

J. S. GUSTIN.
Refining Iron.

No. 2,743.

Patented Aug. 2, 1842.

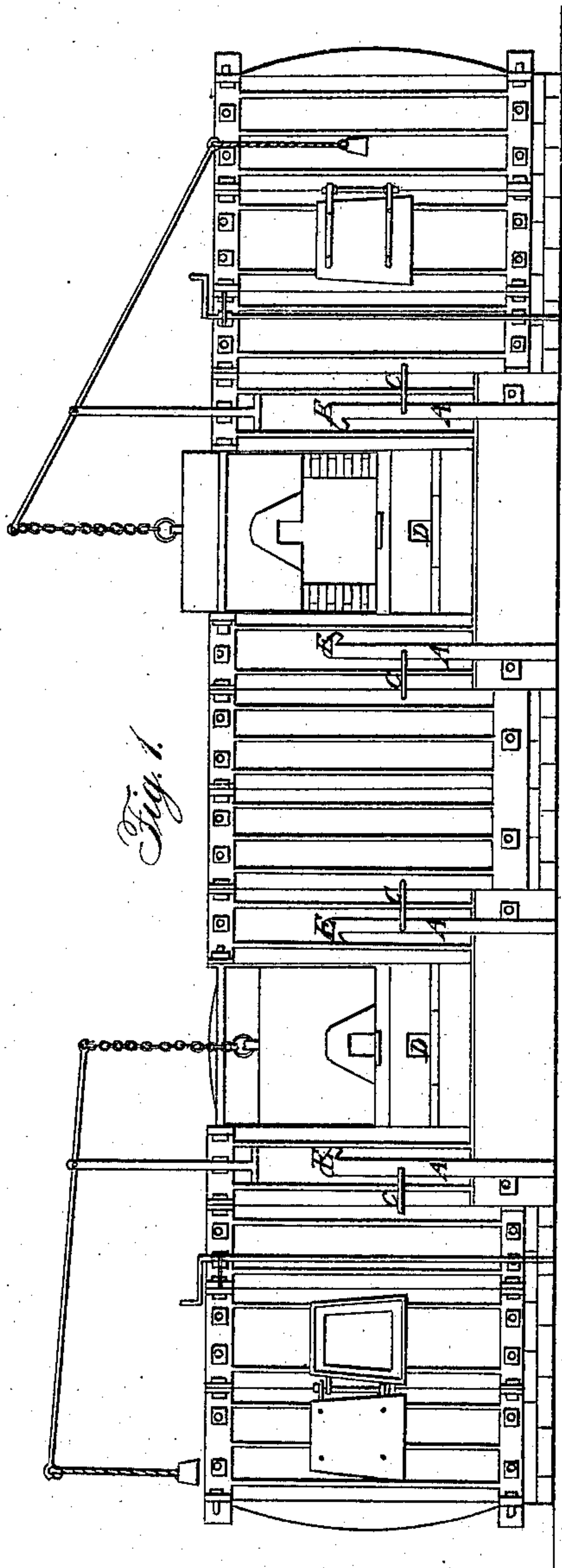
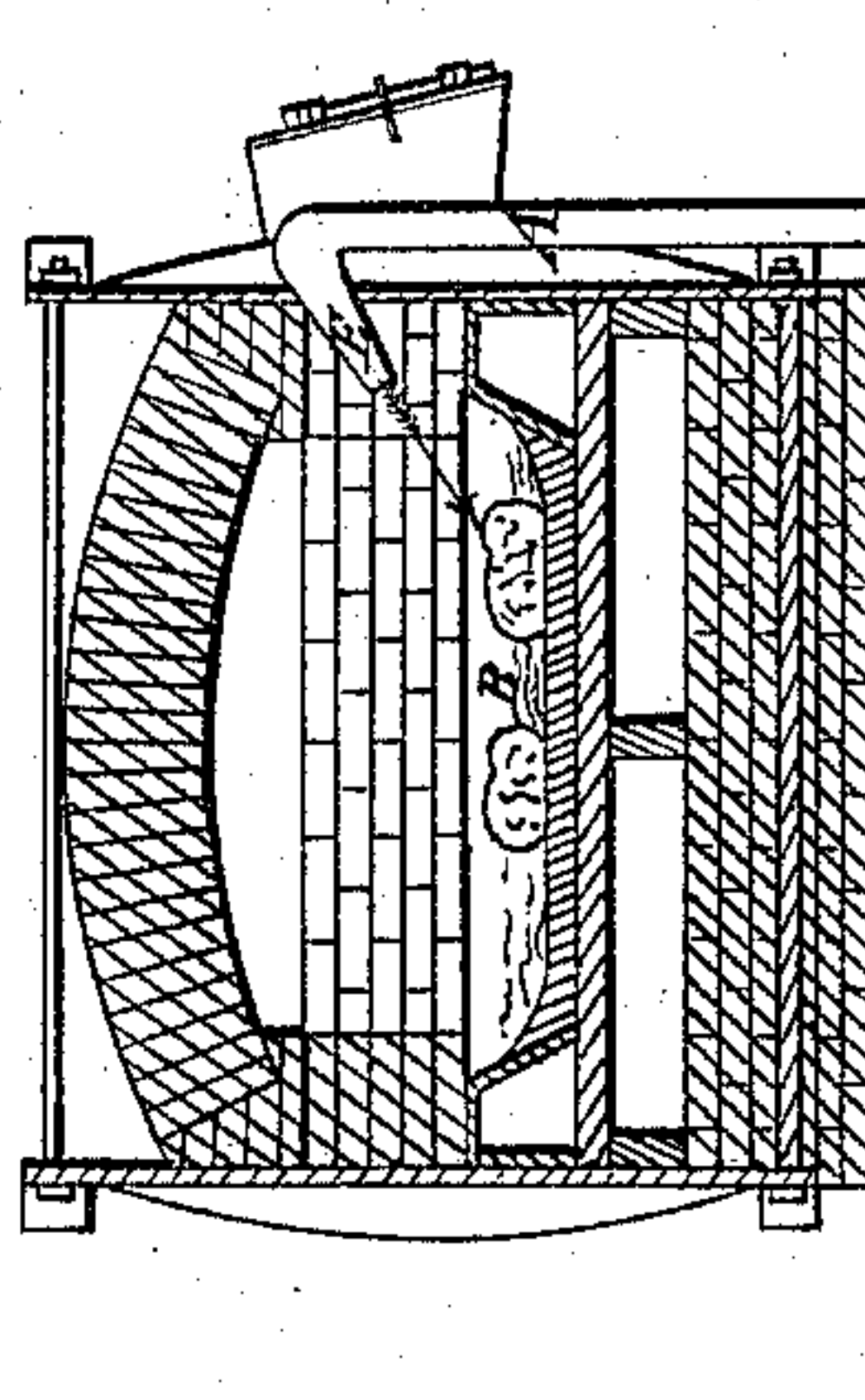


