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# United States Patent [19]

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Bearden et al.

[45] Date of Patent: **Aug. 10, 1993**

[54] **OPTICAL DATA STORAGE APPARATUS AND METHOD**

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[75] Inventors: **Alan J. Bearden, Berkeley; Michael P. O'Neill, Orinda, both of Calif.**

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[73] Assignee: **The Regents of the University of California, Oakland, Calif.**

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[21] Appl. No.: **676,263**

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[22] Filed: **Mar. 27, 1991**

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### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 414,897, Sep. 29, 1989, Pat. No. 5,029,023.

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[51] Int. Cl.<sup>5</sup> ..... **G11B 7/00**

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[52] U.S. Cl. .... **369/106; 369/112; 369/116; 369/275.3; 369/275.4**

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[58] Field of Search ..... **369/106, 54, 55, 112, 369/116, 121, 275.1, 275.3, 275.4, 275.5**

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*Attorney, Agent, or Firm*—Peter J. Dehlinger

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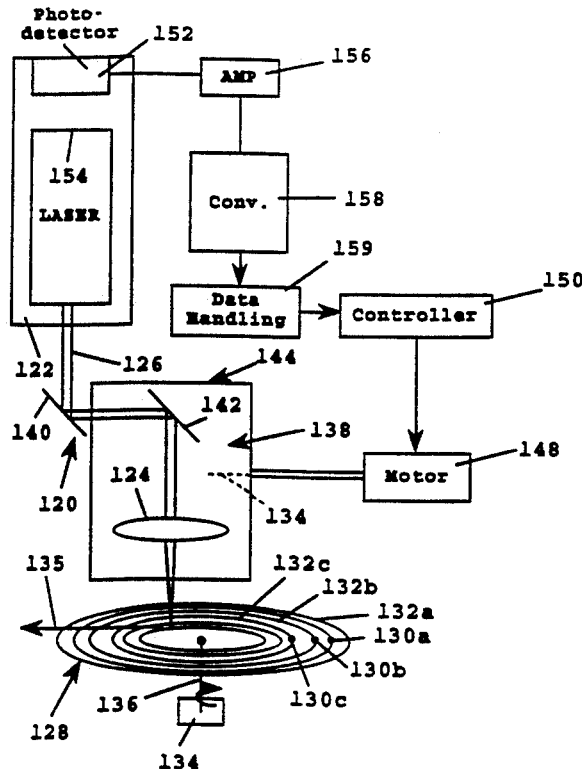
### [57] ABSTRACT

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An optical data storage apparatus and disc in which information is stored in the form of multiple submicron depths at information-storage sites on the disc surface. The depth information is read by directing a focused laser beam onto the storage sites, back reflecting a portion of the reflected beam into the laser cavity, and converting power fluctuations in the laser beam to submicron distance measurements.

