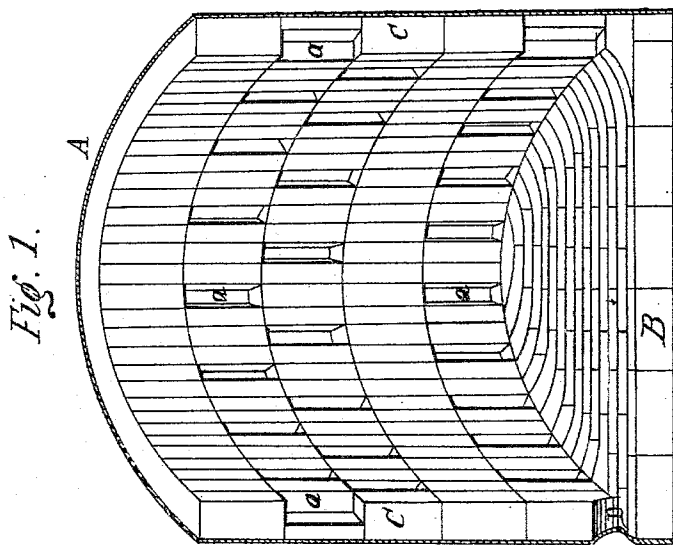
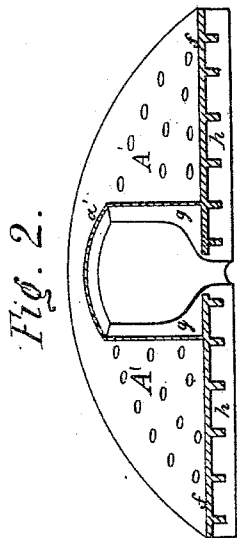


A. G. COOK.
MANUFACTURE OF IRON.

No. 62,819.

Patented Mar. 12, 1867.



Witnesses

B. C. K. Vee
H. A. Wendell

Inventor:

A. G. Cook.

United States Patent Office.

ANSON G. COOK, OF BURLINGTON, VERMONT.

Letters Patent No. 62,819, dated March 12, 1867.

IMPROVEMENT IN THE MANUFACTURE OF IRON.

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, A. G. COOK, of the city of Burlington, county of Chittenden, and State of Vermont, have invented a new and useful Improvement in the Manufacture of Iron; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification, in which—

Figure 1 is a sectional perspective view of the rectifier, with the top or cover removed.

Figure 2 is a similar view of the cover.

My invention relates to the construction of the rectifier, to the process of manufacture, and to the composition used in such process, as hereinafter described.

To enable others to use my invention, I will proceed to describe how the same may be carried out in practice.

In the accompanying drawing, A represents a case, which may be made of iron, of any suitable form or size; a convenient size will hold, when lined, as hereinafter described, from five to ten tons of melted iron. B is a lining of fire-brick covering the bottom, and C a similar lining to the sides of the case, said side lining being provided with cavities or recesses, *a*, for a purpose hereinafter explained. D is an opening or outlet at the bottom of the case, through which the metal is drawn off after it has undergone the refining process. A' is the top or cover which is made to fit closely on the case A. Said cover is also made of iron, and is provided with a series or number of points, flanges, or lips, as shown at *f* in fig. 2 of the drawing. If the flanges are used they may be arranged to cross each other, or in any desired manner, and are for the purpose of holding the lining *h*, of fire-clay, to the under face of the cover. The said cover is provided with a funnel, *a'*, through which the melted iron is poured, or passes from a cupola furnace in which it is melted, into the rectifier A. Said funnel is also lined with fire-clay, and the whole apparatus, when the cover is placed upon it, has a lining of fire-brick or fire-clay, shown at B C, *g h*, whereby the melted iron is prevented from coming in contact with the outer iron case A. The top A' is provided with any desired number of perforations, shown in fig. 2, to allow the escape of the gases or other products of combustion in the process hereinafter explained. I use a composition consisting of the black oxide of manganese and coal tar, which, to prevent a too rapid combustion, should be mixed with clay, or other suitable material for that purpose. This is placed in the cavities *a* in the side lining C after the rectifier has been properly heated. The rectifier is then filled with charcoal, and the cover is placed upon it and securely fastened, to prevent its rising and allowing the charcoal to float in the process hereinafter explained.

The process is as follows: The iron, which may be of the commonest kind, as magnetic iron ore mixed with a small quantity of hematite iron, in the proportion say of two hundred pounds of hematite iron to the ton, is melted in the ordinary cupola furnace, after which it is drawn off and poured or otherwise conducted through the funnel *a'* into the rectifier A, into which it passes, filling the interstices in and entirely submerging the charcoal therein, and producing a rapid combustion thereof and of the composition in the recesses of the lining C. The conditions of combustion are such as to increase the temperature of the melted iron, previously very highly heated in the cupola furnace, and to cause the products thereof to pass through and thoroughly impregnate the mass of melted iron in the rectifier, and to remove, with the escaping products, such impurities as sulphur, phosphorus, &c., contained therein, and also to reduce any oxide of iron found in the mass. The combustion of the coal tar and charcoal serves to carbonize the melted iron, and the combustion of the manganese, while assisting in the action of carbonizing the iron, tends to remove the impurities referred to, and also to give the iron the requisite hardness. The melted iron, after being allowed to remain the required length of time in the rectifier to thoroughly absorb the carbon and remove the impurities, is drawn off at D into a pig-bed prepared for its reception, or into ladles, and poured into castings. The entire mass of iron in the rectifier is purified and carbonized alike; and any desired number of blasts may be made of the same quality, the quality being governed by and dependent upon the amount of the composition employed in the process. The poorest quality of iron, either pig, scrap, or old burned iron, such as gas retorts, may be used. Ordinarily, I use what is termed magnetic iron, using, as above stated, only about two hundred pounds of hematite iron to the ton. The iron I produce is a pure charcoal iron, of a superior quality and temper, and at a cost materially less than that of the best American iron; and, as has been demonstrated by actual experiment, steel or malleable iron may be made by the same process, from wrought iron or from cast iron made from the common magnetic iron ore.

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

1. The rectifier, or apparatus consisting of a chamber or vessel lined with fire-brick, and provided with recesses *a*, or their equivalent, substantially as described.
2. The perforated cover *A'* provided with the points or flanges for securing the lining of fire-clay, substantially as described.
3. The process herein described of treating fused metal in a closed vessel or chamber containing charcoal or its equivalent, substantially as described.
4. The employment or use of the compound of oxide of manganese and coal tar, for the purpose of refining iron, substantially as described.

In testimony whereof I have hereunto set my hand this 9th day of January, 1867.

ANSON G. COOK.

Witnesses:

T. E. WALES,
W. L. BURNAP.