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Dror et al.

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(54) **MINIATURE TELEPHOTO LENS ASSEMBLY**

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(58) **Field of Classification Search**

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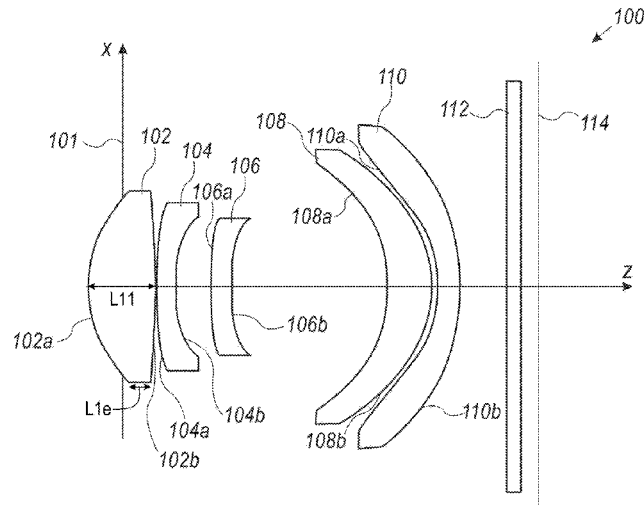
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(57) **ABSTRACT**

An optical lens assembly includes five lens elements and provides a TTL/EFL<1.0. In an embodiment, the focal length of the first lens element $f_1 < TTL/2$, an air gap between first and second lens elements is smaller than half the second lens element thickness, an air gap between the third and fourth lens elements is greater than TTL/5 and an air gap between the fourth and fifth lens elements is smaller than about 1.5 times the fifth lens element thickness. All lens elements may be aspheric.

12 Claims, 6 Drawing Sheets



Related U.S. Application Data

No. 15/418,925, filed on Jan. 30, 2017, now Pat. No. 9,857,568, which is a continuation of application No. 15/170,472, filed on Jun. 1, 2016, now Pat. No. 9,568,712, which is a continuation of application No. 14/932,319, filed on Nov. 4, 2015, now Pat. No. 9,402,032, which is a continuation of application No. 14/367,924, filed as application No. PCT/IB2014/062465 on Jun. 20, 2014, now abandoned.		7,961,406 B2	6/2011	Tang et al.
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See application file for complete search history.

