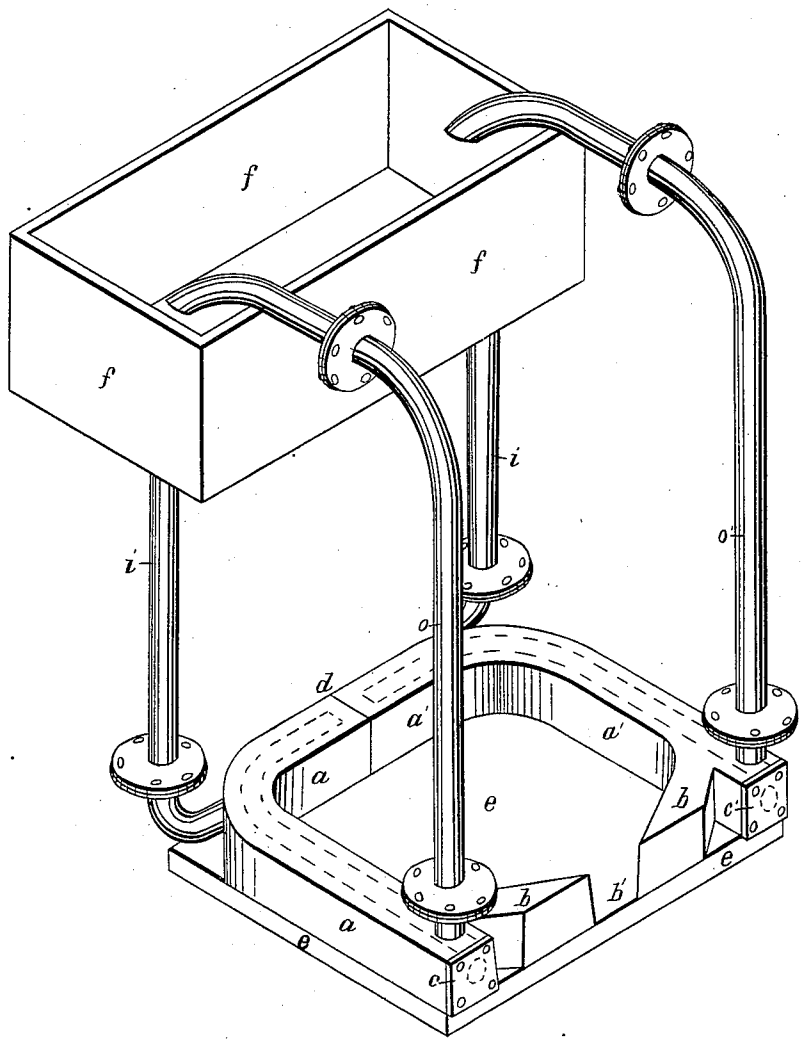
J. I. WILLIAMS.

Puddling and Boiling Furnace.

No. 77,790. Patented May 12, 1868.

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# United States Patent Office.

JOHN I. WILLIAMS, OF ETNA, PENNSYLVANIA.

*Letters Patent No.* 77,790, *dated May* 12, 1868.

## IMPROVEMENT IN BOILING AND PUDDLING-FURNACES.

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, JOHN I. WILLIAMS, of Etna, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Boiling and 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, which shows my improvements in perspective, and to the letters of reference marked thereon.

My invention relates to that class of boiling or puddling-furnaces, the sides of which consist of hollow chill-boxes, for the admission of water; and the nature of it consists in dispensing with the use of "fixing" for the boshes, by the use of boshes constructed and arranged as hereinafter described, and in producing and sustaining a constant circulation of warm water through the boxes or boshes, by means of a tank or reservoir of water connected with the hollow boxes of the furnace.

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

*a* and *a'* are two puddling-furnace chill-boxes, so shaped as to enclose a space of suitable size and shape for working the iron, the back corners being rounded instead of angular, and the front corners having curved jambs *b*, which extend well around toward the door *b'*.

*c c'* are two caps, made tight when the furnace is in use, through which the sand-core, used in casting the hollow chill-boxes, is removed after the casting is done. At their opposite ends, *d*, the boxes are closed and fitted well together, end to end. The bottom, *e*, of the furnace, the walls, fire-bridge, flues, &c., are, except as above described, made in the usual way.

A water-tank, *f*, adapted in size to the requirements of the furnace, as presently to be explained, is placed above or in other convenient position. From this the pipes *i i'* conduct a supply of water into the hollow chill-boxes *a a'*, which, flowing along, passes out at or near the opposite ends of the chill-boxes, and is carried up over, and redischarged into the tank by the pipes *o o'*. In this way a continuous flow of water is secured through the boxes *a a'*.

The object of redischarging the water into the tank is to keep the water in the tank, and, of course, in the chill-boxes, at a moderately high temperature, since I find that admitting cold water into the boxes, when they are in use, is, in some respects, exceedingly objectionable. But as a portion of the water is lost by evaporation, and since, on failure of the proper supply of warm water, the boxes are liable to be seriously injured, I make the tank *f* of such capacity, with reference to the size of the chill-boxes, and the amount of loss by leakage or evaporation, that a supply of water may be contained therein, and heated sufficient to meet the requirements of the furnace while heating up, or from heat to heat, or during the ordinary cessations from work.

In this way I insure the safe preservation of the chill-boxes from injury, without delay in the work of puddling, or danger of injury from a failure to supply water of the proper temperature.

By making the water-chill boxes *a a'* and jambs *b* so as to enclose a working-chamber, of circular or oval or rounded form inside, and drawing them in, so as to reduce in size the body of the furnace to the size corresponding to that of the area or working-space of an ordinary furnace in good "fix" or working order, I am enabled to dispense with the usual "fixing," with a large consequent saving of the cost of fixing-material, and a saving of the time required in preparing a furnace with "fixing" for use.

I also find that the water, acting on the surface of the chills, causes the cinder, oxides of iron, or other suitable substance, to adhere to the surface of the chills, and prevents their burning, and at the same time the metal which is being worked is confined in a space suitable to the requirements of the puddling process.

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

1. The hollow cast-iron water-chill boxes *a a* of a puddling or boiling-furnace, made with rounded back corners, and jambs *b* in front, substantially as and for the purpose hereinbefore described.

2. The use of hollow water-boshes or boxes, connected with a water-reservoir or tank, of suitable capacity to keep up a circulation of warm water, as well between heats as when the furnace is in operation, substantially as hereinbefore described.

In testimony whereof, I, the said JOHN I. WILLIAMS, have hereunto set my hand.

JOHN I. WILLIAMS.

Witnesses:

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