(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
9 January 2014 (09.01.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/006494 A3

(51) International Patent Classification:
B23K 9/09 (2006.01) *B23K 9/10* (2006.01)
B23K 9/095 (2006.01)

(21) International Application Number:
PCT/IB2013/001462

(22) International Filing Date:
5 July 2013 (05.07.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
13/543,545 6 July 2012 (06.07.2012) US

(71) Applicant: **LINCOLN GLOBAL, INC.** [US/US]; 17721 Railroad Street, City of Industry, CA 91748 (US).

(72) Inventor: **PETERS, Steven, R.**; 15565 Windmill Point Road, Huntsburg, OH 44046 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
6 March 2014

(54) Title: APPARATUS FOR AND METHOD OF ENERGY REPLACEMENT IN A WELDING WAVEFORM DURING WELDING BASED ON DIFFERENCE BETWEEN DETERMINED POWER OUTPUT AND DESIRED POWER OUTPUT

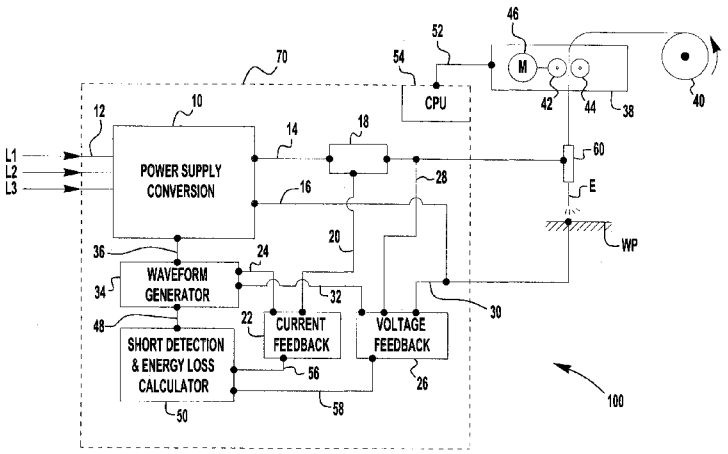


FIG. 1

(57) Abstract: A system (100) and a method are provided which uses a power supply (70)which receives an input signal (12) and provides an output signal to an electrode (E), where the output signal generates an arc between the electrode (E) and at least one workpiece (WP), and the output signal has a desired output power profile. The power supply (70) has at least an output power circuit (50) which determines an output power of the output signal, a power differential calculator (50) which determines a difference between the determined output power and the desired output power profile, and a waveform generator (34)which changes a power output of the output signal based on the determined difference between the desired output power profile and the determined output power.

WO 2014/006494 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/001462

A. CLASSIFICATION OF SUBJECT MATTER
INV. B23K9/09 B23K9/095 B23K9/10
ADD.

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)
B23K

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/120687 A1 (N. OHSAKI ET AL) 17 May 2012 (2012-05-17)	1-3,5, 9-11, 15-19
Y	paragraphs [0111], [0121], [0127] - [0128]; figures	12-14

Y	US 2005/016974 A1 (R. K. MYERS ET AL) 27 January 2005 (2005-01-27) paragraphs [0076] - [0077], [0086] - [0087]; figures	12-14

X	JP 2012 095516 A (DAIHEN CORP) 17 May 2012 (2012-05-17)	1-6, 9-13,15, 19
	abstract; figures	

	-/--	

[X] Further documents are listed in the continuation of Box C.

[X] 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

"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	Date of mailing of the international search report
16 December 2013	03/01/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Jeggy, Thierry

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/001462

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2006 198668 A (DAIHEN CORP) 3 August 2006 (2006-08-03) abstract; figures -----	1-3,5,7, 8,15,19
A	US 7 304 269 B2 (B. E. FULMER ET AL) 4 December 2007 (2007-12-04) cited in the application abstract; claims; figures -----	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2013/001462

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012120687 A1	17-05-2012	CN 102227867 A	26-10-2011
		CN 103368439 A	23-10-2013
		EP 2330729 A1	08-06-2011
		JP 4784717 B2	05-10-2011
		JP 5110189 B2	26-12-2012
		JP 2011177023 A	08-09-2011
		US 2012120687 A1	17-05-2012
		WO 2010137278 A1	02-12-2010
US 2005016974 A1	27-01-2005	AT 448042 T	15-11-2009
		AU 2004201851 A1	10-02-2005
		BR PI0401837 A	24-05-2005
		CA 2465408 A1	25-01-2005
		EP 1502692 A1	02-02-2005
		ES 2334226 T3	08-03-2010
		JP 4119404 B2	16-07-2008
		JP 2005040862 A	17-02-2005
		KR 20050013067 A	02-02-2005
		MX PA04005214 A	27-01-2005
		US 2005016974 A1	27-01-2005
JP 2012095516 A	17-05-2012	NONE	
JP 2006198668 A	03-08-2006	CN 1810430 A	02-08-2006
		JP 2006198668 A	03-08-2006
US 7304269 B2	04-12-2007	AT 516911 T	15-08-2011
		AU 2005200744 A1	22-12-2005
		BR PI0501155 A	24-01-2006
		CA 2497247 A1	04-12-2005
		CN 1706583 A	14-12-2005
		EP 1607162 A1	21-12-2005
		ES 2370152 T3	13-12-2011
		JP 4435715 B2	24-03-2010
		JP 2005342789 A	15-12-2005
		KR 20060043288 A	15-05-2006
		MX PA05002727 A	07-12-2005
		TW I277480 B	01-04-2007
		US 2005269306 A1	08-12-2005
		US 2008087654 A1	17-04-2008