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United States Patent [19]
Hayes

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- [54] **SOFT IMPACT DISPENSE NOZZLE**
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- [52] **U.S. Cl.** **118/319**; 118/52; 118/300;
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[57] **ABSTRACT**

An apparatus and a method of dispensing process liquid from a liquid source onto a surface of a semiconductor wafer is disclosed in accordance with the present invention. The apparatus includes a nozzle having a bore with a longitudinal axis in fluid communication with the liquid source and a flow surface having a perimeter. The flow surface is oriented at a first angle relative to the axis and in fluid communication with the bore to dispense a sheet of process liquid from the perimeter onto a wafer surface. In a preferred embodiment, the nozzle is axisymmetric and includes a housing having a source portion connected to the liquid source and a dispense portion, and the bore traverses the source and dispense portions. An insert is provided having a first section disposed in the dispense portion of the bore adjacent to the source portion and a second section including the flow surface which is fully circumferential and continuous. The flow surface is in close proximity to the dispense portion, so as to define a flow path along the flow surface to control the flow of the process liquid. In the method of the invention, the nozzle is positioned to dispense a sheet of process liquid onto the wafer surface, while the surface is being rotated. The nozzle is radially offset from the center of the surface such that a portion of the continuous sheet of process liquid is dispensed directly onto the center of the wafer surface.

[56] **References Cited**

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25 Claims, 9 Drawing Sheets

