



US005916368A

United States Patent [19]

[11] Patent Number: **5,916,368**

Ebert

[45] Date of Patent: **Jun. 29, 1999**

- [54] **METHOD AND APPARATUS FOR TEMPERATURE CONTROLLED SPIN-COATING SYSTEMS**
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- [21] Appl. No.: **08/807,680**
- [22] Filed: **Feb. 27, 1997**
- [51] Int. Cl.⁶ **B05C 21/00**; B05B 11/00; B23B 5/22
- [52] U.S. Cl. **118/500**; 269/21; 118/52; 118/319; 279/3
- [58] **Field of Search** 118/52, 319, 320, 118/500, 503; 269/21; 279/3, 134, 135; 165/61, 80.1, 80.5, 75

- Unknown, Patent Abstracts of Japan, vol. 097, No. 005, May 30, 1997 & JP 09 007918 A (M Setetsuku KK), Jan. 10, 1997.
- Unknown, Patent Abstracts of Japan, vol. 095, No. 009, Oct. 31, 1995 & JP. 07 142378 A; (Tokyo Electron Ltd; Others: 01), Jun. 2, 1995.
- Unknown, Patent Abstracts of Japan, vol. 013, No. 275 (C-610), Jun. 23, 1989 & JP 01 070168 A (Hitachi Ltd.), Mar. 15, 1989.
- Unknown, Patent Abstracts of Japan, vol. 013, No. 024 (C-561), Jan. 19, 1989 & JP 63 229169 A (Hitachi Ltd.), Sep. 26, 1988.
- Unknown, Patent Abstracts of Japan, vol. 010, No. 332 (E-453), Nov. 12, 1986 & JP 61 137332 A (Hitachi Ltd.), Jun. 25, 1986.
- Unknown, Patent Abstracts of Japan, vol. 012, No. 077 (E-589), Mar. 10, 1988 & JP 62 216229 A (NEC Corp.), Sep. 22, 1987.
- Unknown, Patent Abstracts of Japan, vol. 011, No. 051 (E-480), Feb. 17, 1987 & JP 61 214520 A (Hitachi Ltd.), Sep. 24, 1986.

[56] References Cited

U.S. PATENT DOCUMENTS

2,632,725	3/1953	Marks et al.	154/128
4,068,019	1/1978	Boeckl	427/82
4,075,974	2/1978	Plows et al.	118/52
4,086,870	5/1978	Canavello et al.	118/52
4,587,139	5/1986	Hagan et al.	427/130
4,609,037	9/1986	Wheeler et al.	118/52
4,775,550	10/1988	Chu et al.	427/38
4,838,979	6/1989	Nishida et al.	156/345
4,889,069	12/1989	Kawakami	118/52
5,003,062	3/1991	Yen	437/231
5,013,586	5/1991	Cavazza	427/240
5,580,607	12/1996	Takekuma et al.	427/240
5,626,675	5/1997	Sakamoto et al.	118/663

OTHER PUBLICATIONS

Unknown, Patent Abstracts of Japan, vol. 097, No. 002, Feb. 28, 1997 & JP 08 273996 A (NEC Kansai Ltd.), Oct. 18, 1996.

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[57] ABSTRACT

Disclosed is method and apparatus for distributing a chemical over the surface of a substrate. The method includes depositing the chemical on a portion of the surface of a substrate near the center of the substrate. The method further includes controlling the temperature of the surface of a substrate so that the viscosity of the chemical is calibrated to cause the chemical to be deposited on the surface of the substrate in a substantially uniform manner.

20 Claims, 13 Drawing Sheets

