

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 November 2007 (15.11.2007)

PCT

(10) International Publication Number
WO 2007/130362 A3

(51) International Patent Classification:
F23M 5/08 (2006.01)

(21) International Application Number:
PCT/US2007/010475

(22) International Filing Date: 1 May 2007 (01.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/746,085 1 May 2006 (01.05.2006) US

(71) Applicants (for all designated States except US): **SIERRA ENERGY** [US/US]; 221 1st Street, Davis, CA 95616 (US). **MATERIALS CONVERSIONS, INC.** [US/US]; 967 West Harvard, Ontario, CA 91762 (US). **IMPROVED CONVERTERS, INC.** [US/US]; 10 Basom Court, Sacramento, CA 95835 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CORBETT, Martin, J.** [US/US]; c/o Sierra Energy Corporation, P.O. Box 74093, Davis, CA 95617-4093 (US). **JASBINZEK, John**

[US/US]; c/o Materials Conversions, Inc., 967 W. Harvard Place, Ontario, CA 91762-1845 (US). **KASTEN, Christopher, J.** [US/US]; c/o Improved Converters, Inc., 10 Basom Court, Sacramento, CA 95835 (US).

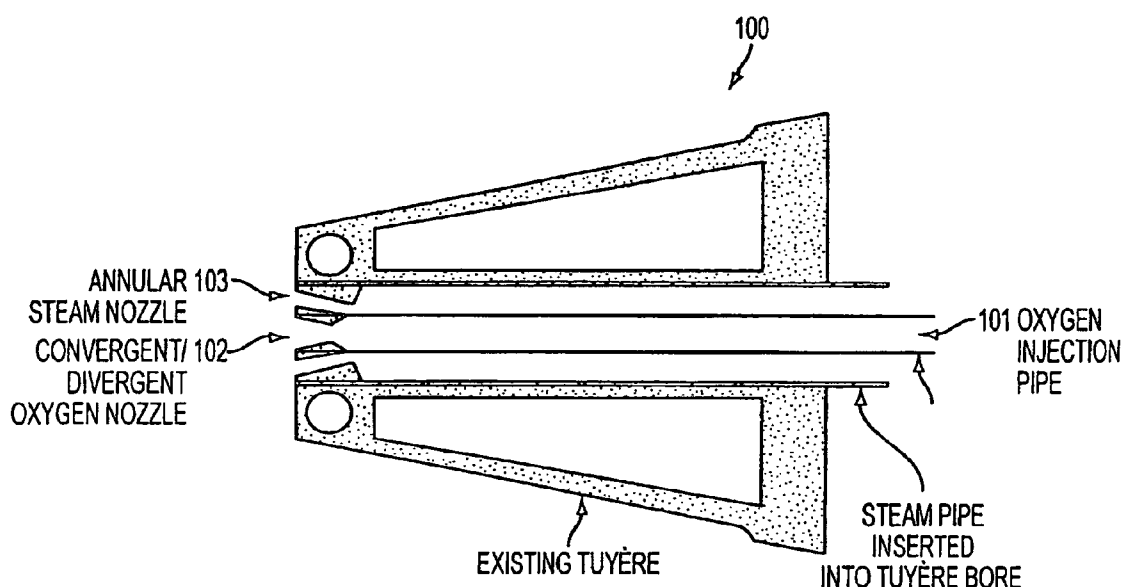
(74) Agent: **RIVARD, Paul, M.**; Banner & Witcoff, Ltd., Suite 1200, 1100 13th Street, Washington, DC 20005-4051 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: TUYERE FOR OXYGEN BLAST FURNANCE/CONVERTER SYSTEM



(57) Abstract: A tuyere for an oxygen blast furnace has a body and a first conduit extending through the body. The first conduit is adapted to receive a medium at one end of the conduit and discharge the medium at a second end of the conduit through at least one discharge nozzle. A second conduit can be arranged concentrically around the first conduit and is adapted to receive a medium and discharge the medium through at least one discharge nozzle. In another aspect, a portable oxygen blast furnace system includes oxygen blast furnace secured to a railcar. The portable furnace system can be transported by rail for processing material at remote locations.

WO 2007/130362 A3



Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

3 January 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/10475

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F23M 5/08 (2007.01)

USPC - 110/182; 110/297

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC: 110/182, 297

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: all classes/subclasses (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST(USPT,PGPB,EPAB,JPAB); Google

Search Terms: tuyere, blast furnace, oxygen, rail, railcar, portable, steam, adjustable, nozzle, concentric

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 4,887,800 A (HOTTA et al) 19 December 1989 (19.12.1989), entire document Fig 1; col 1, ln 50-col 2, ln 7	1-3 ----- 4-14, 16-18
X -- Y	US 537, 572 A (Hayes) 16 April 1895 (16.04.1895), Fig 1; pg 1, ln 23-246	15 ----- 16-20
Y	US 2,711,214 A (BLOOMER) 21 June 1955 (21.06.1955), entire document, Figs 1-4; col 3, lns 13-29; col 1, lns 61-63	4-9, 13-14, 17-18
Y	US 4,340,209 A (ABASCAL) 20 July 1982 (20.07.1982), entire document, Figs 1-4; Abstract	10-14
Y	US 4,055,251 A (PIETON) 25 October 1977 (25.10.1977), entire document, Abstract; Fig 2	19-20
A	US 4,569,327 A (VELTEN) 11 February 1986 (11.02.1986), entire document	20
A	US 5,544,867 A (NEYER) 13 August 1996 (13.08.1996), entire document	1-20
A	US 296,225 A (SCHULZE-BERGE) 01 April 1884 (01.04.1884), entire document	1-20

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 September 2007 (12.09.2007)

Date of mailing of the international search report

09 NOV 2007

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Date