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United States Patent [19]

Futagawa et al.

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[54] **OBJECTIVE LENS DRIVING APPARATUS AND METHOD INCLUDING VISCO-ELASTIC SUPPORT FOR A MAGNETIC CIRCUIT WHICH ALLOWS TRANSLATION OF THE MAGNETIC CIRCUIT WITHOUT PIVOTING OR ROTATING THERE OF**

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Primary Examiner—Thang V. Tran

[57] ABSTRACT

An objective lens driving apparatus includes a base, an objective lens for converging an optical beam on an optical disc while the optical disc is rotating, and a holding member for holding the objective lens. A first supporting mechanism elastically supports the holding member on the base in such a manner as to allow the holding member to be translated in a focusing direction which is substantially perpendicular to a surface of the optical disc and in a tracking direction which is substantially perpendicular to the focusing direction and parallel to a radial direction of the optical disc. A moving mechanism including a coil and a magnetic circuit for translates the holding member in the focusing direction and the tracking direction by a driving force generated by the coil and the magnetic circuit. A second supporting mechanism for visco-elastically supports the magnetic circuit on the base in such a manner as to translate the magnetic circuit in the focusing direction. The magnetic circuit is translated in an opposite direction to the translation direction of the holding member by a driving force acting oppositely to the driving force for translating the holding member in the focusing direction.

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[21] Appl. No.: 671,510

[22] Filed: Jun. 27, 1996

Related U.S. Application Data

[63] Continuation of Ser. No. 315,349, Sep. 30, 1994, Pat. No. 5,602,808.

[30] Foreign Application Priority Data

Oct. 1, 1993 [JP] Japan 5-247215

[51] Int. Cl.⁶ G11B 7/085

[52] U.S. Cl. 369/44.14; 369/44.15; 369/44.16; 359/823

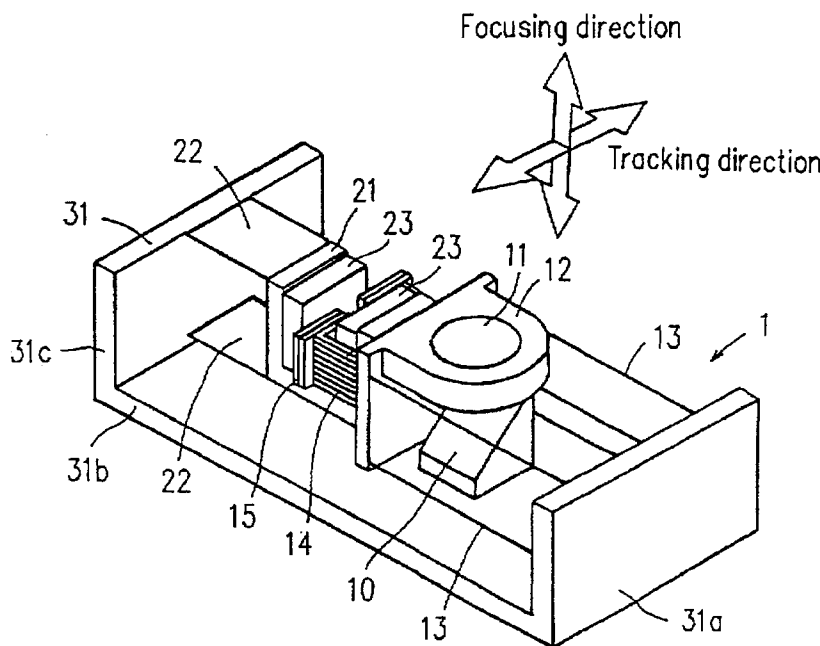
[58] Field of Search 369/44.14, 44.15, 369/44.16, 44.21, 44.22; 359/813, 814, 823, 824