Fig. 2.



UNITED STATES PATENT OFFICE.

JOHN S. GUSTIN, OF NEW YORK, N. Y., ASSIGNOR TO PETER COOPER.

IMPROVEMENT IN FURNACES FOR PUDDLING AND REFINING IRON.

Specification forming part of Letters Patent No. 2,743, dated August 2, 1842.

To all whom it may concern:

Be it known that I, JOHN S. GUSTIN, of the city, county, and State of New York, have invented certain new and useful Improvements in the Manufacture and Refining of Iron, in which the principles of the finery-fire are combined with the puddling process; and I do hereby declare that the following is a full and exact description of the same.

My invention consists in introducing into the puddling-furnace at one or more places, as may suit the kind of iron to be worked, a current of atmospheric air, the operation of which is to decarbonize the crude iron, and also to liberate the other impurities contained therein.

To enable others skilled in the art of making iron to use my invention, I will proceed to describe its arrangement and operation, reference being made to drawings, hereunto annexed, of a front elevation and an end sectional view of a furnace.

I take the ordinary puddling-furnace, of which Figure 1 is a front view of a double furnace, and Fig. 2 a sectional view.

In order that the full advantages of my invention may be obtained, I would recommend the use of anthracite coal as a fuel, it being less impregnated with sulphur than bituminous coals generally are, and the application may be made more effectually. The sides of the bottom or basin should be formed with some material—such as iron-stone ore or other material—that will resist an extraordinary heat, such cinder as is generally used in puddling being too easily melted when exposed to the necessary heat at which the furnace should be worked. At each side of the charging-door and immediately under the roof of the furnace I pass through the side wall a tuyere, *eeee*, of about one and a half inch in diameter, pointing to the center of the bottom B. In the air-pipes *aaaa*, the end of which forms the tuyere, I place at a convenient part well-fitted throttle-valves with a handle, *cccc*, by which the workmen may regulate the blast. Under the door or other convenient part of the furnace is a place for tapping, D, for the purpose of drawing off the cinder. The air-pipes should connect with some convenient blowing apparatus, of which the common fan-blower is probably the best.

The method of operation is as follows: Get the furnace at a proper heat, and charge it

with iron of a weight suitable to its dimensions—say from three to four and a half hundred pounds. When it is melted and ready for working, open the throttles in the air-pipes, by which means a current of air is thrown upon the surface of the melted metal, which is intended as a substitute for the scale and water used in the ordinary mode of puddling. The operation is continued at ordinary heat and method of puddling until the boiling or fermentation is nearly subsided, at which time the heat is to be increased and continued until the iron has come to nature. The mass of metal is then brought directly before the tuyere or air-pipes and remelted or sunk in the operation of balling. This part of the operation should be performed with care, exposing all parts equally to the current, so as to insure uniformity of quality to the iron, this being the refining operation in which the last traces of carbon or other impurities pass off in form of cinder or gas. The fluid cinder on the bottom, being mostly composed of impurities from the iron, should therefore be tapped and drawn off to make the best quality of iron. This operation should be performed before the metal has been brought before the tuyere or immediately after the fermentation has subsided. Should it be found that the kind of iron that is to be worked would be improved by being run out, as may be the case with some metal, the operation may be performed as follows: Put the pig metal in the furnace, and when it is melted stir it, as is usual in the puddling process, keeping the metal at a bright heat. The tuyeres should be opened at the same time, so as to throw a strong current of air on the whole surface of the melted metal. When it appears by the usual indication that the metal is in a proper state for tapping, it should be drawn off as in the ordinary method of the refinery-fire.

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

The use of atmospheric air, introduced directly upon the heated iron in the furnace, in the manner and for the purposes set forth and described in the specification hereunto annexed.

JOHN S. GUSTIN.

Witnesses:

ABEL WHEATON, Jr.,
GEO. ARMSTRONG.