

UNITED STATES PATENT OFFICE.

RILEY PORTER WILSON, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO
FRANKLIN J. WALL, OF NEW YORK, N. Y.

PROCESS OF REFINING IRON WITH AIR.

SPECIFICATION forming part of Letters Patent No. 384,813, dated June 19, 1888.

Application filed November 21, 1883. Renewed May 23, 1886. Serial No. 293,566. (No specification.)

To all whom it may concern:

Be it known that I, RILEY PORTER WILSON, of Cleveland, in the county of Cuyahoga and State of Ohio, a citizen of the United States, have invented a new and useful Improvement in the Process of Refining Iron with Air, which is carried out substantially as hereinafter set forth.

The object of my invention is to avoid the loss of metal from oxidation during the finishing stage of the process to more fully purify the crude metal, and thus enable an air-blast to be used for the manufacture of the finer grades of metal from pig-iron.

To this end and to such others as the invention may relate the same consists in the peculiar process, the details of which are hereinafter set forth, and which consist, essentially, in providing a reducing surface-atmosphere which can be regulated at will by supplying the gases in the chamber over the molten charge with an excess of combustible hydrocarbon, so as to reduce the oxidized metal as it is burned by the blast during the finishing stages and thus prevent loss, and allowing the purifying process to be carried to a point of perfection beyond that heretofore attained.

In carrying out my process I prefer to use a converter or furnace-chamber provided with a blast which is capable of being so adjusted as to furnish an exceedingly moderate draft when desired. The converter should be provided with a means for charging and discharging, and should be provided with suitable acid or basic lining. Although many of the furnaces now in use in the manufacture of steel are capable of being employed in carrying out my process, I find from experience that furnaces constructed in accordance with the descriptions contained in Patents Nos. 284,992 and 298,534 are particularly well adapted to such use.

The furnace used should be provided with a wide and shallow bed for the molten metal, (which is treated in charges,) and the surface of the metal should be covered with a suitable flux or slag. A basic flux is added when phosphorus and sulphur are to be removed from the iron. An excess of combustible hydrocarbon is maintained in the gases within the chamber above the molten charge in order to reduce the oxides, which would otherwise be carried off by the blast, to metal again and thus prevent their loss. This excess of carbon may be supplied from any one or more of several sources, and may be either in the form of hydrocarbon vapor or gases.

The air-blast through the charge should be so regulated as to burn out the foreign substances which it is designed to remove with as little agitation to the molten metal as possible, and in the finishing stage of the process it should be reduced to a minimum in order to allow the flux to collect upon the top, where it will absorb the impurities.

Having thus described my invention and set forth its merits, what I claim to be new, and desire to secure by Letters Patent, is—

The process herein described for treating impure iron for the manufacture of wrought-iron and steel, the same consisting in subjecting the impure iron while in a molten state to the action of a blast of air, in order to oxidize and carry off the impurities, and simultaneously subjecting the iron to the action of a reducing-atmosphere of hydrocarbon gas or vapor held above the surface of the molten metal, substantially as specified.

RILEY PORTER WILSON.

Witnesses:

L. A. STRATTON,
ODELL WILSON.