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# United States Patent [19] Wakabayashi et al.

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### [54] OBJECTIVE LENS DRIVER

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### [30] Foreign Application Priority Data

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Oct. 16, 1997 [JP] Japan ..... 9-283824

[51] Int. Cl.<sup>6</sup> ..... **G02B 7/04**

[52] U.S. Cl. .... **250/201.5; 359/824; 369/44.22**

[58] Field of Search ..... 250/201.5, 201.1, 250/201.2; 359/814, 822, 824; 369/44.15, 44.21, 44.22

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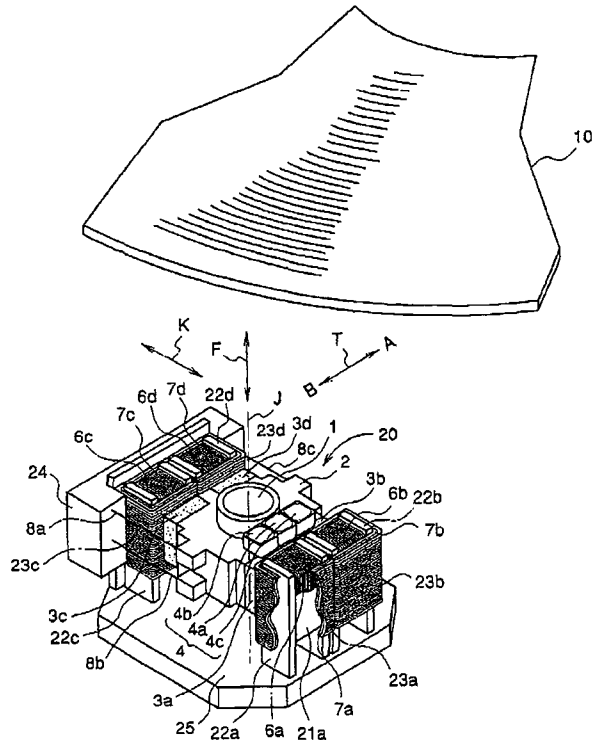
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Primary Examiner—Que T. Le  
Assistant Examiner—Kevin Pyo  
Attorney, Agent, or Firm—Parkhurst & Wendel

