

[54] CATADIOPTRIC REDUCTION PROJECTION OPTICAL SYSTEM

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 167,209, Dec. 16, 1993, abandoned, which is a continuation-in-part of Ser. No. 95,919, Jul. 23, 1993, abandoned, which is a continuation-in-part of Ser. No. 65,046, May 24, 1993, abandoned, which is a continuation of Ser. No. 918,763, Jul. 27, 1992, abandoned.

[30] Foreign Application Priority Data

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[51] Int. Cl.⁶ G02B 17/00; G02B 21/00

[52] U.S. Cl. 359/731; 359/364; 359/366; 359/727

[58] Field of Search 359/364-366, 359/726-732, 857-863

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Attorney, Agent, or Firm—Shapiro and Shapiro

[57] ABSTRACT

A first partial optical system including a first group of lenses having a positive refractive power, a first concave reflection mirror and a second group of lenses having a positive refractive power, for forming a primary reduced image of an object, a second partial optical system including a second concave reflection mirror and a third group of lenses having a positive refractive power, for further reducing the primary reduced image and refocusing it, and a reflection mirror arranged between the first partial optical system and the second partial optical system, for deflecting a light path are arranged in a sequence as viewed from the object. A good image-forming ability as a projection optical system for fabricating a semiconductor device is attained with a simple construction.