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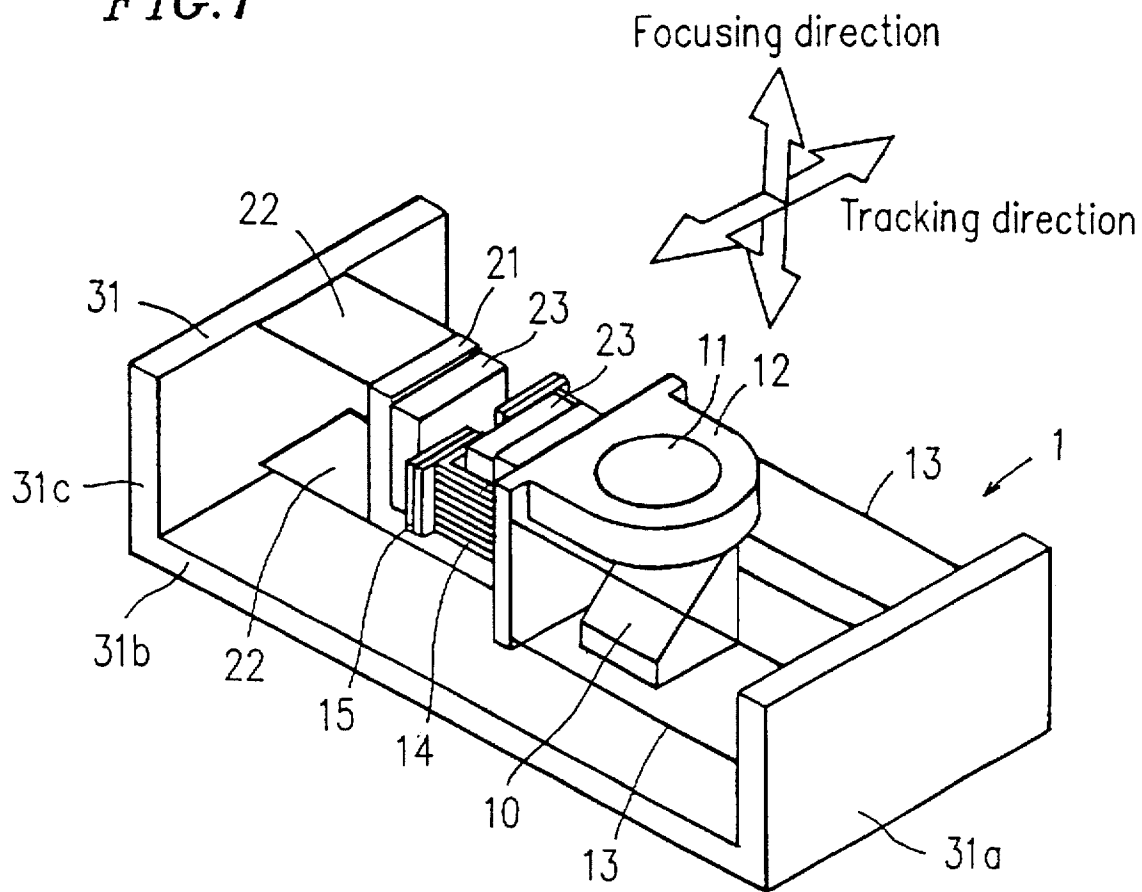
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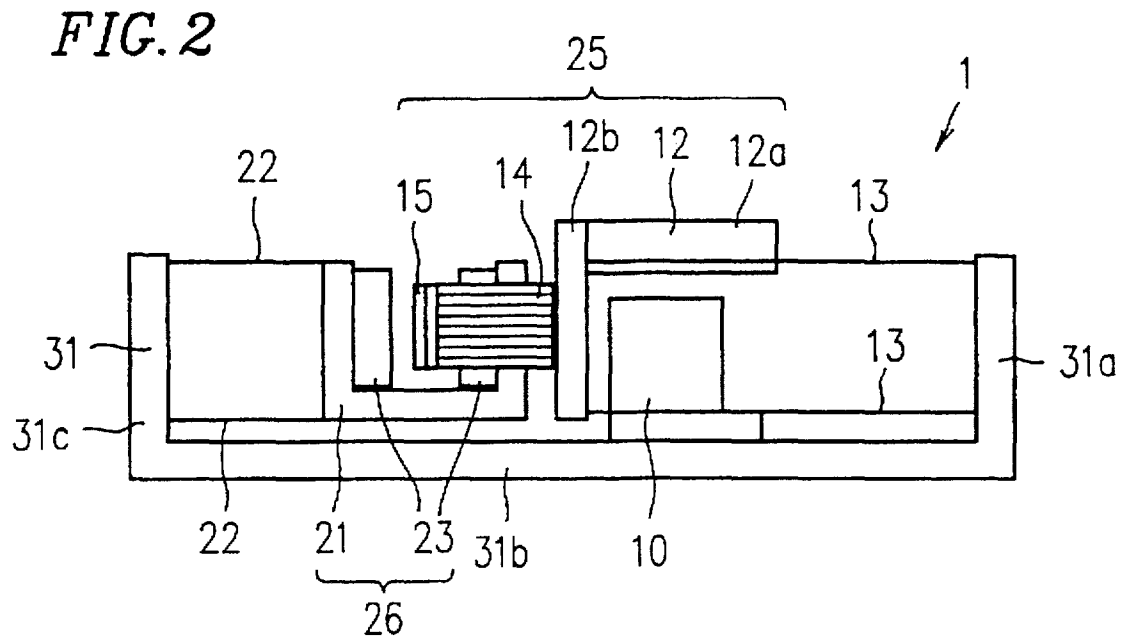
24 Claims, 14 Drawing Sheets