### [57] ABSTRACT

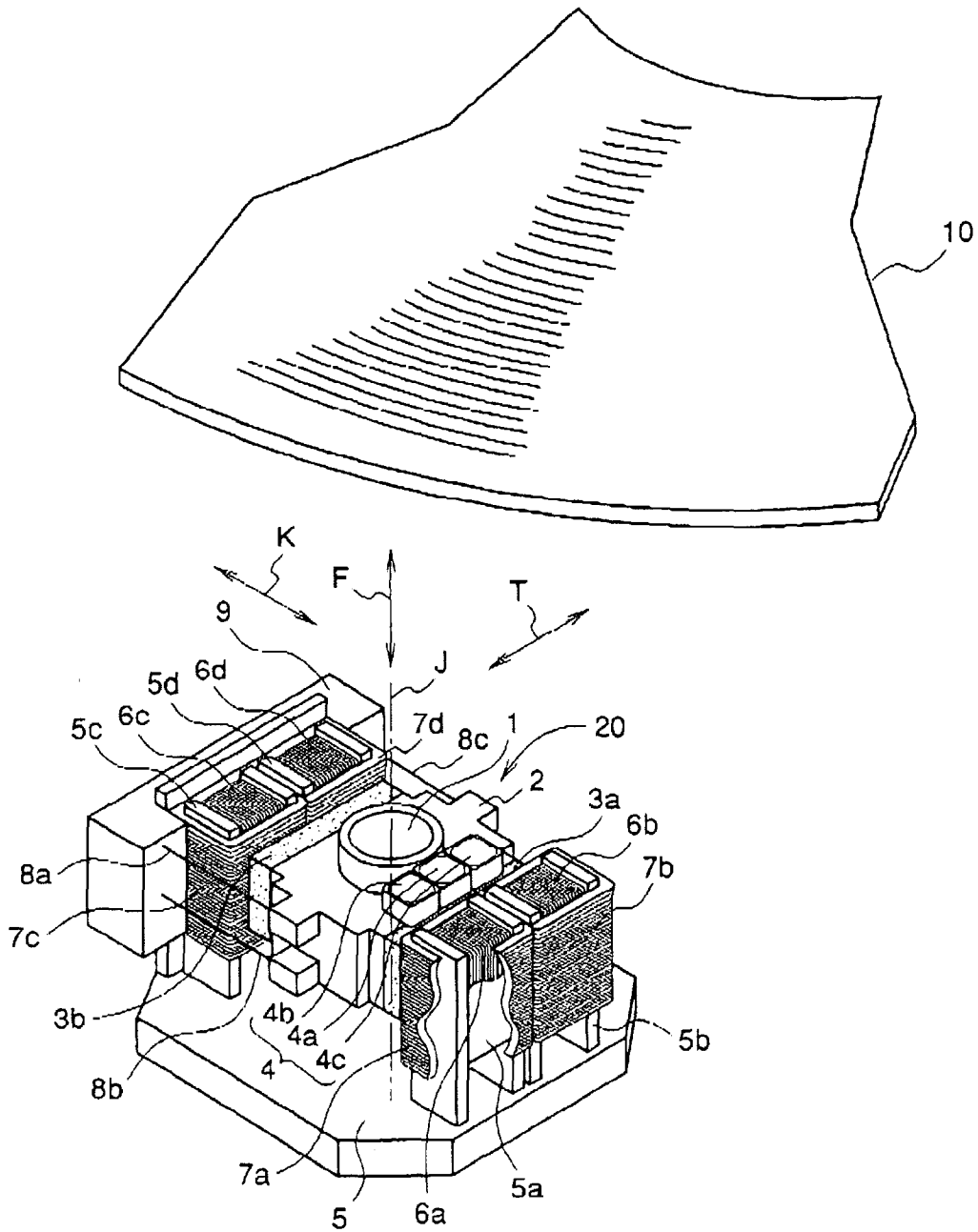
In an objective lens driver, at least one permanent magnet is mounted on a movable member, and plural yokes, each being wound with a coil having its winding axis in the focusing direction, are disposed facing the permanent magnet. The yokes are arranged almost symmetrically about a plane including the center of gravity of the movable member and being perpendicular to the tracking direction. In this structure, even when the movable member moves in the tracking direction, since the permanent magnet (a magnetic field source) also moves with the movable member, the distribution of magnetic flux density that contributes to the drive also shifts according to the movement of the movable member, so that the distribution of magnetic flux density maintains being almost symmetrical about the center of gravity of the movable member. Accordingly, in tilt drive, a constant sensitivity to tilt drive is obtained regardless of the position of the movable member. Further, since the rotation axis of tilt drive is fixed, there arises no crosstalk of displacement in the focusing direction and the tracking direction. Furthermore, since the point of action of driving force on the movable member is fixed, there arises no crosstalk of angular displacement in the tilt direction due to focusing drive and tracking drive. Consequently, stable focusing control, tracking control and tilt correction control are realized in an objective lens driver capable of correcting a tilt.