28 Claims, 26 Drawing Sheets

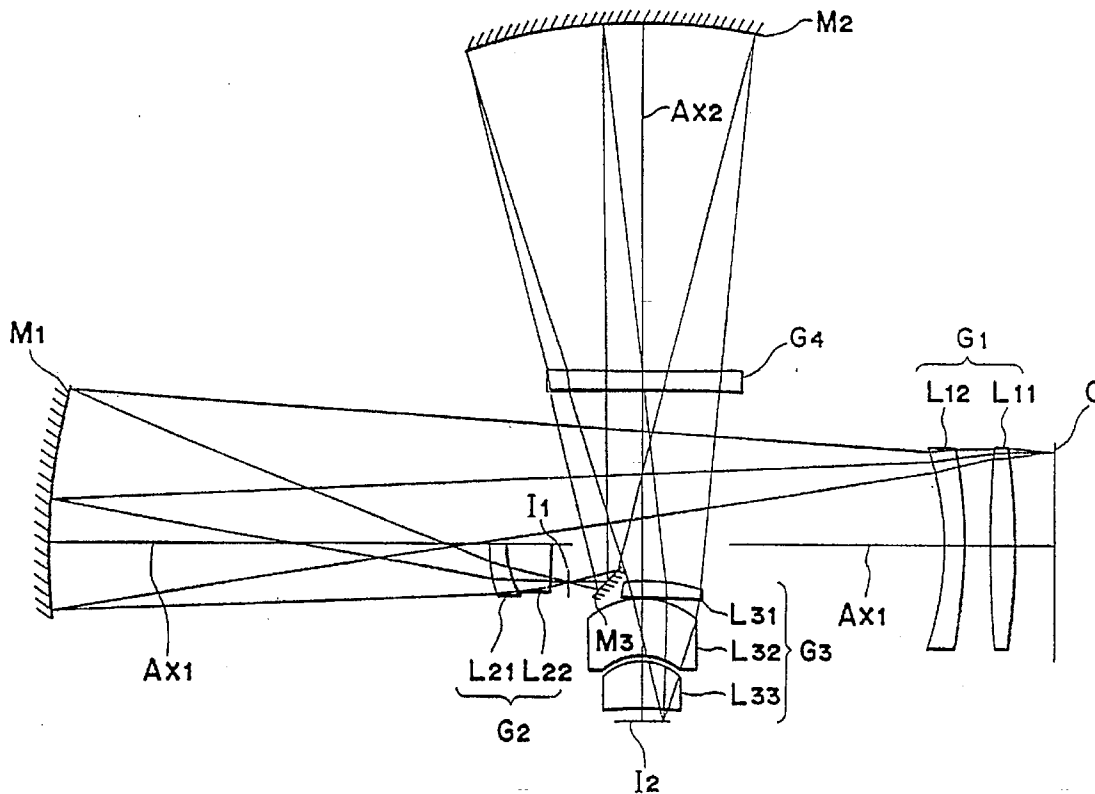


FIG. 1

