

UNITED STATES PATENT OFFICE.

CHARLES COCHRANE, OF "THE ELLOWES," UPPER GORNAL, ENGLAND.

IMPROVEMENT IN PREPARATIONS OF IRON ORES FOR SMELTING.

Specification forming part of Letters Patent No. 128,712, dated July 9, 1872.

To all whom it may concern:

Be it known that I, CHARLES COCHRANE, of "The Ellowes," Upper Gornal, in the county of Stafford, England, have invented "an Improvement in the Preparation of Iron Ores for Smelting;" and do hereby declare that the following description forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvement, by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to secure by Letters Patent—that is to say,

My invention has for its object the deoxidizing of iron ore before its treatment in the blast-furnace; and consists in passing over the same a current or currents of highly heated carbonic-oxide gas. Such carbonic oxide may be prepared from any convenient source, but I prefer to take the same as it passes from the top of the blast-furnace, together with other gases, and to pass it through suitable heating-stoves of known construction, whereby it is heated to the requisite degree before passing into a closed or partially-closed chamber or kiln containing the iron ore to be operated upon. The action of the carbonic oxide upon the iron ore will also to some extent carbonize the iron, and thus the ore after treatment, as above described, will require little more than the action of heat and the addition of the requisite fluxing materials in the blast-furnace to convert it into the cast-iron of commerce.

In practically carrying out my invention I prefer to heat the carbonic-oxide gas to from 1000° to 1500° Fahrenheit, but I do not limit myself to these temperatures. For this purpose I cause the gas to pass through any suit-

able known construction of heating apparatus on its way from the blast-furnace or other place where it is produced to the chamber or kiln containing the ore. This chamber or kiln may be variously arranged for the purposes of my invention; thus, in one arrangement I employ a kiln such as is described in the specification to other Letters Patent for which I am applying for an invention of "an improved mode of, and apparatus, kiln, or furnace for, preparing iron ores for smelting," in which kiln the highly-heated gases are made to pass at the lower end thereof through a central shaft or tube, and after passing up through and acting upon the mass of ore contained in the kiln, the gases escape through a flue leading from near the upper end of the kiln to a chimney-shaft, or to a fan or exhausting apparatus for accelerating the draught. The reduced ores are discharged at the bottom of the kiln through discharging-boxes provided with slides.

Having thus described the nature and operation of my invention, I claim and desire to secure by Letters Patent—

The process of deoxidizing iron ore before its treatment in the blast-furnace by subjecting the same to currents of highly-heated carbonic-acid gas after such gas has been especially heated for the purpose, as herein described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 13th day of April, 1870.

CHARLES COCHRANE.

Witnesses:

CHAS. D. ABEL,
JNO. BN. MILLARD.