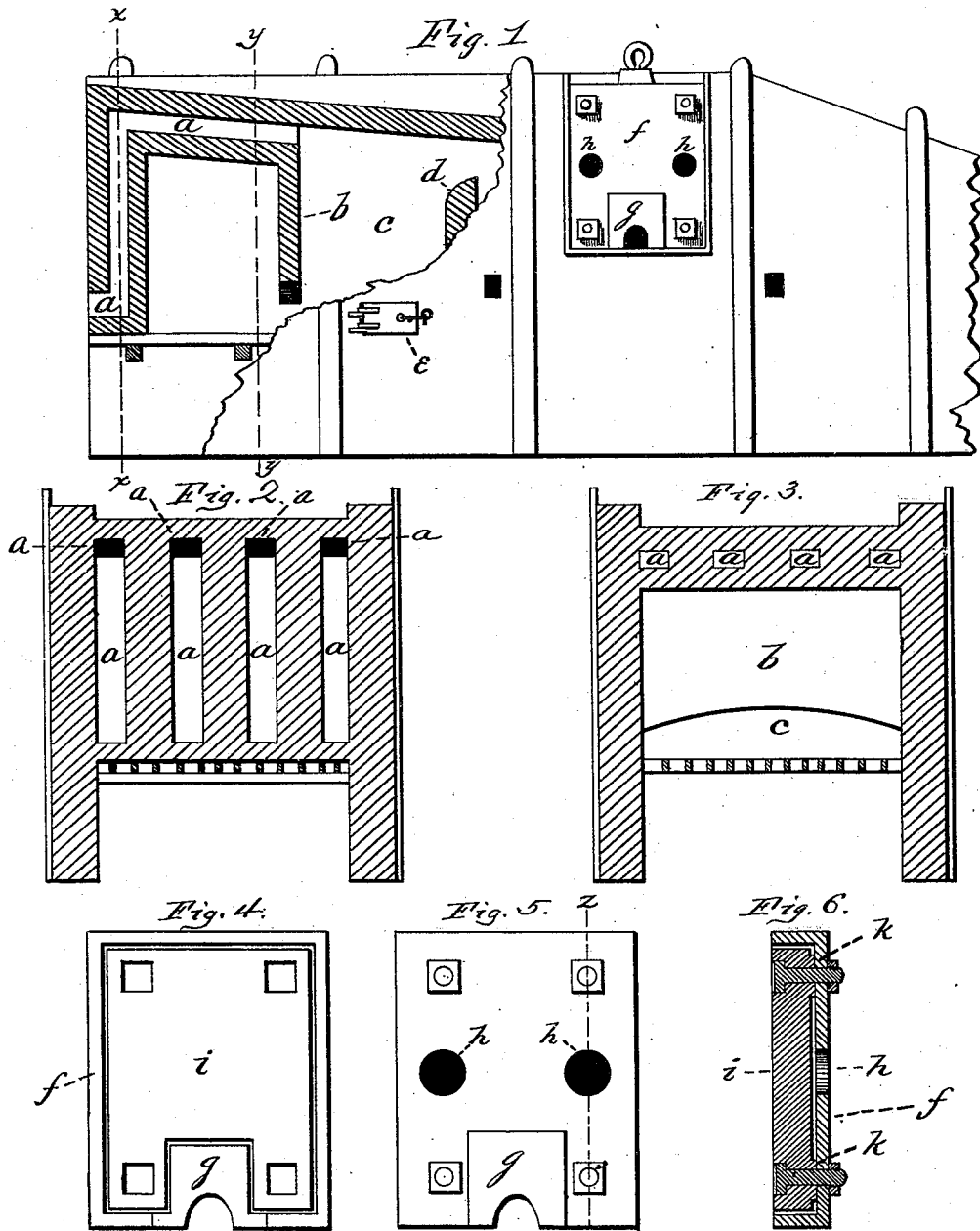


J. PEDLEY.

CONSTRUCTION AND PROTECTION OF PUDDLING-FURNACE.
No. 181,975. Patented Sept. 5, 1876.



Witnesses
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UNITED STATES PATENT OFFICE.

JAMES PEDLEY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY NEVILLE, OF SAME PLACE.

IMPROVEMENT IN CONSTRUCTION AND PROTECTION OF PUDDLING-FURNACES.

Specification forming part of Letters Patent No. 181,975, dated September 5, 1876; application filed May 22, 1876.

