

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 July 2006 (20.07.2006)

PCT

(10) International Publication Number
WO 2006/076146 A3

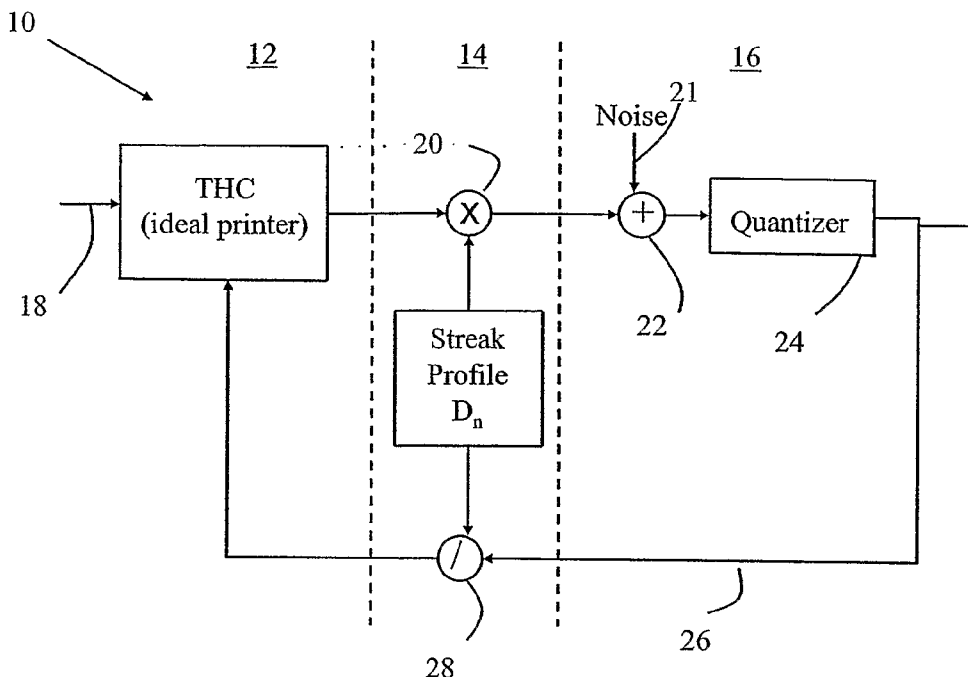
- (51) International Patent Classification:
B41J 2/36 (2006.01)
- (21) International Application Number:
PCT/US2005/046717
- (22) International Filing Date:
21 December 2005 (21.12.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/990,672 10 January 2005 (10.01.2005) US
- (71) Applicant: POLAROID CORPORATION [US/US];
1265 Main Street, Waltham, MA 02451 (US).
- (72) Inventors: BUSCH, Brian, D.; 582 Peakham Road, Sud-
bury, MA 01776 (US). HERTEL, Dirk, W.; 100 Cove
Way, Apt. 903, Quincy, MA 02169 (US). HILLE, Leif, D.;
14 Oakridge Avenue, Natick, MA 01760 (US). SAQUIB,
Suhail, S.; 33 Trowbridge Lane, Shrewsbury, MA 01545
(US).
- (74) Agent: MACCARONE, Gaetano, D.; Polaroid Corpora-
tion, 1265 Main Street, Waltham, MA 02451 (US).

- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, 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, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV,
LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI,
NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG,
SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ,
VC, VN, YU, 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, 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).

- Published:
— with international search report
- (88) Date of publication of the international search report:
8 March 2007

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR CONTROLLING THE UNIFORMITY OF PRINT DENSITY OF A THERMAL PRINT HEAD ARRAY



(57) Abstract: A method for controlling the print density of individual heating elements of a thermal print head array determines respective energy values for each heating element in response to image pixel data to be printed, multiplies determined energy values by a respective predetermined correction factor for one or more respective heating elements for improving print density consistency between individual heating elements, and dithers adjusted energy values from the step of multiplying as a function of adjacent image pixels.

WO 2006/076146 A3



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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/046717

A. CLASSIFICATION OF SUBJECT MATTER
INV. B41J2/36

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)
B41J

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 practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 243 265 A (* DOWTY MARITIME LIMITED) 23 October 1991 (1991-10-23) page 6, line 22 - page 11, line 7; figures 1-3	1, 2, 6-8, 13, 14, 19
Y		3, 4, 10-12, 15-18, 20
A		5, 9
Y	PATENT ABSTRACTS OF JAPAN vol. 015, no. 057 (M-1080), 12 February 1991 (1991-02-12) & JP 02 289364 A (VICTOR CO OF JAPAN LTD), 29 November 1990 (1990-11-29) abstract	3, 4, 15, 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
- "E" earlier document 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

15 November 2006

Date of mailing of the international search report

04/12/2006

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Kulhanek, Peter

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/046717

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 608 442 A (BENNEFELD ET AL) 4 March 1997 (1997-03-04) column 7, lines 11-27 column 10, lines 40-50 column 11, lines 17-54; figure 1	10-12, 17,18,20
Y	US 4 827 279 A (LUBINSKY ET AL) 2 May 1989 (1989-05-02) cited in the application column 4, line 3 - column 6, line 17; figure 5	21,22,30
A		1-20, 23-29,31
Y	US 2003/071866 A1 (WONG VICTOR C [US] ET AL) 17 April 2003 (2003-04-17) paragraphs [0052] - [0067]; figures 2,5	21,22, 25,27, 30,31
A		23,24, 26,28,29
Y	US 5 149 960 A (DUNNE BRUCE [US] ET AL) 22 September 1992 (1992-09-22) column 5, line 62 - column 7, line 54; figures 6,7	21,22, 25,27, 30,31
Y	US 4 647 184 A (RUSSELL JAMES P [US] ET AL) 3 March 1987 (1987-03-03) column 6, lines 8-50	21,22, 25,27, 30,31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/046717

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-20

Method and apparatus for controlling the density of a thermal printer using a correction of the print data values for the individual heating elements and applying a dithering process for avoiding printing artifacts

2. claims: 21-31

Method for controlling the density of a thermal printer using first and second correction factors in an iterative process for the individual heating elements

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/046717

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
GB 2243265	A	23-10-1991	AU	7489691 A	21-10-1991
			WO	9114577 A1	03-10-1991
JP 02289364	A	29-11-1990	JP	2516068 B2	10-07-1996
US 5608442	A	04-03-1997	JP	3520090 B2	19-04-2004
			JP	10507698 T	28-07-1998
			WO	9606739 A2	07-03-1996
US 4827279	A	02-05-1989	DE	68909315 D1	28-10-1993
			DE	68909315 T2	14-04-1994
			EP	0346647 A1	20-12-1989
			JP	2043062 A	13-02-1990
US 2003071866	A1	17-04-2003	NONE		
US 5149960	A	22-09-1992	DE	4220954 A1	07-01-1993
			GB	2257511 A	13-01-1993
			JP	5231942 A	07-09-1993
US 4647184	A	03-03-1987	NONE		