

H. McDONALD.

Improvement in Puddling-Furnaces.

No. 129,153.

Patented July 16, 1872.

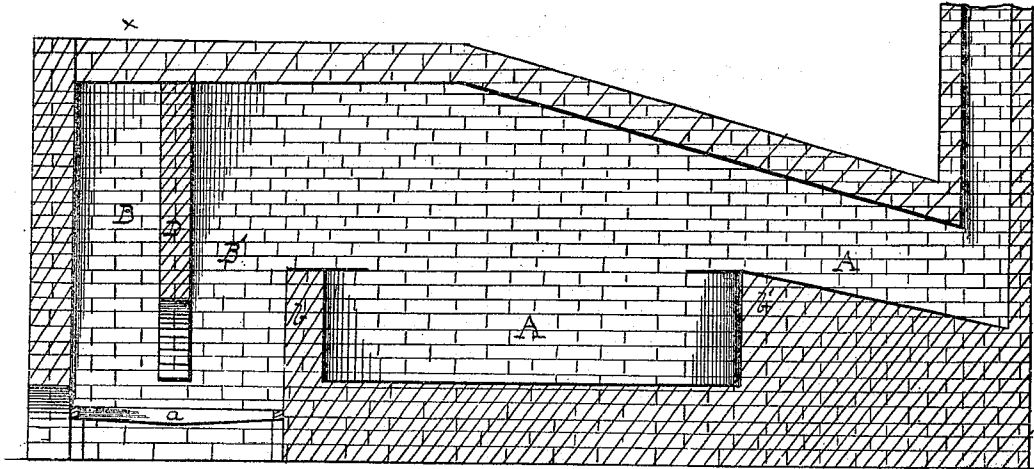


Fig. 1.

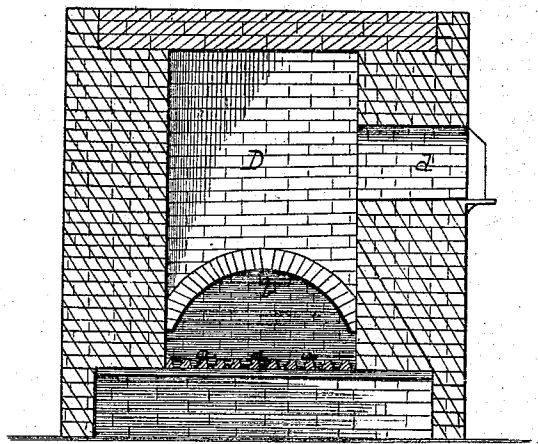


Fig. 2.

Witnesses:

R. C. Wenshall
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Inventor:

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by Bakewell, Christy & Kerr
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UNITED STATES PATENT OFFICE.

HUGH McDONALD, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN PUDDLING-FURNACES.

Specification forming part of Letters Patent No. 129,153, dated July 16, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, HUGH McDONALD, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Puddling-Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a longitudinal vertical section of an ordinary puddling or boiling furnace fitted with my improvement; and Fig. 2 is a transverse vertical section through *x x*, Fig. 1.

Like letters of reference indicate like parts in each.

One of the considerable items of expense incurred in the manufacture of iron by the process of boiling or puddling is that of fuel, since a large percentage of its heat-producing properties escapes as smoke, unconsumed gases, &c. To remedy this, smoke-burning furnaces have been devised, most of which are objectionable on account of cost, complication, or for other reasons.

By my improvement I adapt the ordinary fire-chamber of a puddling, boiling, heating, or smelting furnace for use as a smoke-burner, without lessening its capacity as a chamber for the combustion of fuel, whereby, at small cost, each such furnace may be converted to a smoke-burner, with the desired result in saving of fuel and increase of effective heat.

To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and mode of operation.

In the drawing, B and B' represent the fire-chamber of an ordinary puddling or boiling furnace; *a*, the grate-bars; *b*, the fire-bridge; A, the working-chamber; *b'*, the flue-bridge; and A', the neck. Transversely across the fire-chamber B B', from one side wall to the other, I build a partition-wall, D, which extends down from the top or cover till its lower edge is even with or a little below the upper edge or surface of the fire-bridge *b*, and still far enough above the grate-bars *a* to leave room for working forward the fuel from the chamber B to the chamber B'. Preferably its

lower edge is of arched form, as shown, though it may be straight. This partition-wall is at, or not far from, a point equidistant between the end wall and the fire-bridge *b*, though in this respect I do not limit myself, provided only it be so arranged as to leave a chamber, B, into which the raw fuel is fed through a stop-hole, *d*, or other suitable opening, and from which, as it becomes coked or incandescent, it can be worked forward under the wall D to the combustion-chamber B'. The chamber B' is provided with a stop-hole similar to that shown at *d*. In the construction of new furnaces the space for the chambers B B' may be lengthened somewhat—say a few inches more or less—beyond the dimensions ordinarily adopted; but this is not essential. The action of the heat after it passes the fire-bridge *b* is well known, and the advantages of coking certain kinds of fuel in one chamber and feeding it along into another, where it is to be burned, need not here be set forth.

Thus, by the simple interposition of the wall D, I secure for the ordinary puddling, boiling, heating, or smelting furnace all the material advantages which are sought to be accomplished by the construction of elaborate and costly smoke-burning contrivances.

Two or more walls, D, may be introduced, if so desired, but one I consider sufficient, in most cases, to secure a useful result.

I am aware that in a steam-boiler furnace a front chamber for the combustion of fuel has been combined with a rear ascending flue, in which latter the gases were intended to be consumed; but such construction falls short of what is required in a furnace for boiling or puddling iron. In my improvement the chamber B' in rear of the wall D is of a capacity such as to perform the function not only of a smoke-consuming chamber, but also of a fuel-combustion chamber; and such feature is important where so intense a heat is required as in the class of furnaces referred to; and the better to secure this combustion of the fuel it is important that the grate of the furnace extend back under the chamber B', or that a separate grating be arranged thereunder, so that the air may be admitted freely therein. I have also attained the best results when the incandescent fuel in the chamber B' was on a level

with or a little below the lower edge of the wall D.

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

A partition-wall, D, extending transversely across the fire-chamber of the ordinary puddling, boiling, or heating furnace, so as to divide the same into a front coking-chamber, B, and a rear smoke and fuel combustion-cham-

ber, B', arranged with reference to the fire-bridge and underlying grate-bars, substantially as set forth.

In testimony whereof I, the said HUGH McDONALD, have hereunto set my hand.

HUGH McDONALD.

Witnesses:

A. S. NICHOLSON,
G. H. CHRISTY.