To all whom it may concern:

Be it known that I, JAMES PEDLEY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Construction and Protection of Puddling-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a side elevation, partly sectional. Fig. 2 is a section on line *x x*, Fig. 1. Fig. 3 is a section on line *y y*. Fig. 4 is a view of inside face of door. Fig. 5 is the same outside. Fig. 6 is a section on line *z z*.

This invention has relation to puddling-furnaces; and consists, first, in dividing the fire-chamber from the combustion-chamber by means of a hanging bridge, and in providing air-chambers, which extend upwardly and backwardly through the furnace-roof, and open into the combustion-chamber immediately above the bridge; secondly, in the combination, with a flanged door-casting, of a detachable fire-clay lining, which is bolted to the door-casting, and provided with nipples, which separate the adjacent surfaces of the two, all as hereinafter described and claimed.

In the end walls of the furnace I construct a number of flues, *a*, which rise to the roof, and then run along the line of the roof longitudinally till they deliver inside the hanging bridge *b*. This hanging bridge extends the width of the fire-space, and forms a diaphragm extending nearly down to the grate-bars. Its purpose is to concentrate the gas and smoke, and give it an outlet only through the gas-chamber *c* in front of the bridge *d*, thus preventing the mingling of hot air with it till it reaches the proper place, namely, just as it is about to pass over the bridge *d*. I prefer to cover that portion of the grate-bars extending under the gas-chamber, since the access of air through the bars at that point is liable to interfere with the working, so that practically the fuel is burned only in the combustion-chamber. Air enters the flues *a*, and passing along the heated walls and roof, be-

comes hot enough to combine with the heated gas in chamber *c*, and being directed downward, produces chemical combination and intense heat, which is very effective for all purposes.

As in the process of puddling it is a matter of great importance to have some means of suddenly cooling, and then suddenly heating the metal, dampers are used generally, but are not fully effective in point of time. I provide a door or adjustable regulator, *e*, to the gas-chamber *c*. When the operator wishes to cool his metal suddenly, he has only to open the regulator *e*, which, by the draft, instantly sends in large volumes of cold air, instantly reducing the heat without interfering with the draft, which I wish to maintain. Then, when he wishes to heat again, everything is ready, the hot air entering, and the fuel burning briskly, and the draft on, and all he has to do is to close the regulator *e*, and the white heat is produced at once. These effects may be modified by opening the regulator *e* to a greater or less extent.

The intense heat produced in these furnaces makes a fire-clay door a necessity. This is usually made of a cast-iron casing, the inside of which is built up of fire-bricks. But the heat melts away the bricks or warps them so that they fall out and expose the iron, which, in turn, falls a prey to the heat. Hence, doors are a considerable expense, as they last but a short time. My door is constructed as follows: I take the usual casting *f* and rabbit *g*, but cut in the casting bolt-holes at the four corners, and one or more cold-air ports, *h*, in the face of the casting. Then I take a solid block of fire-clay, *i*, of the shape shown, which will nearly, but not quite, fill the hollow portion of the casting *f*, leaving an air-space on the edges. By means of the teats *k* on the block *i*, (or these projections may be on the casting, or the same effect produced by washers,) I keep the block from touching the casting except at the bolt-holes. Then the bolts are passed through, and nuts turned down to tighten the whole. The bolt-holes are countersunk on the inner face of the block. Thus constructed, air surrounds the block, and the draft of the furnace keeps the air-space

constantly filled with cold air, thus keeping the casting comparatively cool. The casting will last a long time thus, and the fire-clay block lining being in one piece, does not crumble away and melt so rapidly as when made of a number of bricks fitted in.

I do not mean to be understood as claiming, broadly, a puddling-furnace, provided with the air-flues passing rearwardly from the front, or a furnace provided with a hanging bridge; nor in fact the combination without further limitation of a hanging bridge and air-flues.

Having fully described my invention, what I claim is as follows:

1. In a puddling-furnace having the combustion-chamber *c*, terminated by the bridge *d*, and divided from the fire-chamber by means of the hanging bridge *b*, the combination with said combustion-chamber of the air-flues *a*, extending upward and backward

through the roof of the furnace, and opening into the combustion-chamber immediately above the bridge *b*, substantially as shown and described.

2. The combination, with the flanged door-casting *f*, of the detachable fire-clay lining *i* bolted thereto, but separated from contact therewith by a space around its edges, substantially as described and shown.

3. The combination, with the door-casting *f*, of the detachable fire-clay lining *i*, having the nipples *k*, to separate the adjacent surfaces, substantially as described and shown.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of May, 1876.

JAMES PEDLEY.

Witnesses:

HENRY NEVILLE,
THOS. J. McTIGHE.