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EXHIBIT 1000

FIG. 1





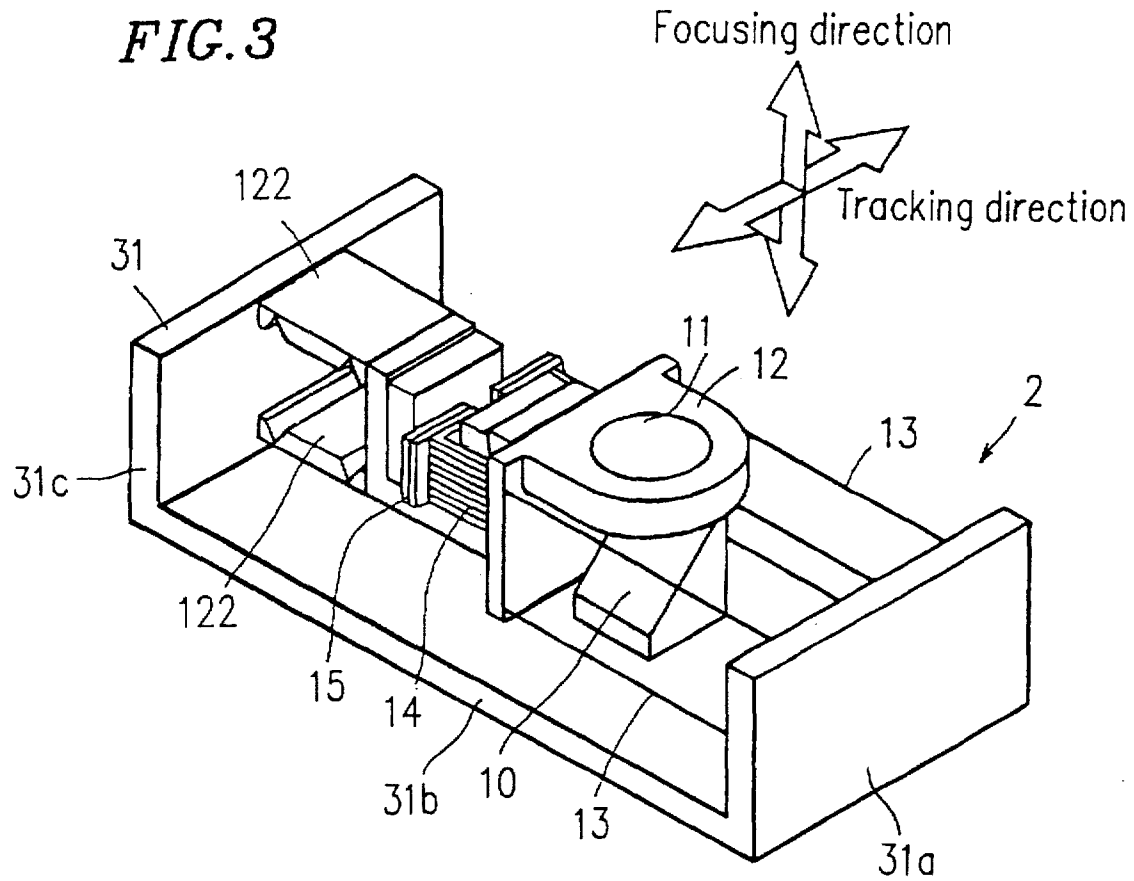