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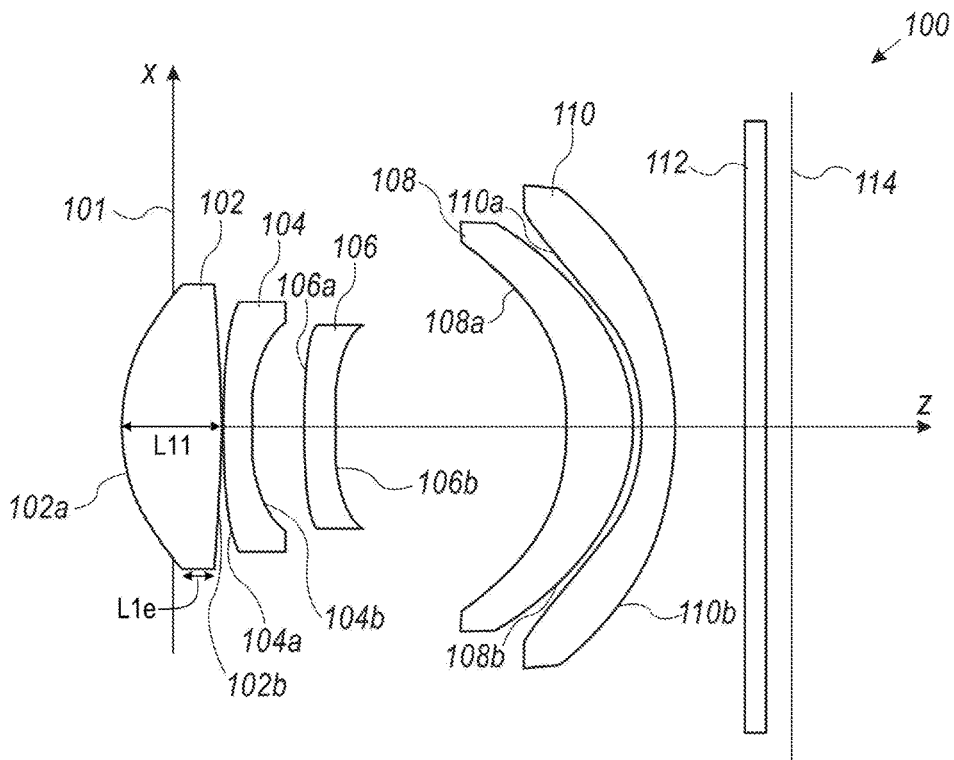
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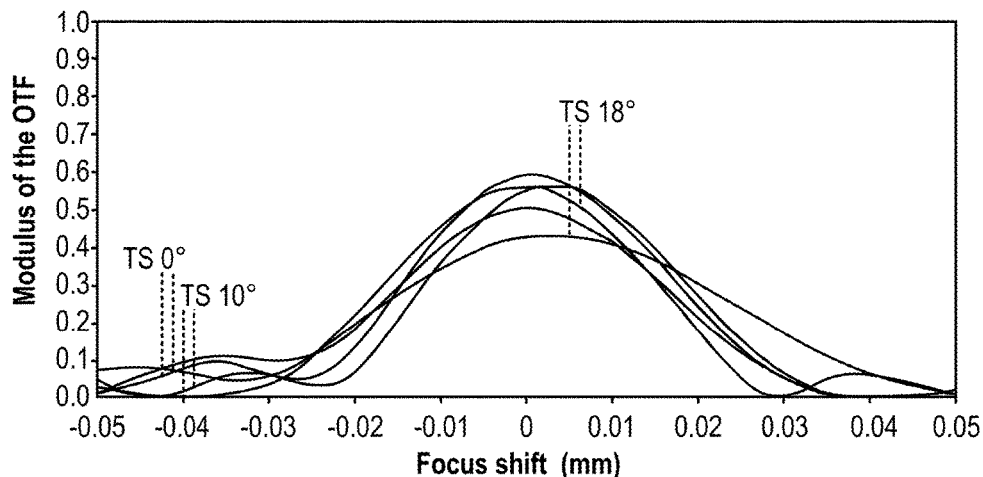
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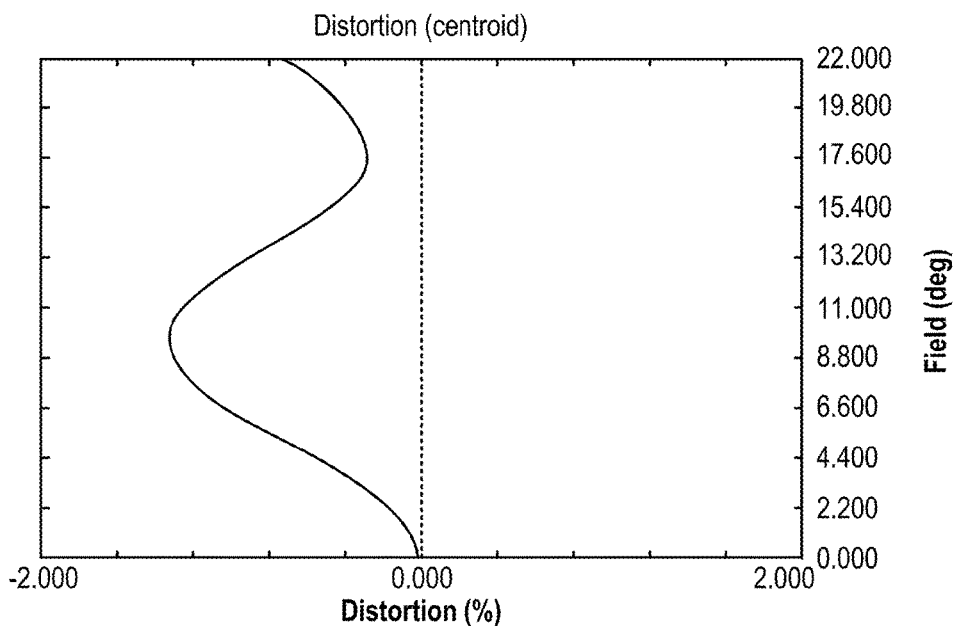
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Polychromatic Diffraction Through Focus MTF
Angle 6/2/2013
Data for 0.4350 to 0.6560 μm .
Spatial Frequency: 180.0000 cycles/mm.

FIG. 1B



30/06/2013
Maximum distortion = 1.3%

FIG. 1C

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