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(54) **METHODS OF SURFACE TREATMENT FOR ENHANCING THE PERFORMANCE OF A FLOATING PHAKIC REFRACTIVE LENS DESIGN**

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(58) **Field of Search** 623/912, 6.11, 623/6.57, 6.6, 6.62; 264/1.32, 1.36, 1.37, 1.38, 2.6

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,573,998 A		3/1986	Mazzocco	623/6
4,585,456 A		4/1986	Blackmore	623/6
4,702,244 A		10/1987	Mazzocco	128/303 R
5,147,397 A		9/1992	Christ et al.	623/6
5,192,319 A		3/1993	Worst	623/6
5,258,025 A		11/1993	Fedorov et al.	623/6
5,300,117 A		4/1994	Baikoff et al.	623/6
5,397,848 A		3/1995	Yang et al.	525/477
5,480,428 A		1/1996	Fedorov et al.	623/6
5,584,882 A	*	12/1996	Yabushita et al.	623/6
5,603,774 A		2/1997	LeBoeuf et al.	134/1
5,882,421 A	*	3/1999	LeBoeuf et al.	134/1
6,066,172 A	*	5/2000	Huo et al.	623/6.56
6,399,734 B1	*	6/2002	Hodd et al.	528/32

FOREIGN PATENT DOCUMENTS

RU	112032544	4/1989
WO	9817205	4/1998

OTHER PUBLICATIONS

"Structural Changes in IOL Surface Layer in UV–Treatment "Chabrova, C–MRS Int. Symp. Proc. 1991, vol. 3, 505–508. Vasilets, Polymer, 39(13): 2875–2881 (1997) "Improvement of Micro–Wear Resistance of Silicone by Vacuum Ultraviolet Irradiation".

* cited by examiner

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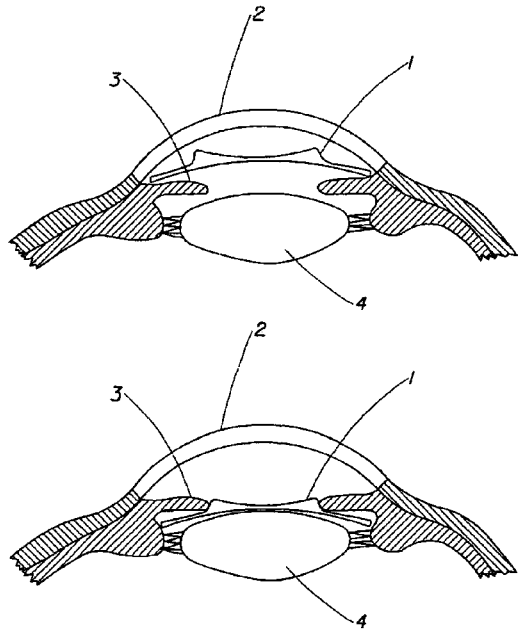
(57) **ABSTRACT**

A method of preparing phakic intraocular lenses from hydrophobic materials is described. In this process, the lens is tested to determine whether it can float submerged in an aqueous medium. If it cannot (e.g., if it remains on top of the aqueous medium), the lens is surface treated (for example, by vacuum UV or corona discharge processes) to increase its wetting ability (e.g., to reduce its hydrophobicity). The lenses prepared by this process are also described.

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