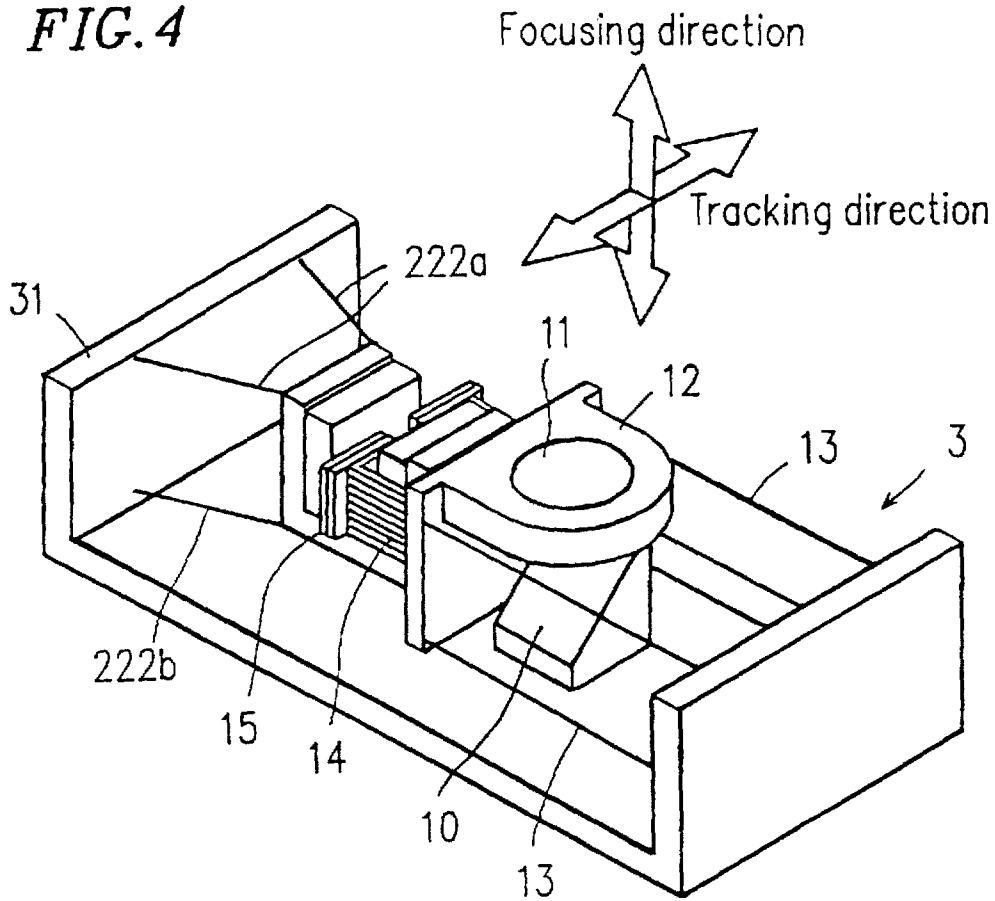


FIG. 4



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