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# United States Patent [19]

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**Komma et al.**

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## [54] COMPOUND OBJECTIVE LENS HAVING TWO FOCAL POINTS

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[21] Appl. No.: **190,520**

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### [30] Foreign Application Priority Data

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Aug. 4, 1993 [JP]	Japan	5-193353

[51] Int. Cl.<sup>6</sup> ..... **G02B 5/32; G11B 7/00**

[52] U.S. Cl. .... **359/19; 369/44.23; 369/94; 369/103; 369/112**

[58] Field of Search ..... **359/15, 16, 19; 369/94, 369/103, 109, 112, 44.23**

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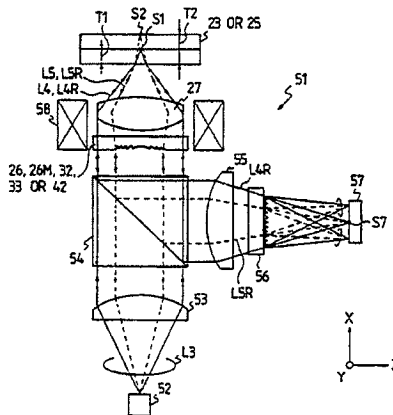
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Primary Examiner—Martin Lerner  
Attorney, Agent, or Firm—Lowe, Price, Leblanc & Becker

### [57] ABSTRACT

A compound objective lens is composed of a hologram lens for transmitting a part of incident light without any diffraction to form a beam of transmitted light and diffracting a remaining part of the incident light to form a beam of first-order diffracted light, and an objective lens for converging the transmitted light to form a first converging spot on a front surface of a thin type of first information medium and converging the diffracted light to form a second converging spot on a front surface of a thick type of second information medium. Because the hologram lens selectively functions as a concave lens for the diffracted light, a curvature of the transmitted light differs from that of the diffracted light. Therefore, even though the first and second information mediums have different thicknesses, the transmitted light incident on a rear surface of the first information medium is converged on the its front surface, and the diffracted light incident on a rear surface of the second information medium is converged on the its front surface. That is, the compound objective lens has two focal points.

34 Claims, 43 Drawing Sheets



LG Electronics, Inc. et al.  
**EXHIBIT 1006**

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FIG. 1  
PRIOR ART

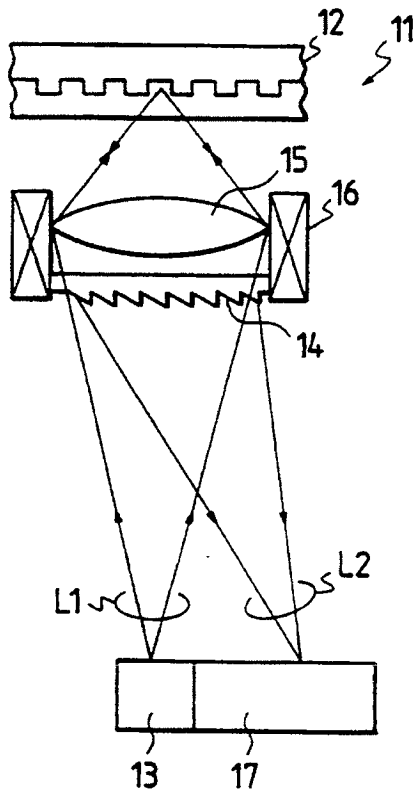


FIG. 2A  
PRIOR ART

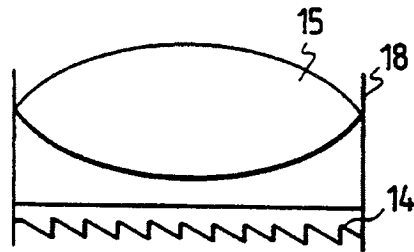


FIG. 2B  
PRIOR ART

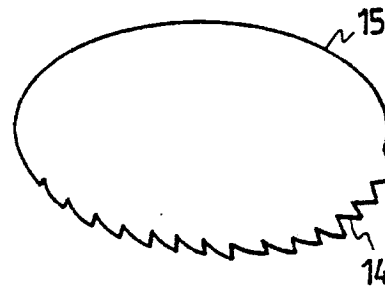
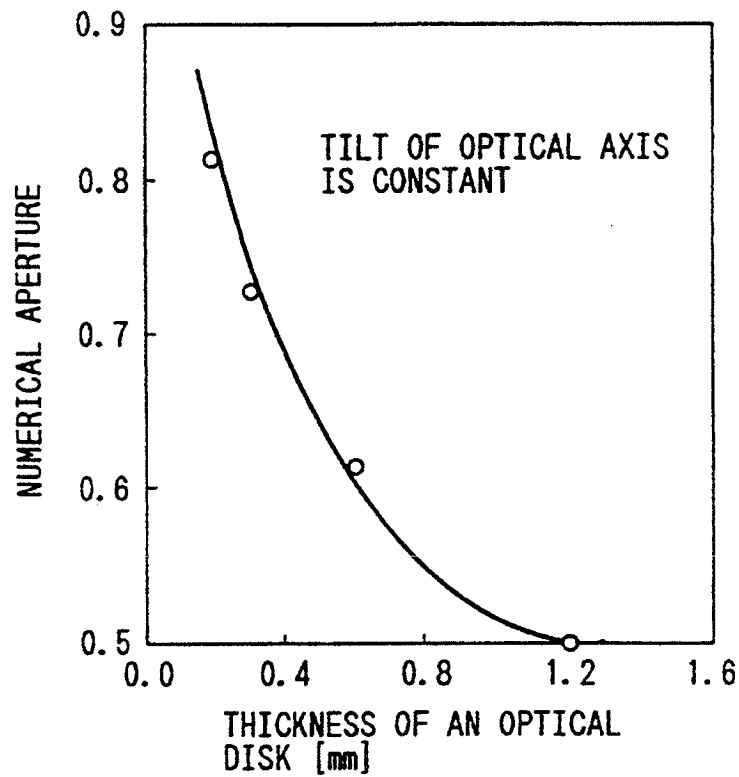


FIG. 3 PRIOR ART





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