



US006010570A

# United States Patent [19]

[11] **Patent Number:** **6,010,570**

**Motoda et al.**

[45] **Date of Patent:** **Jan. 4, 2000**

[54] **APPARATUS FOR FORMING COATING FILM FOR SEMICONDUCTOR PROCESSING**

5,853,812 12/1998 Kawasaki et al. .... 118/302

[75] Inventors: **Kimio Motoda**, Kumamoto; **Tetsu Kawasaki**, Yamanashi-ken, both of Japan

### FOREIGN PATENT DOCUMENTS

4-124812 4/1992 Japan .  
5-55133 3/1993 Japan .  
7-326554 12/1995 Japan .

[73] Assignee: **Tokyo Electron Limited**, Tokyo, Japan

### OTHER PUBLICATIONS

[21] Appl. No.: **08/914,819**

Patent Abstracts of Japan, vol. 9, No. 308 (P-410) (2031), Dec. 4, 1985, JP 60-140350, Jul. 25, 1985.

[22] Filed: **Aug. 20, 1997**

Derwent Abstracts, AN-96-066540, JP 7-326554, Dec. 12, 1995.

### [30] Foreign Application Priority Data

Aug. 30, 1996 [JP] Japan ..... 8-249230

*Primary Examiner*—Laura Edwards

*Attorney, Agent, or Firm*—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

[51] **Int. Cl.<sup>7</sup>** ..... **B05C 5/00**

### [57] ABSTRACT

[52] **U.S. Cl.** ..... **118/323**; 118/302; 118/305; 118/669; 118/671; 118/683; 118/696; 118/712; 118/600; 156/578; 239/104; 239/106; 239/112; 239/69; 222/160; 222/52; 222/55

Disclosed is an apparatus for forming a coating film for semiconductor processing, including a holder for holding a substrate, a coating solution supply device arranged to face one main surface of the substrate held by the holder and provided with a discharge port for supplying a coating solution onto the one main surface of the substrate, the coating solution forming a band-like stream having a width smaller than that of the substrate, a moving device for moving the coating solution supply device in parallel and relative to the substrate held by the holder to form a coating region and a non-coating region on the one main surface of the substrate, and a clearance retaining device for maintaining constant the distance between the discharge port of the coating solution supply device and the one main surface of the substrate.

[58] **Field of Search** ..... 118/302, 323, 118/305, 300, 669, 671, 683, 696, 712, 600; 156/356, 357, 378, 367, 368, 578; 239/104, 106, 112, 722, 69; 222/160, 52, 55

### [56] References Cited

#### U.S. PATENT DOCUMENTS

5,002,008 3/1991 Ushijima et al. .... 118/302  
5,094,884 3/1992 Hillman et al. .  
5,119,759 6/1992 Hicks ..... 118/323  
5,127,362 7/1992 Iwatsu et al. .  
5,183,508 2/1993 Cholinski ..... 118/683  
5,350,452 9/1994 Rempe et al. .... 118/609

**24 Claims, 7 Drawing Sheets**

