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### (54) Imaging apparatus and method adapted to control ink droplet volume and void formation

(57) Imaging apparatus and method adapted to control ink droplet volume and void formation. The apparatus (10) includes an ink jet print head (45) having a nozzle (110) for ejecting an ink droplet (150) therefrom. A heater element (130) is in heat transfer communication with the ink droplet for variably supplying heat energy to the ink droplet, so that the volume of the ink droplet is controlled as the heat energy is variably supplied to the ink droplet. A controller (40) is connected to the heater element for variably controlling the heat energy supplied to the ink droplet. The controller varia-

bly controls the heat energy by variably controlling a plurality of voltage pulses sequentially supplied to the heater element. Moreover, in order to reduce the potential for void formation in the ink droplet, the pulses are spaced-apart by a predetermined delay interval. Suitable control of ink droplet volume and delay interval between pulses results in uniform print density and "gray-scaling" of each dot or pixel in the output image and also precludes void formation.

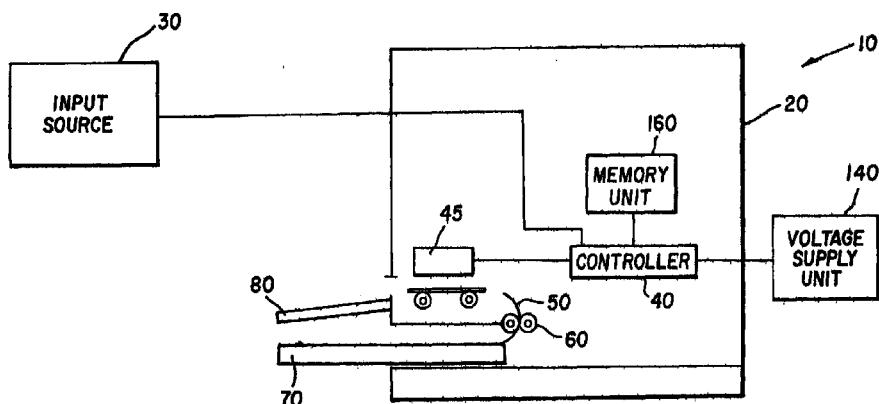


FIG. 1



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 609 997 A (HEWLETT PACKARD CO) 10 August 1994 * the whole document * ---	1,2,4,9, 10,12	B41J2/05 B41J2/14 B41J2/205 B41J2/21
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 085 (M-206), 8 April 1983 & JP 58 011169 A (CANON KK), 21 January 1983 * abstract * ---	1-4,9-12	
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A	EP 0 649 746 A (HEWLETT PACKARD CO) 26 April 1995 * the whole document * ---	1,6-9, 14-17	
A	EP 0 709 213 A (CANON KK) 1 May 1996  * column 12, line 13 - line 46 * * figure 9 * ---	1,6,7,9, 14,16	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B41J
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A	WO 96 32289 A (SILVERBROOK KIA ; EASTMAN KODAK CO (US)) 17 October 1996 * page 10 * * page 14, line 21 - line 28 * * claims * -----	1-17	
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	24 June 1999	Didenot, B	
CATEGORY OF CITED DOCUMENTS		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	
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			

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

EP 98 20 0819

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