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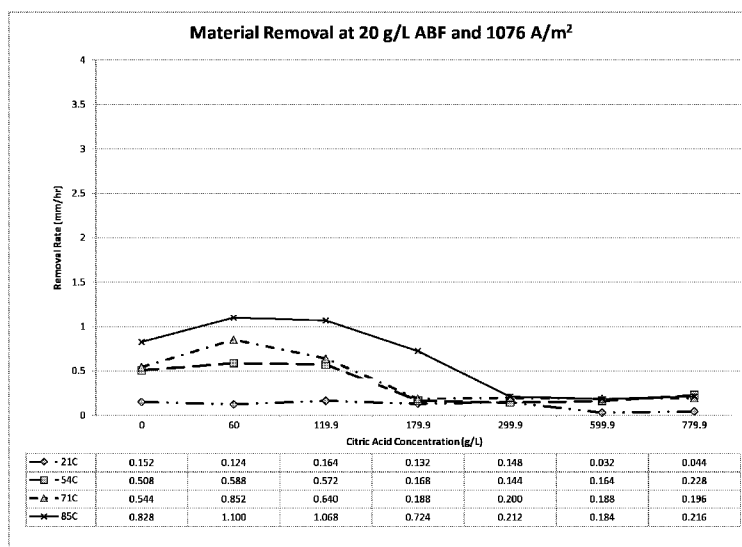


FIG. 1A

(57) Abstract: A method of removing hydrogen from the surface of a non-ferrous metal workpiece, including exposing the surface to a bath of an aqueous electrolyte solution including a concentration of citric acid from about 1.665 g/L to about 982 g/L and a concentration of ammonium bifluoride less than or equal to about 360 g/L, and being substantially free of a strong acid; controlling the temperature of the bath to be about -2 °C to about 90 °C; connecting the workpiece to the anode of a DC power supply and immersing a cathode of the DC power supply in the bath; and applying a current across the bath at a voltage and a current density measured as current per surface area of the workpiece.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/061707**A. CLASSIFICATION OF SUBJECT MATTER***C25F 3/26(2006.01)i*

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)

C25F 3/26; C25F 5/00; B23H 9/00; C25F 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: Electrolyte solution, citric acid, ammonium bifluoride, electropolishing, titanium alloy

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6352636 B1 (WEI; BIN et al.) 05 March 2002 See abstract; columns 4-6; claim 1 and figure 1.	1-16
A	US 3003896 A (EARL W. KENDALL et al.) 10 October 1961 See column 1 and claim 1.	1-16
A	US 2007-0029209 A1 (PIESSLINGER-SCHWEIGER et al.) 08 February 2007 See abstract; paragraphs 9,13,14 and claims 1,5,6,10.	1-16
A	US 3468774 A (EARL W. KENDALL et al.) 23 September 1969 See column 6 and claim 7.	1-16

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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

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"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6352636 B1	05.03.2002	BR 0004898 A	29.05.2001
		CZ20003794A3	15.08.2001
		EP 1094134 A1	25.04.2001
		JP 04523139 B2	04.06.2010
		JP 2001-172799 A	26.06.2001
		KR 10-0781626 B1	05.12.2007
		SG87182A1	19.03.2002
US 3003896 A	10.10.1961	None	
US 2007-0029209 A1	08.02.2007	AT 339534 T	15.10.2006
		CA 2525138 A1	18.11.2004
		DE 10320909 A1	18.11.2004
		DE 502004001497 D1	26.10.2006
		DK1625246T3	13.11.2006
		EP 1625246 A2	15.02.2006
		EP 1625246 B1	13.09.2006
		ES 2271882 T3	16.04.2007
		JP 04592683 B2	24.09.2010
		JP 2006-526071 A	16.11.2006
		US 7807039 B2	05.10.2010
		WO 2004-100283 A2	18.11.2004
		WO 2004-100283 A3	18.11.2004
US 3468774 A	23.09.1969	None	