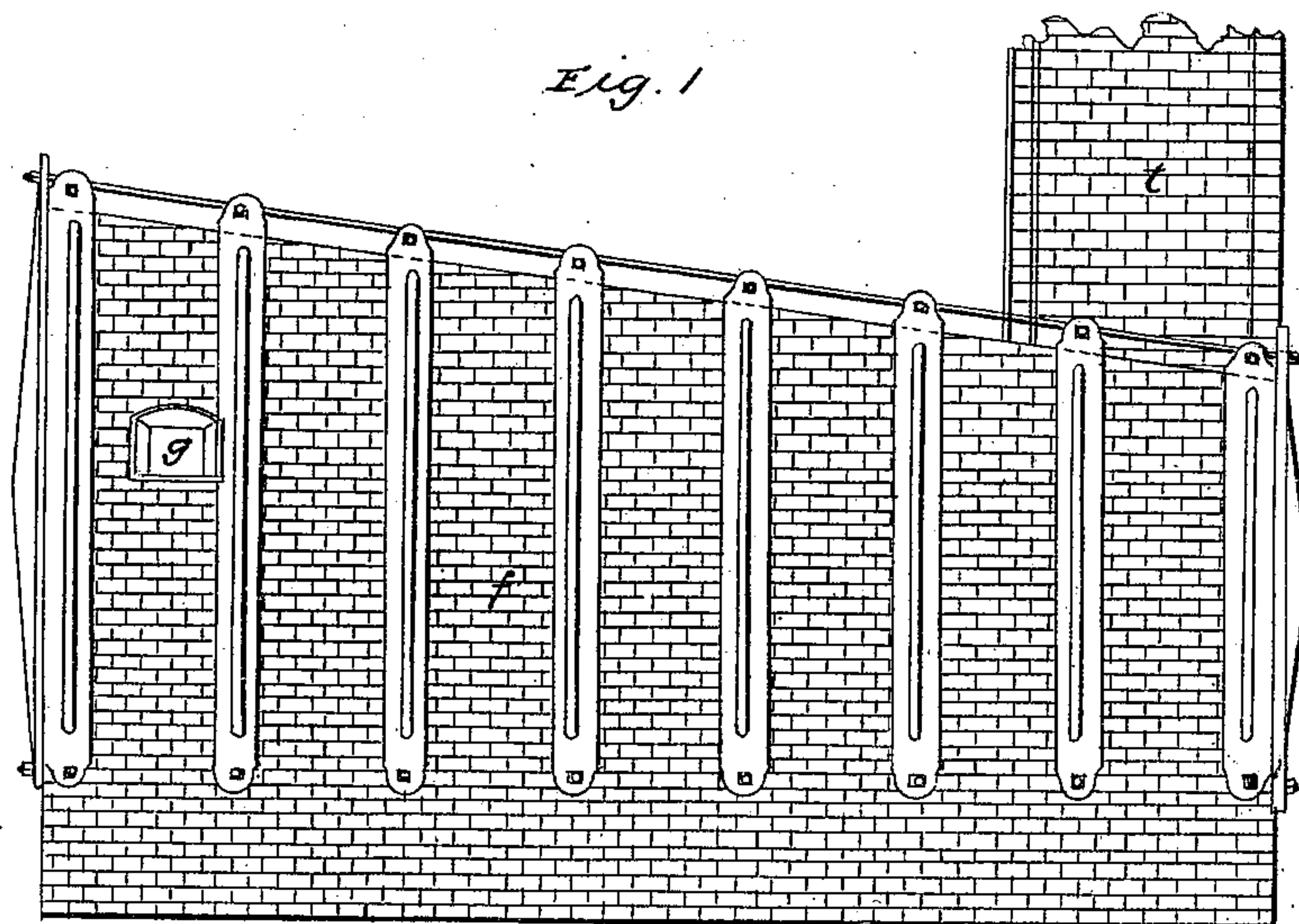


J. MALONE.

Furnace for Annealing Sheet Iron.

No. 55,014.

Patented May 22, 1866.



