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(54) **Operation method of moving hearth furnace**

(57) An operation method of a moving hearth furnace, in which a reduced metal is obtained by reducing by heating a metal oxide loaded into the moving hearth furnace, includes the steps of supplying and burning a fuel including combustible wastes as a heat source for

the operation. According to the operation method of a moving hearth furnace, the resources can be used effectively and costs can be reduced by using industrial wastes as a fuel.

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EUROPEAN SEARCH REPORT

Application Number
EP 02 01 2441

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 29 35 103 A (ESTERMANN THOMAS) 12 March 1981 (1981-03-12) * page 16, line 9 - line 14 * * page 17, line 3 - line 15; claims 1-12 *	1-8	C21B13/10 C21B13/00
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 08, 30 June 1998 (1998-06-30) & JP 10 060509 A (NKK CORP), 3 March 1998 (1998-03-03) * abstract *	1	
A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 07, 31 July 1996 (1996-07-31) & JP 08 073909 A (NKK CORP), 19 March 1996 (1996-03-19) * abstract *	1	
A	DE 12 31 273 B (DEMAG-ELEKTROMETALLURGIE) 29 December 1966 (1966-12-29) * column 3, line 8 * *, sentence 20 - sentence 35; claims 1,2; figure 1 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) C21B
A	DE 195 41 673 A (FRIED KRUPP) 29 August 1996 (1996-08-29) * claims 1-3 *	1	
A	DE 195 20 651 A (FÜNDERS DIETER) 12 December 1996 (1996-12-12) * claims 1-5,11-14,27 *	1	
A	DE 33 20 951 A (MINDERMAN FRITZ) 13 December 1984 (1984-12-13) * page 3, paragraph 1; claim 1 *	1	
		-/--	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 November 2002	Examiner Elsen, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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Application Number
EP 02 01 2441

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
A	DE 29 23 726 B (MINDERMAN FRITZ) 4 December 1980 (1980-12-04) * claims 1-4 *	1		
A	DE 29 35 544 A (MINDERMAN FRITZ) 19 March 1981 (1981-03-19) * page 2, line 12 - line 30; claims 1,2,4,6 * * page 3, line 27 - line 33 *	1		
A	US 5 824 134 A (JIM POWERS) 20 October 1998 (1998-10-20) * claim 1; figure 1 *	1		
A	US 3 998 606 A (TSUNEO MIYAHITA) 21 December 1976 (1976-12-21) * abstract *	1,2		
A	DATABASE WPI Section Ch, Week 198348 Derwent Publications Ltd., London, GB; Class A95, AN 1983-830039 XP002221661 & JP 58 180594 A (FURUHASHI T), 22 October 1983 (1983-10-22) * abstract *	9,10		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 42 32 285 A (LOTTERMOSER MANFRED) 31 March 1994 (1994-03-31) * column 4, line 26 - line 41; claims 1,3,4 *	9,10		
X,P	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 10, 10 October 2002 (2002-10-10) & JP 2002 161318 A (NIPPON STEEL CORP), 4 June 2002 (2002-06-04) * abstract *	1,7		
The present search report has been drawn up for all claims				
Place of search		Date of completion of the search	Examiner	
THE HAGUE		20 November 2002	Elsen, D	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document				

EPO FORM 1603 03 82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 01 2441

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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20-11-2002

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 2935103	A	12-03-1981	DE 2935103 A1	12-03-1981
JP 10060509	A	03-03-1998	JP 3303693 B2	22-07-2002
			CN 1180750 A ,B	06-05-1998
			EP 0812899 A2	17-12-1997
			KR 245040 B1	02-03-2000
			US 6221311 B1	24-04-2001
			US 6048380 A	11-04-2000
JP 08073909	A	19-03-1996	NONE	
DE 1231273	B	29-12-1966	NONE	
DE 19541673	A	29-08-1996	DE 19541673 A1	29-08-1996
DE 19520651	A	12-12-1996	DE 19520651 A1	12-12-1996
DE 3320951	A	13-12-1984	DE 3320951 A1	13-12-1984
DE 2923726	B	04-12-1980	DE 2923726 B1	04-12-1980
DE 2935544	A	19-03-1981	DE 2935544 A1	19-03-1981
US 5824134	A	20-10-1998	US 6197087 B1	06-03-2001
US 3998606	A	21-12-1976	JP 1129605 C	24-12-1982
			JP 49130891 A	14-12-1974
			JP 57017038 B	08-04-1982
			AT 363577 B	10-08-1981
			AT 332674 A	15-01-1981
			AU 6820674 A	23-10-1975
			BE 814070 A1	16-08-1974
			DE 2419517 A1	07-11-1974
			FR 2226458 A1	15-11-1974
			GB 1464949 A	16-02-1977
JP 58180594	A	22-10-1983	NONE	
DE 4232285	A	31-03-1994	DE 4232285 A1	31-03-1994
JP 2002161318	A	04-06-2002	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82