



(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **93306748.0**

(51) Int. Cl.⁵ : **B41J 2/04**

(22) Date of filing : **25.08.93**

(30) Priority : **04.09.92 US 940596**

(43) Date of publication of application :
09.03.94 Bulletin 94/10

(84) Designated Contracting States :
DE FR GB

(88) Date of deferred publication of search report :
14.06.95 Bulletin 95/24

(71) Applicant : **XEROX CORPORATION**
Xerox Square
Rochester New York 14644 (US)

(72) Inventor : **Quate, Calvin F.**
859 Cedro Way
Stanford, California 9.4305 (US)
Inventor : **Rawson, Eric G.**
20887 Maureen Way
Saratoga, California 95070 (US)

(74) Representative : **Goode, Ian Roy et al**
Rank Xerox Ltd
Patent Department
Parkway
Marlow Buckinghamshire SL7 1YL (GB)

(54) **Droplet ejections by acoustic and electrostatic forces.**

(57) A technique for ejecting droplets using acoustic radiation and electrostatic attraction. Ejection proceeds by acoustically raising a mound (14) of ink (18) proximate an electrode (20) and then electrostatically attracting the mound by applying a voltage to the electrode. The electric field further accelerates the mound and, since the raised mound has a restricted volume, a Rayleigh instability necks off the mound, thereby creating a droplet (12). The droplet is ejected onto a recording medium (34) by the momentum imparted to the droplet by the acoustic energy and the electrostatic force. Beneficially, the applications of the acoustic energy and the electrode voltage are used to address the ejecting droplet ejector. Droplet ejectors in a column (or row) form a column (or row) of mounds, while an electrode voltage is applied to each of the electrodes of a row (or columns) of droplet ejectors. Only the droplet ejector associated with an acoustically raised a mound and with an energized electrode ejects a droplet.

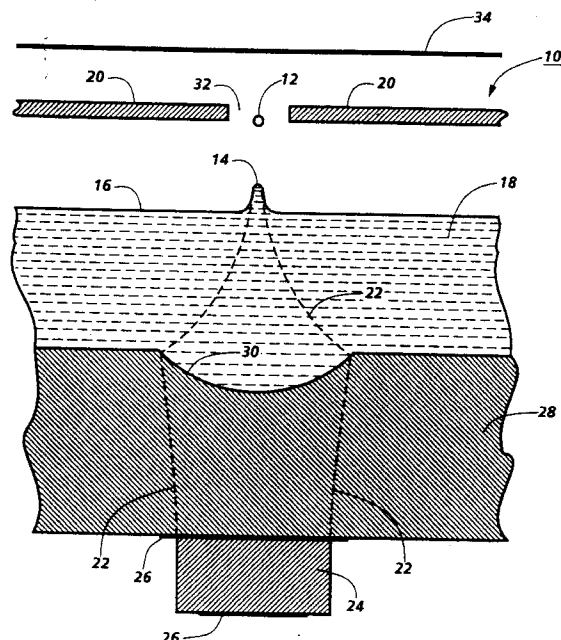


Fig. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 30 6748

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.5)
D,X	US-A-4 697 195 (QUATE CALVIN F ET AL) 29 September 1987 * column 4, line 43 - column 6, line 16 *	1,2,7,9	B41J2/04
A	---	3,6,8,10	
D,A	US-A-4 308 547 (LOVELADY KENNETH T ET AL) 29 December 1981 * column 6, line 16-19; claim 1 *	1,2,7,9	
A	PATENT ABSTRACTS OF JAPAN vol. 013 no. 022 (M-786) ,19 January 1989 & JP-A-63 233844 (TOKYO ELECTRIC CO LTD) 29 September 1988, * abstract *	4,5	
A	PATENT ABSTRACTS OF JAPAN vol. 014 no. 013 (M-918) ,11 January 1990 & JP-A-01 259956 (FUJI XEROX CO LTD) 17 October 1989, * abstract *	1,2,7,9	
A	PATENT ABSTRACTS OF JAPAN vol. 011 no. 355 (E-558) ,19 November 1987 & JP-A-62 132500 (NEC CORP) 15 June 1987, * abstract *	1,2,7,9	TECHNICAL FIELDS SEARCHED (Int.Cl.5)
A	PATENT ABSTRACTS OF JAPAN vol. 009 no. 231 (M-414) ,18 September 1985 & JP-A-60 087055 (FUJI XEROX KK) 16 May 1985, * abstract *		B41J

		-/--	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 March 1995	Examiner Adam, E
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 (02.92) (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 30 6748

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.5)
A	PATENT ABSTRACTS OF JAPAN vol. 016 no. 135 (M-1230) ,6 April 1992 & JP-A-03 295654 (SEIKO EPSON CORP) 26 December 1991, * abstract *		
A	US-A-4 282 532 (MARKHAM ROGER G) 4 August 1981		
A	EP-A-0 479 441 (SEIKO EPSON CORP) 8 April 1992		
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 March 1995	Examiner Adam, E
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.92 (P04C01)