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(11) **EP 0 893 265 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
10.05.2000 Bulletin 2000/19

(51) Int. Cl.⁷: **B41J 2/21**

(43) Date of publication A2:
27.01.1999 Bulletin 1999/04

(21) Application number: **98111607.2**

(22) Date of filing: **24.06.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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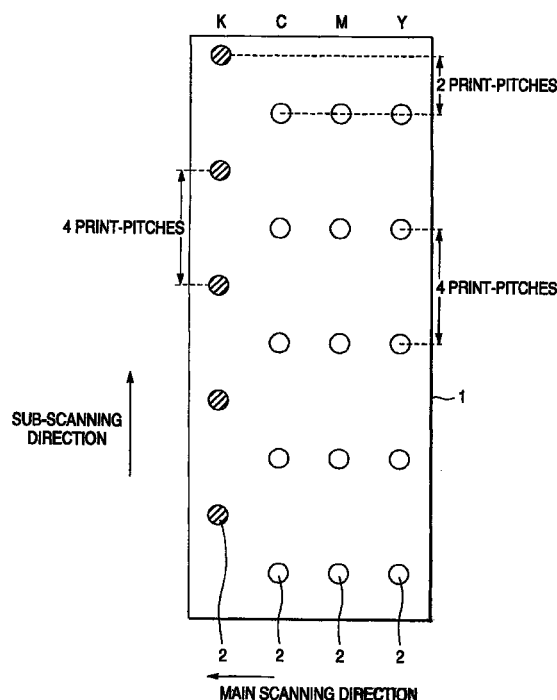
(30) Priority: **25.07.1997 JP 21599197**

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(54) **Ink-jet printing apparatus**

(57) A recording head (1) is so designed that a plurality of nozzle openings (2) for each of the nozzle opening arrays (K, C, M, Y) are arranged at intervals of at least four or more print-pitches in the sub-scanning direction, that the nozzle opening arrays are divided into at least two groups, that the nozzle opening arrays belonging to each of the groups are positioned along the same line in the main scanning direction, and that the groups are shifted away from each other at least two print-pitches in the sub-scanning direction. Dots of different groups do not contact each other during printing, and when printing for one scan line is completed, a recording medium is fed a number of print-pitches that corresponds to the nozzle opening count, so that a paper feeding distance error can be constant.

FIG. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 1607

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.6)
X	EP 0 744 706 A (SEIKO EPSON CORP) 27 November 1996 (1996-11-27)	1,2	B41J2/21
A	* figures 1,2 *	3-8	
X	EP 0 724 962 A (SEIKO EPSON CORP) 7 August 1996 (1996-08-07)	1,2	
A	* figures 1,3 *	3-8	
X	US 4 593 295 A (MATSUFUJI YOHJI ET AL) 3 June 1986 (1986-06-03)	1,2	
A	* figures 1,4 *	3-8	
A	EP 0 610 096 A (CANON KK) 10 August 1994 (1994-08-10) * figures 1,7,11,14,18,21-24,32,36 *	3-8	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 21 March 2000	Examiner Widmeier, W
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ON EUROPEAN PATENT APPLICATION NO.**

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21-03-2000

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0744706	A	27-11-1996	JP 9011509 A	14-01-1997
			US 5844585 A	01-12-1998
EP 0724962	A	07-08-1996	JP 8267832 A	15-10-1996
			US 5683188 A	04-11-1997
US 4593295	A	03-06-1986	JP 1615866 C	30-08-1991
			JP 2041420 B	17-09-1990
			JP 58215351 A	14-12-1983
			JP 1615867 C	30-08-1991
			JP 2041421 B	17-09-1990
			JP 58215352 A	14-12-1983
EP 0610096	A	10-08-1994	JP 6226998 A	16-08-1994
			JP 6312517 A	08-11-1994

EPO FORM P0459

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