Attest
W. D. Lewis
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Inventor.
Joseph Malone
by his attorney
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Fig. 4

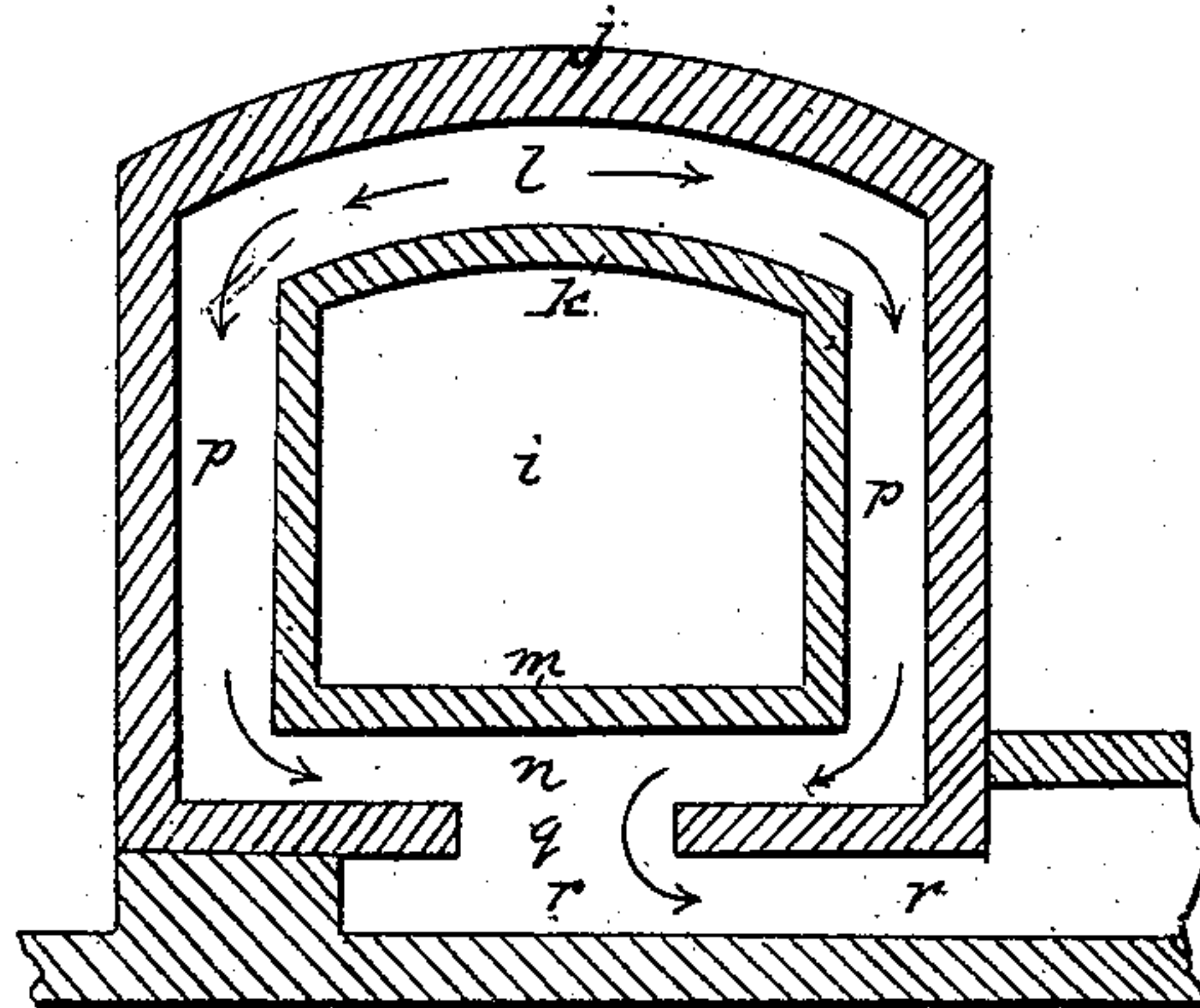
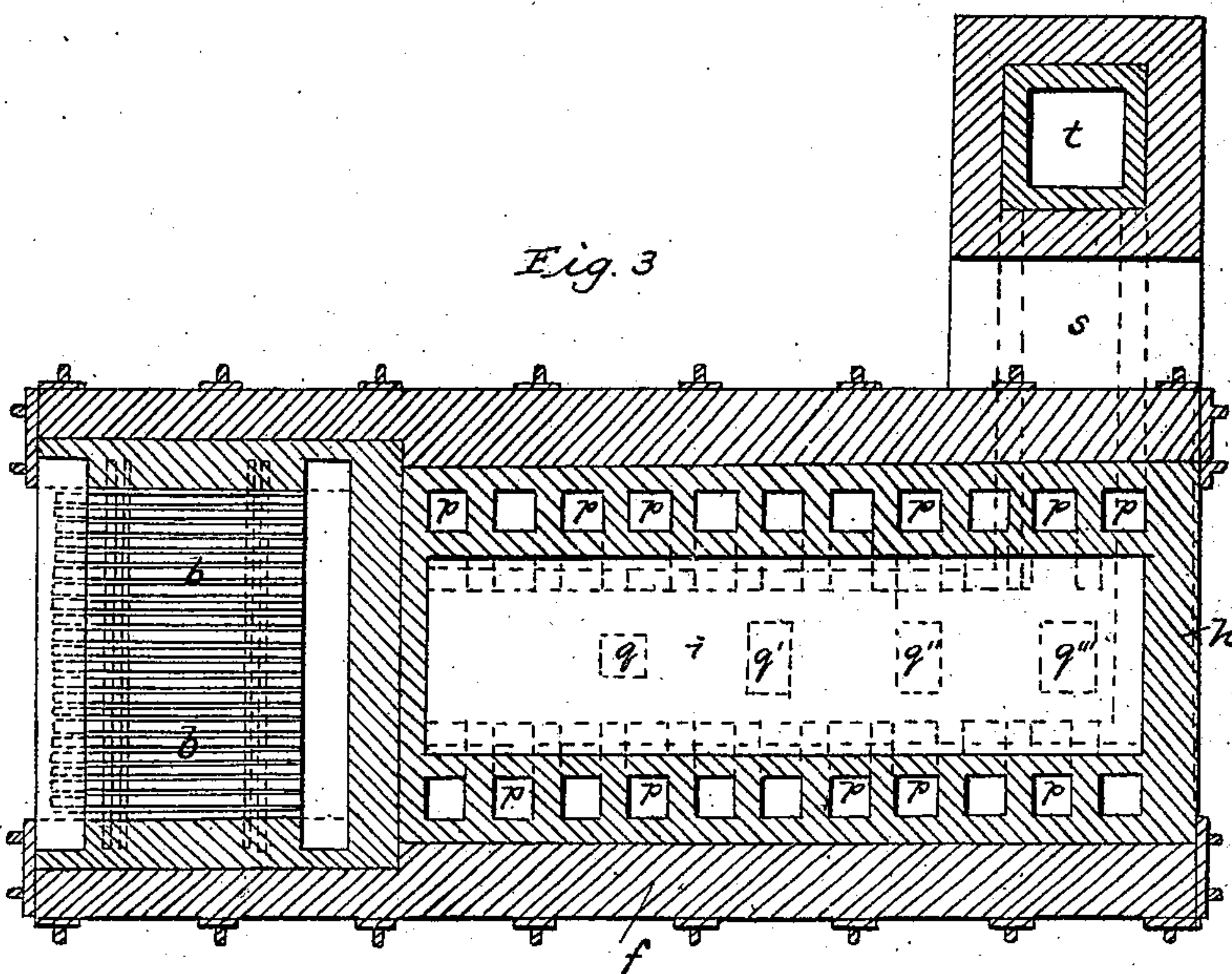


