UNITED STATES PATENT OFFICE.

JOHN D. CHEEVER, OF NEW YORK, N. Y.

METHOD OF REDUCING AND SEPARATING MAGNETIC ORES.

SPECIFICATION forming part of Letters Patent No. 403,250, dated May 14, 1889.

Application filed February 20, 1889. Serial No. 300,610. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN DOW CHEEVER, of New York city, in the county and State of New York, have invented a new and useful Improvement in Methods of Reducing and Separating Magnetic Ores, which improvement is fully set forth in the following specification.

This invention has reference to the treatment of magnetic iron ores for the purpose of separating the magnetic particles from the gangue; and its object is to effect a more perfect separation and to obtain a larger proportion of magnetic particles in the concentrate than is possible by the methods now generally in use.

My invention consists in first heating the ore; second, crushing or disintegrating it while hot, and, third, separating the magnetic from the non-magnetic particles by passing both together through a magnetic field.

I am aware that heretofore it has been proposed to reduce or crush ores in general while hot; but it has never been proposed, so far as I am aware, to apply this method to magnetic ores as a preliminary step to magnetic separation.

I have found that after reducing magnetic ores while hot the ore, which is crystalline in structure, is left in a condition very favorable for the action of a magnetic separator. The structure of the crystals is not impaired or destroyed, as is largely the case with ordinary methods of crushing, so that the magnet acts very efficiently in attracting the magnetic particles. Moreover, the magnetic particles of the ore are separated or detached more completely than by other methods from the non-magnetic particles, so that a smaller proportion of the latter are carried over with the former by the magnetic influence.

In carrying out my invention the ore is heated in any suitable furnace, the heat and duration of treatment depending on the hardness of the mineral. The more refractory the gangue the higher the temperature necessary to secure the best result. In applying heat it is important that the temperature should not be raised to such a point as to decompose the oxide or break up the crystals. While thus heated the ore is passed through reducing-rolls, or otherwise reduced or disintegrated. Finally, the magnetic particles are separated from the gangue by passing the crushed ore through the field of a magnet, the separate substances being received in different chambers or receptacles. In carrying out this step of the process any well-known or suitable magnetic separator may be used; but preferably I employ the apparatus described in the application of John M. McMahan, of even date herewith, Serial No. 300,609.

I claim—

The method of treating magnetic ore for the separation of the magnetic from the non-magnetic particles by first heating the ore; second, reducing or disintegrating it while hot, and, third, separating the magnetic from the non-magnetic particles by bringing both together into and through a magnetic field, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN D. CHEEVER.

Witnesses:

VICTOR E. BURKE,

ROBERT J. CUMMINGS.