(11) **EP 0 911 164 A3** 

(12)

## **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3: 15.12.1999 Bulletin 1999/50

(51) Int Cl.6: **B41J 2/06** 

(43) Date of publication A2: **28.04.1999 Bulletin 1999/17** 

(21) Application number: 98308685.1

(22) Date of filing: 23.10.1998

(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

(30) Priority: 23.10.1997 JP 29081997

(71) Applicants:

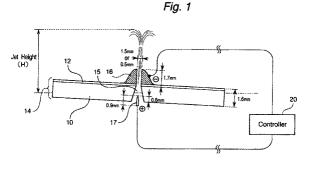
- Shinten Sangyo Co., Ltd. Tokyo 161-0032 (JP)
- Takayanagi Research Incorporated Hamamatsu-shi, Shizuoka 431-0202 (JP)
- New Technology Management Co., Ltd. Tokyo 124-0024 (JP)
- (72) Inventors:
  - Takayanagi, Jun Hmamatsu-shi,Shizuoka 431-0202 (JP)

- Otsubo, Yasufumi Chiba-shi, Chiba 263-0043 (JP)
- Takayanagi, Makoto Hamamatsu-shi, Shizuoka 431-0202 (JP)
- Yokota, Shinichi
   Sagahimara-shi, Kanagawa 228-0802 (JP)
- Imagawa, Yasunori Toyohashi-shi, Aichi 441-8071 (JP)
- Edamura, Kazuya
   Katsushika-ku, Tokyo 124-0024 (JP)
- (74) Representative: Jackson, Robert Patrick Frank B. Dehn & Co., European Patent Attorneys, 179 Queen Victoria Street London EC4V 4EL (GB)

## (54) Recording methods using electro-sensitive movable fluids, and recording apparatuses

(57) In the method of using an ink-jet recording ink composition and the recording apparatus according to the invention, by the application of a voltage between one or plural ink jet electrodes (16) and one or plural source electrodes (17) which are provided in the vicinity of bottom ends of the ink jet electrodes and are electrically insulated from the ink jet electrodes, an ink-jet recording ink composition comprising an electrosensitive movable fluid and a colorant dissolved or dispersed in the fluid is moved in the direction of the source elec-

trodes to the ink jet electrodes and is jetted from tips of the ink jet electrodes. An ink attraction electrode may be further arranged in the present invention, whereby the ink composition jetted from the ink jet electrodes can be attracted by the ink attraction electrode and thereby more precise printing can be carried out. A gate electrode may be furthermore arranged between the ink attraction electrode and the ink jet electrode, whereby printing can be carried out with controlling the jet line of the ink composition.





## **EUROPEAN SEARCH REPORT**

Application Number EP 98 30 8685

Category	Citation of document with indication, where ap of refevant passages		Relevant to claim	CLASSIFICATION OF THE APPLICATION (int.Cl.6)
A	EP 0 778 134 A (NIPPON ELECTRIC 11 June 1997 (1997-06-11) * column 3, line 50 - column 4 2; figure 5 *		-4,14	B41J2/06
A	EP 0 787 792 A (NEW TECHNOLOGY CO L) 6 August 1997 (1997-08-06 * abstract; figure 1 *		2,4,6, 1,22	
A	PATENT ABSTRACTS OF JAPAN vol. 199, no. 802, 30 January 1998 (1998-01-30) & JP 09 267475 A (MURATA MACH 14 October 1997 (1997-10-14) * abstract *	_TD),		
D,A	PATENT ABSTRACTS OF JAPAN vol. 004, no. 167 (M-042), 19 November 1980 (1980-11-19) & JP 55 117663 A (NEC CORP), 10 September 1980 (1980-09-10) * abstract *		2,4,6,	TECHNICAL FIELDS SEARCHED (Int.Ci.6)
D,A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 436 (M-1027), 18 September 1990 (1990-09-18) & JP 02 172746 A (SEIKO EPSON (4 July 1990 (1990-07-04) * abstract *	14	2,4,6,	B41J
	The present search report has been drawn up for a			
		mpletion of the search	Wehr	Examiner W
X : part Y : part doci	ATEGORY OF CITED DOCUMENTS  icularly relevant if taken alone icularly relevant if combined with another unient of the same category nological background	T: theory or principle und E: earlier patent docume after the filing date D: document cited in the L: document cited for oth	ent, but publis application aer reasons	

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

EP 98 30 8685

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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-10-1999

Patent document cited in search repo	rt	Publication date	Patent family member(s)	Publication date
EP 0778134	A	11-06-1997	JP 2783225 B JP 9156105 A US 5742412 A	06-08-19 17-06-19 21-04-19
EP 0787792	A	06-08-1997	JP 9208977 A JP 9208978 A JP 9271188 A JP 10088174 A JP 10146075 A	12-08-19 12-08-19 14-10-19 07-04-19 29-05-19
JP 09267475	A	14-10-1997	NONE	
JP 55117663	A	10-09-1980	NONE	
JP 02172746	Α	04-07-1990	NONE	

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