11 Claims, 9 Drawing Sheets



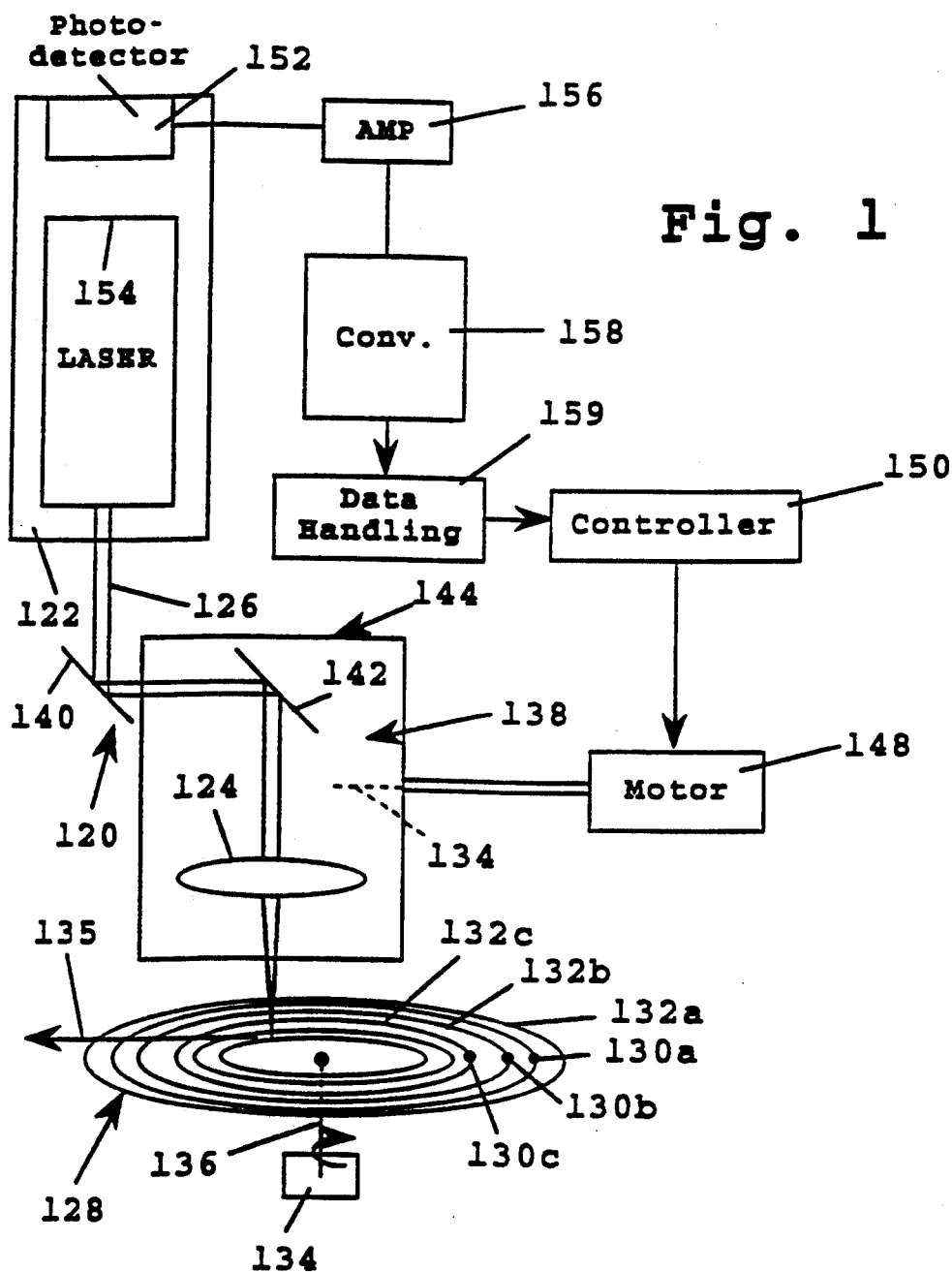


Fig. 1

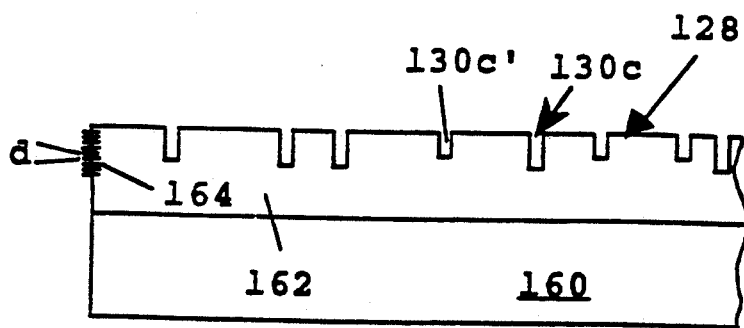
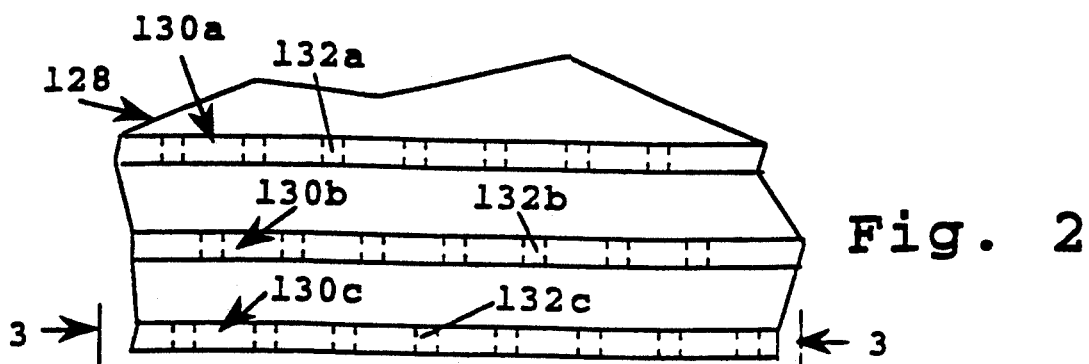


