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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

### United States Patent

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Director of the United States Patent and Trademark Office



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(12) **United States Patent**  
Yamamoto

(10) **Patent No.:** US 9,327,292 B2  
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(54) **PROCESS AND SYSTEM FOR DRY RECOVERY OF FINE AND SUPERFINE GRAINED PARTICLES OF OXIDIZED IRON ORE AND A MAGNETIC SEPARATION UNIT**

(52) **U.S. Cl.**  
CPC ... B03C 1/30 (2013.01); B03B 9/00 (2013.01); B03C 1/10 (2013.01); B03C 1/247 (2013.01); B04C 9/00 (2013.01); B03C 2201/20 (2013.01)

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(58) **Field of Classification Search**  
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USPC ..... 209/710, 711, 219, 3, 38, 39  
See application file for complete search history.

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(56) **References Cited**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(57) **ABSTRACT**

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The present invention refers to a system and method for the totally dry treatment of iron-ore wastes from previous mining operations, suitable for both the processing of ore wastes deposited in barrages and wastes stored in piles. The present invention solves the problems of magnetic separation processes that employ the wet and waste-dewatering way, eliminating the risks which throwing solid wastes into retention barrages bring by a system and method wherein the moisture degree of the ore is reduced by means of a mechanical stir dryer (using natural gas to prevent contamination), which is then sorted into various fractions and finally separated magnetically, with the important difference of being an entirely dry process.

(30) **Foreign Application Priority Data**

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