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(54) **METHOD AND DEVICE FOR MEASURING THE TILT OF AN OPTICAL DISC**

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(58) **Field of Classification Search** None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 5,751,680 A * 5/1998 Ishibashi et al. 369/109.01
- 5,768,232 A * 6/1998 Muramatsu et al. 369/53.35
- 6,304,526 B1 * 10/2001 Nagashima et al. 369/44.23
- 6,545,958 B1 * 4/2003 Hirai et al. 369/44.32
- 2003/0058758 A1 * 3/2003 Takeda 369/44.32

* cited by examiner

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(57) **ABSTRACT**

A method and device for measuring the tilt in an optical disc drive (1) is disclosed. The optical disc drive (1) comprises two lasers (31, 41) generating two laser beams (32, 42) having mutually different optical characteristics. One of these laser beams (32) is continuously ON, and is used for writing or reading data to or from the disc. The other laser beam (42) is repeatedly switched ON and OFF. Tilt is measured by comparing a normalized error signal (RES(ON)) during the ON-phase (TON) with a normalized error signal (RES(OFF)) during the OFF-phase.

20 Claims, 6 Drawing Sheets