18 Claims, 17 Drawing Sheets



LG Electronics, Inc. et al.  
**EXHIBIT 1007**

Fig.1



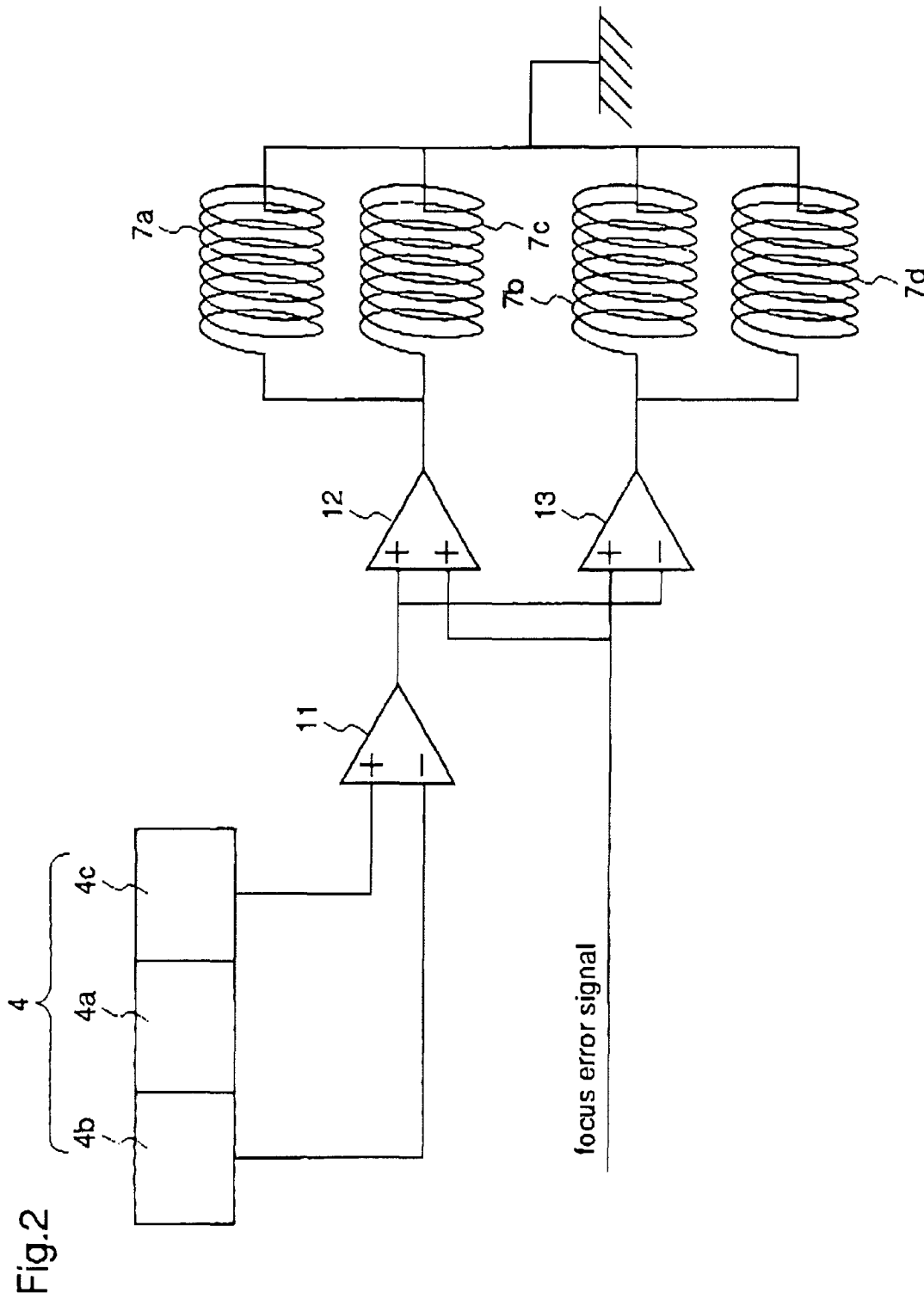


Fig.3

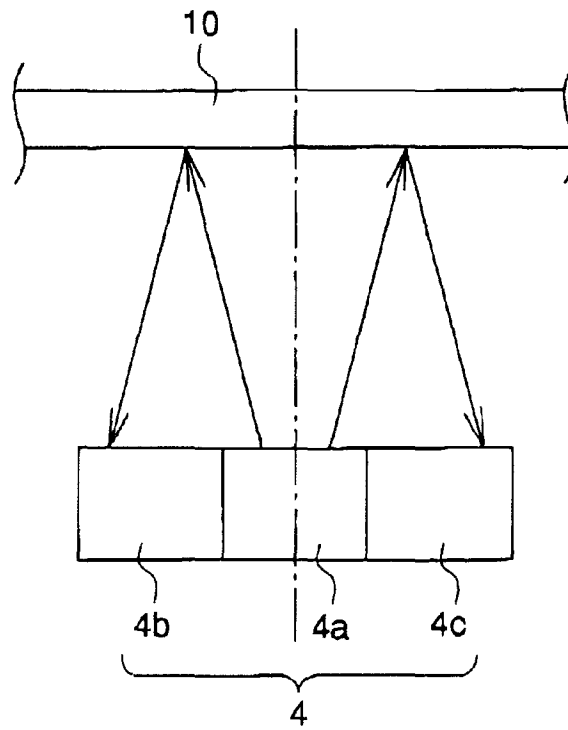