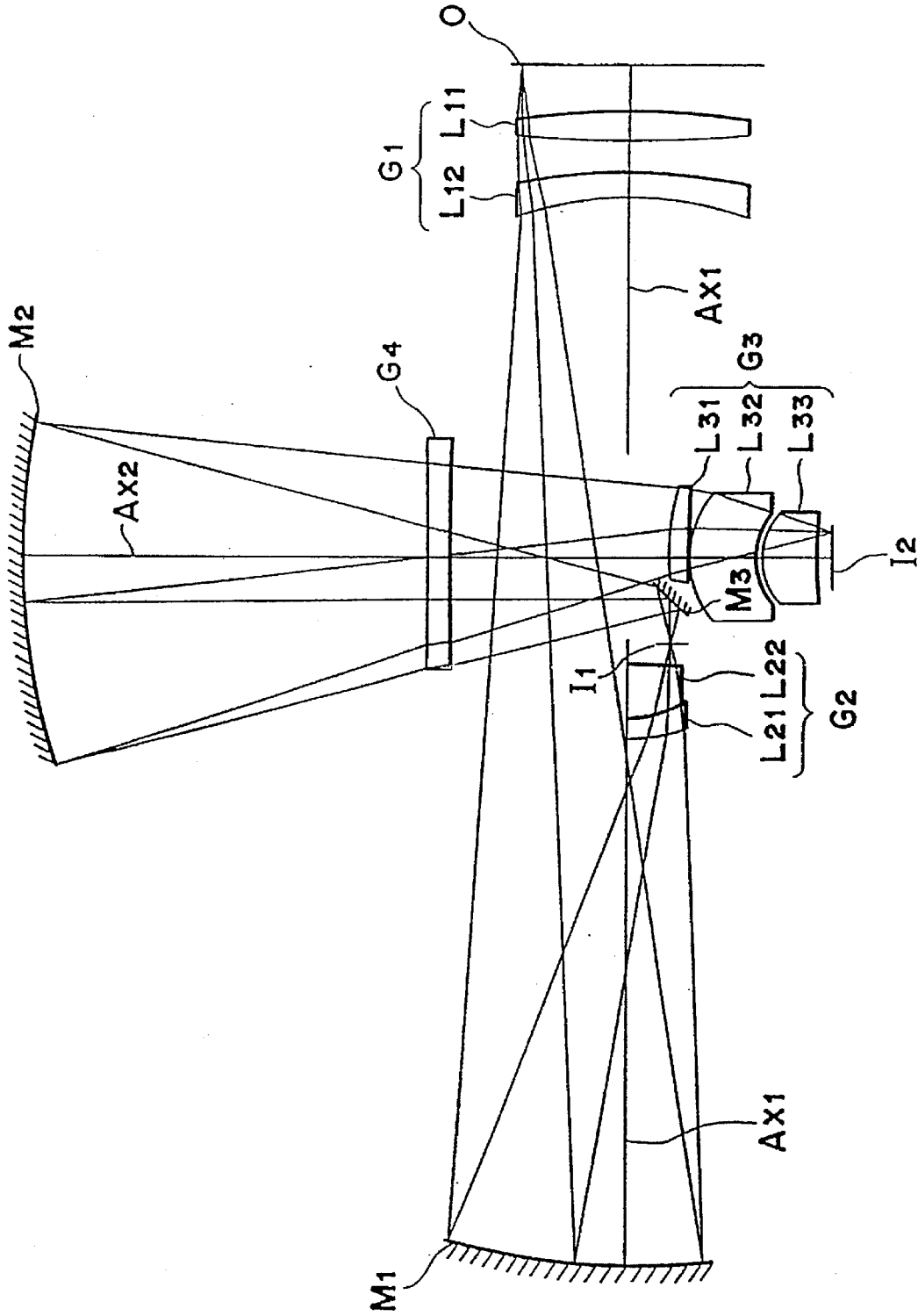
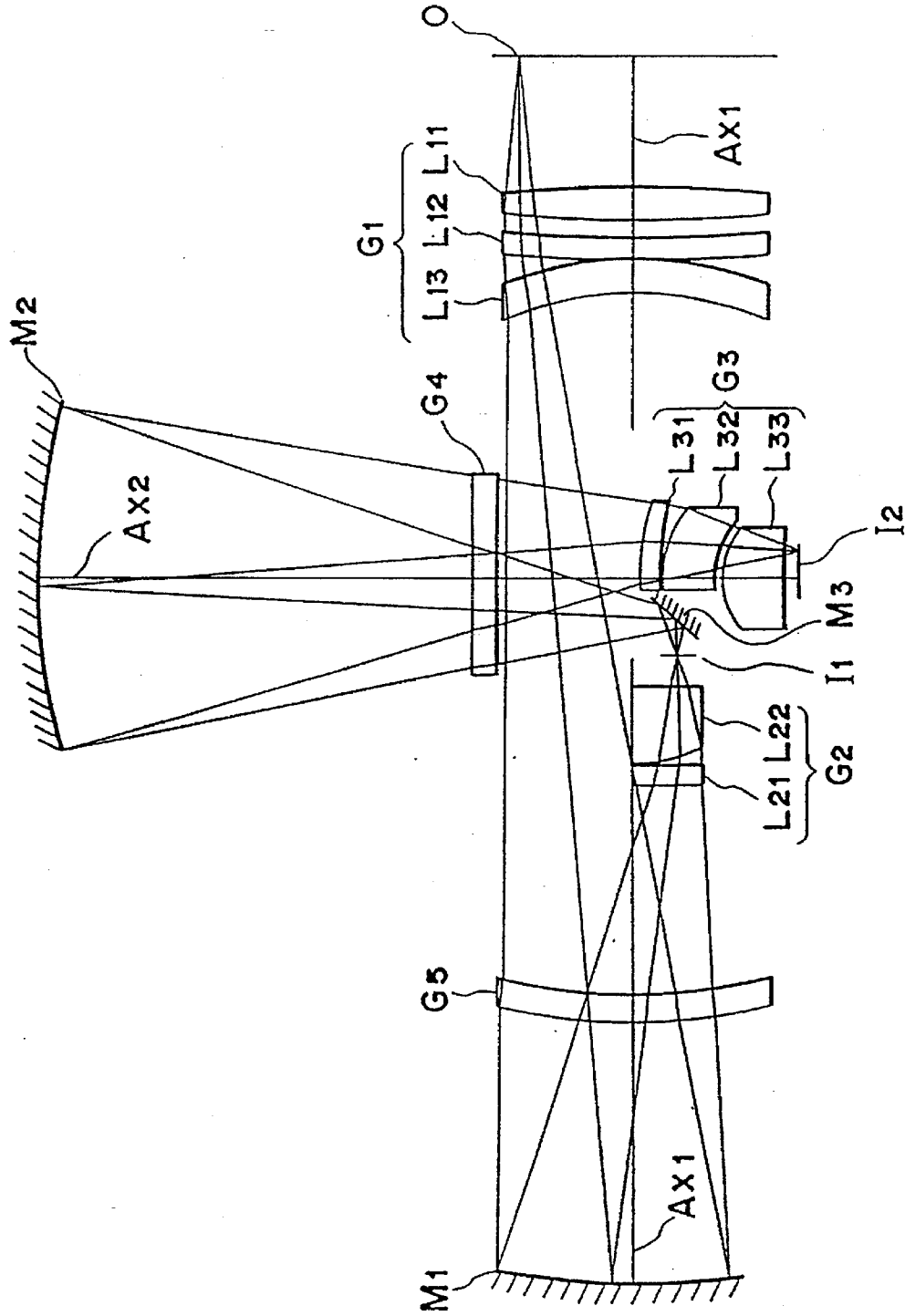


