

[54] **GRADIENT LENS FABRICATION**

4,814,056 3/1989 Welty 118/720

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FOREIGN PATENT DOCUMENTS

0197505 12/1982 Japan 65/37
4015964 1/1986 Japan 118/720

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[58] **Field of Search** 65/18.1, 18.2, 37, 60.1, 65/60.5, 60.51, 60.52, 60.2; 118/504, 720; 427/282, 165, 166, 167, 162; 350/413, 417

OTHER PUBLICATIONS

IBM Technical Disclosure Bulletin, Lentz, vol. 5, No. 1, 6-1962, p. 21.

R. A. Laudise, The Growth of Single Crystals, copyright 1970, by Prentice-Hall, Chapter 6, pp. 225-256.

Goela et al., "Monolithic Material Fabrication by Chemical Vapour Deposition", Journal of Materials Science (1988), pp. 4331-4339.

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[56] **References Cited**

U.S. PATENT DOCUMENTS

2,341,827	2/1944	Sukumlyn	118/220
2,391,595	12/1945	Richards et al.	118/720
2,408,529	10/1946	Osterberg	118/720
2,410,720	11/1946	Dimmick	118/720
2,853,402	9/1958	Blois	118/720
2,925,496	2/1960	Zoubek	118/720
4,101,302	7/1978	Krohn et al.	65/30 R
4,230,396	10/1980	Olshansky et al.	350/96.31
4,310,340	1/1982	Sarkar	65/3.12
4,358,181	11/1982	Gulati et al.	350/96.31
4,359,267	11/1982	Appel	350/320
4,405,207	9/1983	Kay	350/320
4,406,517	9/1983	Olshansky	350/96.31
4,425,146	1/1984	Izawa et al.	65/18.2
4,455,964	6/1984	Weber	118/504
4,473,273	9/1984	Hodge	350/96.31
4,547,210	10/1985	Schneider	65/2
4,776,868	10/1988	Trotter et al.	65/37

[57] **ABSTRACT**

A method for fabricating a lens in which the lens composition is controlled by dynamic shaping and shadowing. A lens material is vaporized and directed to a substrate through an orifice which is rotating relative to the substrate about the lens axis and which has a non-uniform radial distribution. The lens material is condensed on the substrate to form a lens having a radially non-uniform but axially symmetrical distribution. Thereafter, the original orifice may be replaced by a complimentary orifice and another lens material vaporized and directed to the substrate through the replacement orifice which is also rotating relative to the substrate about the lens axis and which also has a non-uniform radial distribution. This second lens material condenses on the first condensed lens material to form a compound lens.

4 Claims, 3 Drawing Sheets