Fig. 3



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UNITED STATES PATENT OFFICE.

JOSEPH MALONE, OF TEMPERANCEVILLE, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND GEORGE WETTENGIL.

IMPROVED FURNACE FOR ANNEALING SHEET-IRON, &c.

Specification forming part of Letters Patent No. 55,014, dated May 22, 1866.

To all whom it may concern:

Be it known that I, JOSEPH MALONE, of the borough of Temperanceville, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Furnaces for Annealing Sheet-Iron, Nails, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is an exterior side view of my improved furnace. Fig. 2 is a longitudinal section through the center of the furnace. Fig. 3 is a horizontal section through the furnace on the line *x x*, Fig. 2. Fig. 4 is a vertical section on the line *z z*, Fig. 2.

In the several figures like letters denote similar parts of the furnace.

The ordinary mode of annealing sheet-iron is to place the sheets, one above another, in packs in a large cast-iron box, which is tightly closed and placed in a furnace, where the box is exposed to the direct action of the fire, while the iron within the box is not so exposed. The box becomes highly heated and is then allowed to cool gradually. These boxes are very expensive to make, are heavy and unwieldy to manage, and soon become so warped and misshapen as to be useless, owing to the high heat to which they are subjected. This method of annealing, being attended with so much cost of labor and money, has been heretofore rendered necessary, owing to the difficulty of constructing a furnace in which the iron can be sufficiently highly and uniformly heated and then gradually cooled without exposing the iron contained therein to the direct action of the fire.

My invention is designed to accomplish this object, the successful attainment of which will be attended with an important saving in the manufacture of sheet-iron, and the annealing-furnace which I have invented is adapted to the annealing of other articles besides sheet-iron.

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

In the accompanying drawings, *a* is the fire-chamber of the furnace, which is placed at one

end, the fire being supported on grate-bars *b*, beneath which is the ash-pit *c*. The front wall, *d*, of the furnace has only one opening above the level of the grate-bars, which opening *e* is only a few inches high and is down close to the grate-bars *b*. In the side wall, *f*, is an opening, *g*, large enough to admit the fuel into the fire-chamber, and which is closed excepting when the coal is to be introduced.

The furnace is highest at the end at which the fire is placed, and gradually decreases in height toward the other end, at which is situated the opening *h* into the annealing-chamber *i*.

The roof of the furnace is an arch, *j*, of fire-brick or tiles, as is also the top of the annealing-chamber *i*. The top *k* of the annealing-chamber and the roof of the furnace being parallel, and at a sufficient distance apart, form a flue, *l*, which extends over the annealing-chamber *i* its entire length, communicating directly with the top of the fire-chamber *a*.

The floor of the annealing-chamber *i* is formed of slabs or tiles of fire-clay *m*, and below it is a longitudinal horizontal flue, *n*, extending under the entire length and width of the annealing-chamber.

On each side of the annealing-chamber *i* are a series of vertical flues, *p p*, &c., which connect the top flue, *l*, with the flue *n*, under the chamber *i*, and are placed close together, with only thin partition-walls between them.

In the bottom of the horizontal flue *n* are openings *q q'*, &c., which lead into a horizontal passage, *r*, placed under the flue *n*, which communicates by a cross-passage, *s*, with the chimney *t*, which is situated at the end of the furnace farthest from the fire-chamber *a*. The openings *q q' q'' q'''* gradually increase in size as their distance from the fire-chamber *a* increases, the object of which is to prevent the flame and heated air from passing too rapidly out of the horizontal flue *n* into the passage *r*.

By the construction of furnace which I have described the annealing-chamber is surrounded on top, bottom, and both sides with heated air and flame, and thus the whole brick-work composing the chamber becomes highly heated, and being constructed of a material capable of retaining the heat, a very uniform degree of temperature is obtained.

In order to compensate in some degree for

the diminished heat of the currents of air passing down the flues farther from the fire-chamber, the height of the chamber is gradually diminished in that direction, as before stated, so as to give less surface of wall to be heated.

Having thus described my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

Constructing a furnace for annealing sheet-iron and other articles, having a fire-chamber at one end and an annealing-chamber, sur-

rounded at top and bottom and both sides with flues for the passage of the flame, hot air, and products of combustion, constructed and arranged substantially as and for the purposes hereinbefore described.

In testimony whereof I, the said JOSEPH MALONE, have hereunto set my hand.

JOSEPH MALONE.

Witnesses:

ALLAN C. BAKEWELL,
W. D. LEWIS.