Fig.4

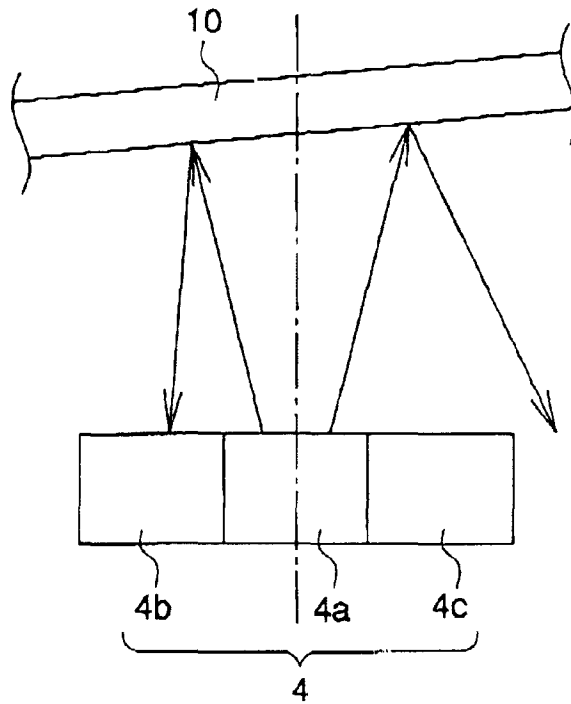
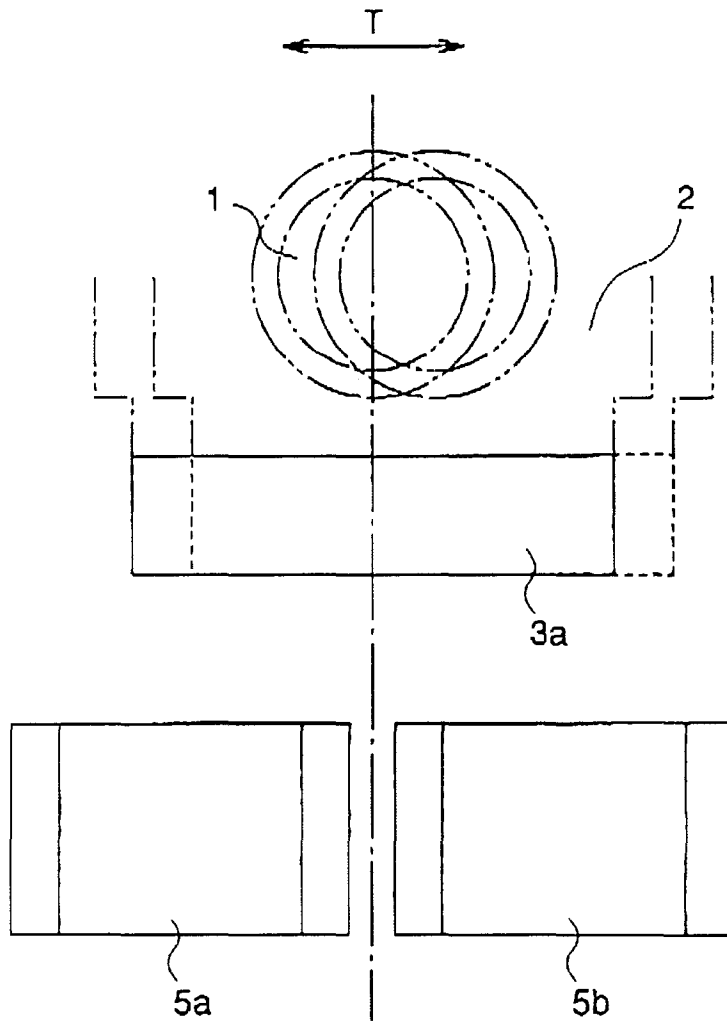


Fig.5



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