FIG. 2



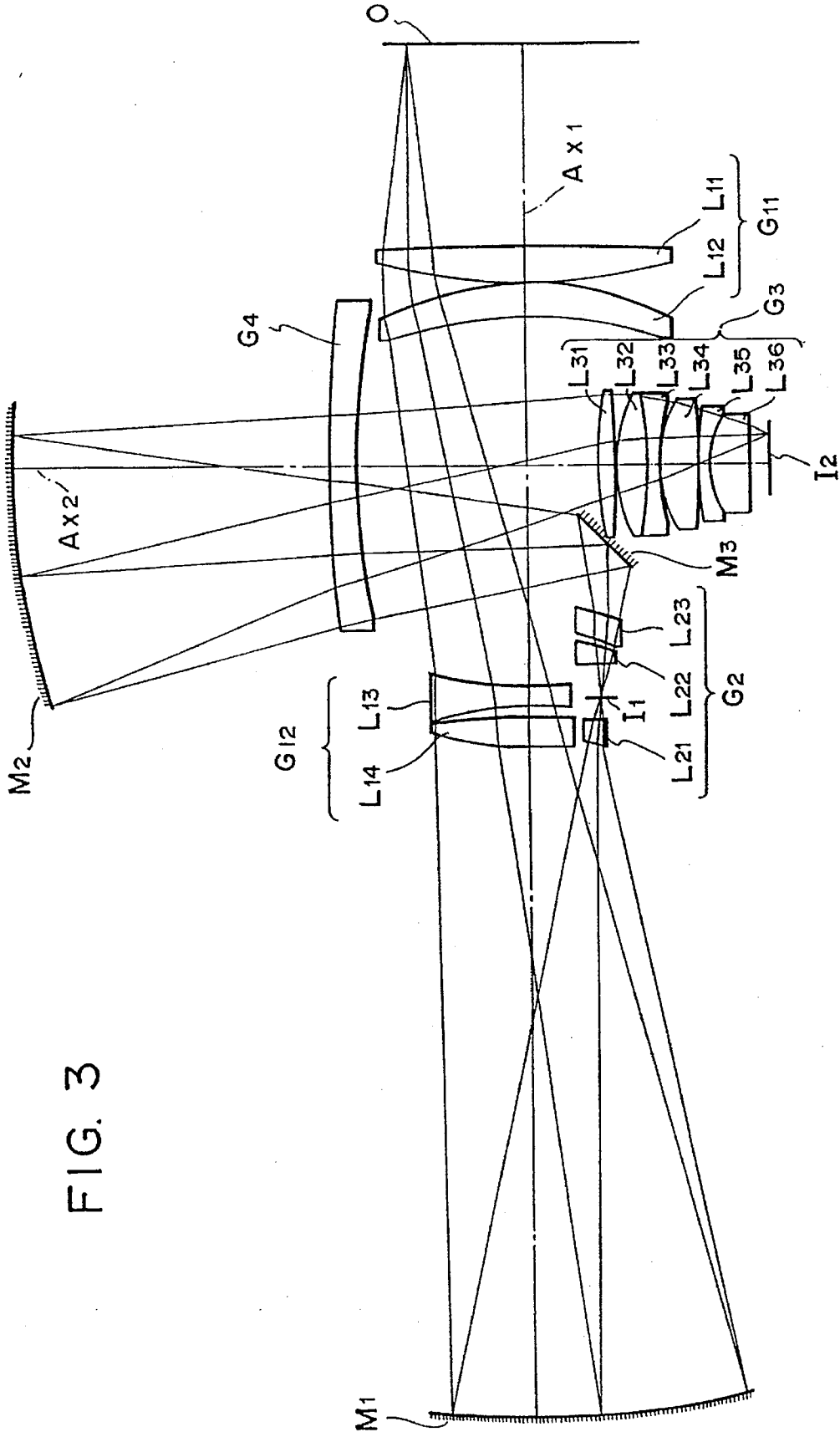


FIG. 3

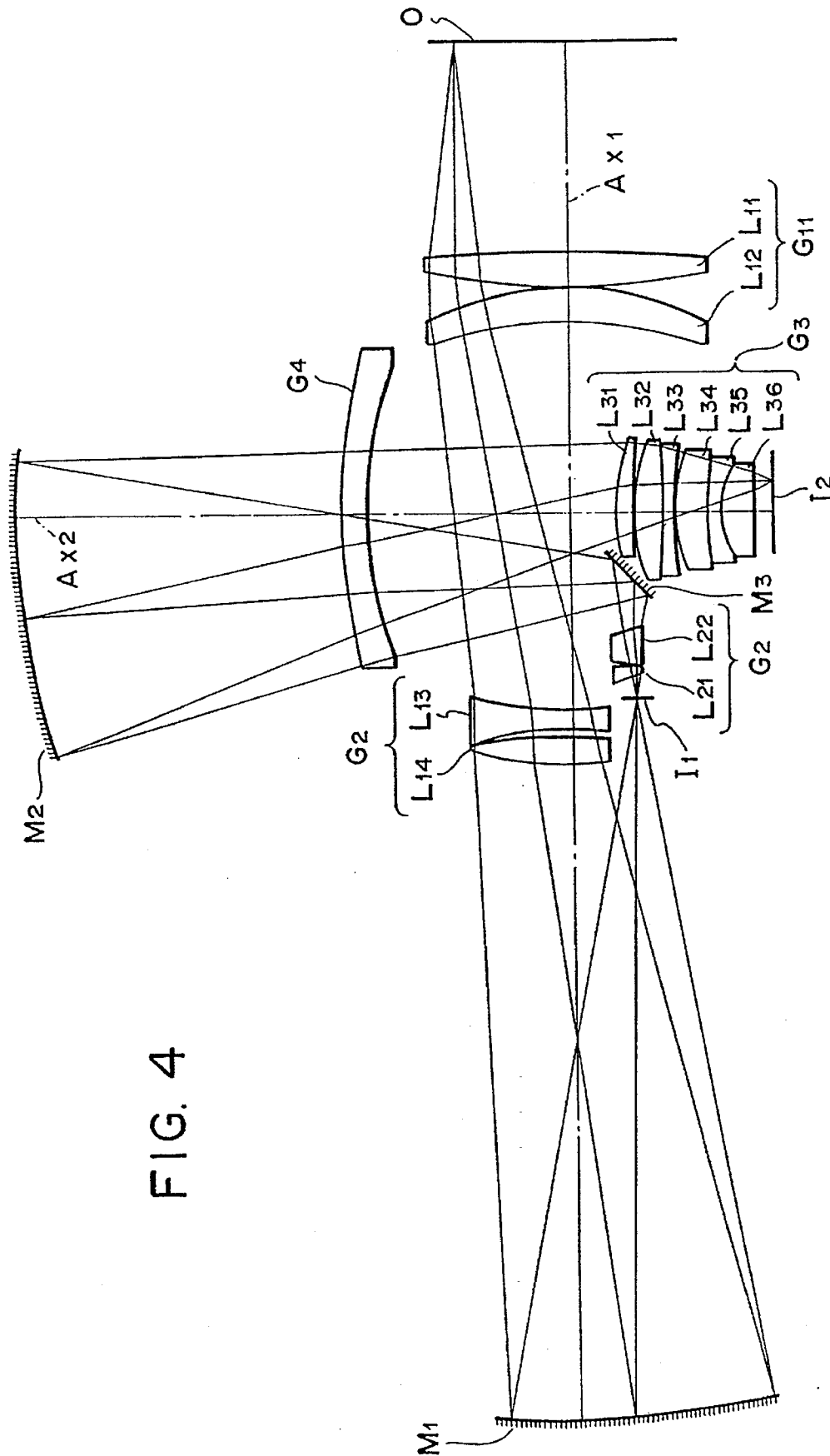


FIG. 4

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