Fig. 3

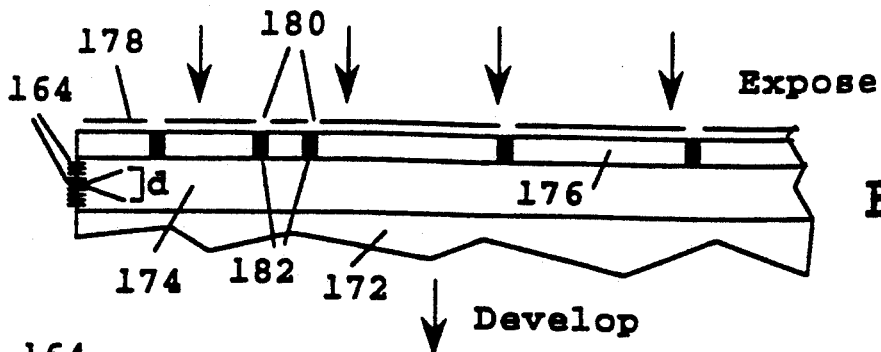


Fig. 4A

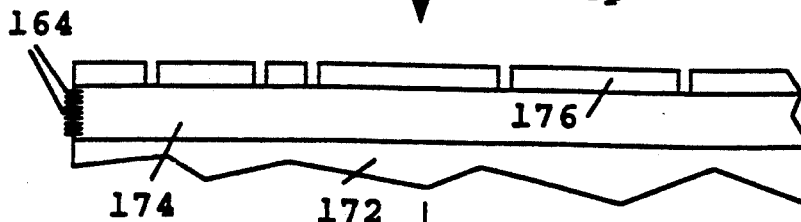


Fig. 4B

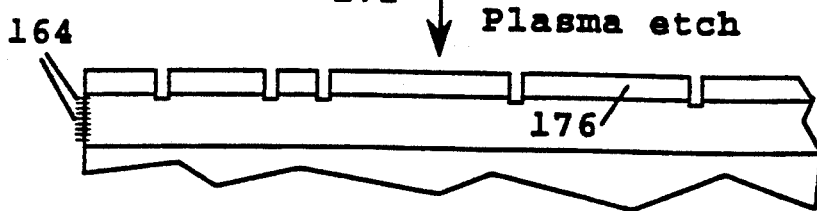


Fig. 4C

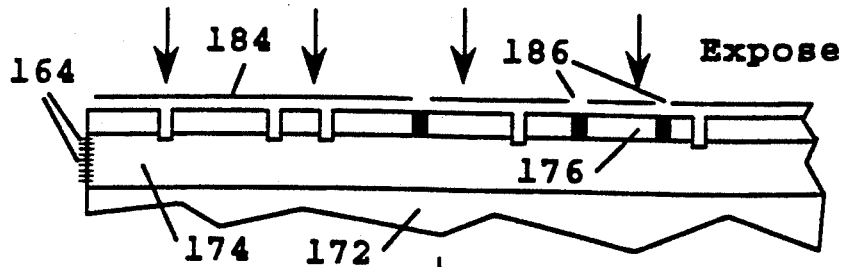


Fig. 4D

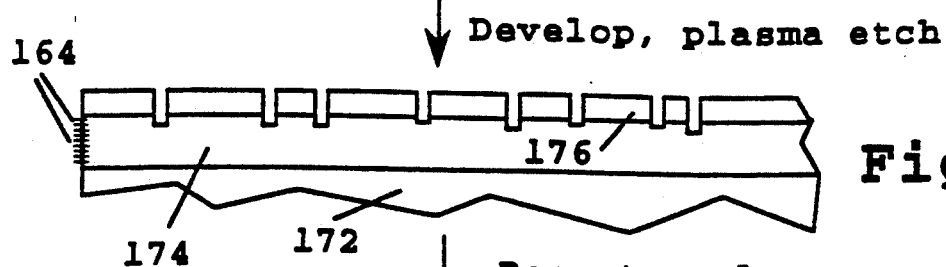


Fig. 4E

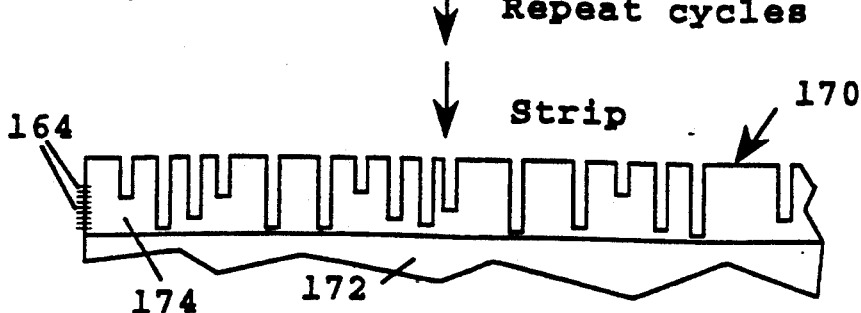


Fig. 4F

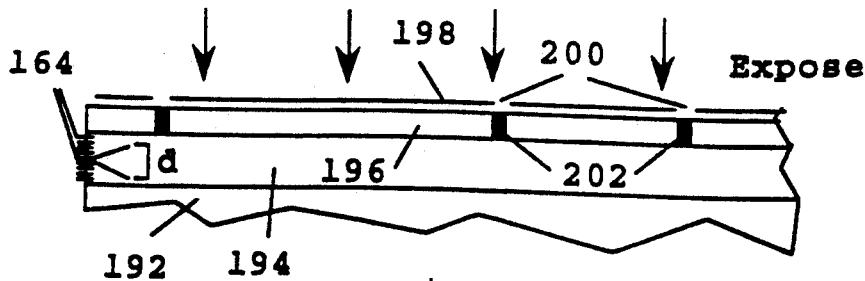


Fig. 5A

↓ Develop, plasma etch, strip

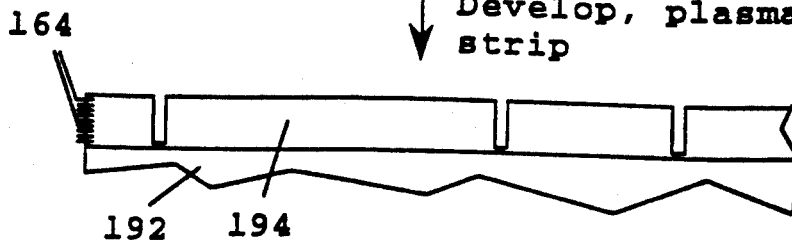


Fig. 5B

↓ Recoat, expose

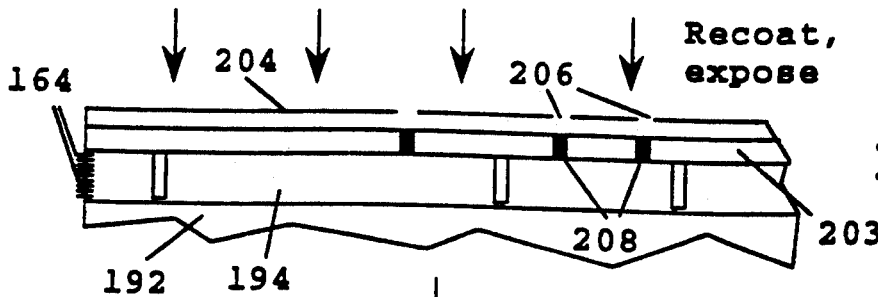


Fig. 5C

↓ Develop, plasma etch, strip

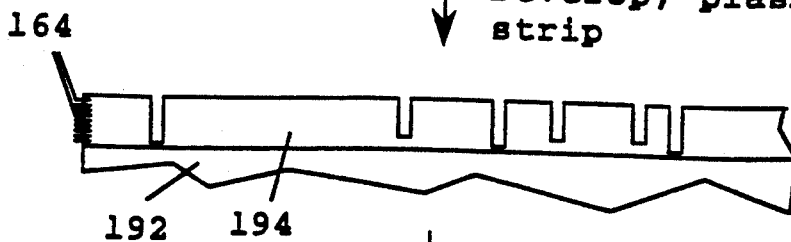


Fig. 5D

↓ Repeat cycles

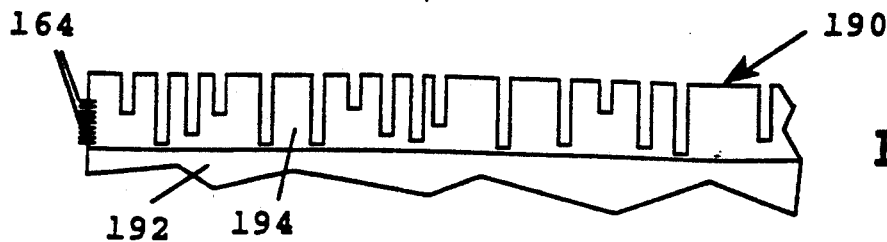


Fig. 5E

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