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Shabtay et al.

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(54) **THIN MULTI-APERTURE IMAGING SYSTEM WITH AUTO-FOCUS AND METHODS FOR USING SAME**

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H04N 5/225 (2006.01)
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CPC **H04N 5/23232** (2013.01); **G02B 7/36** (2013.01); **G02B 27/646** (2013.01);
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(58) **Field of Classification Search**

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See application file for complete search history.

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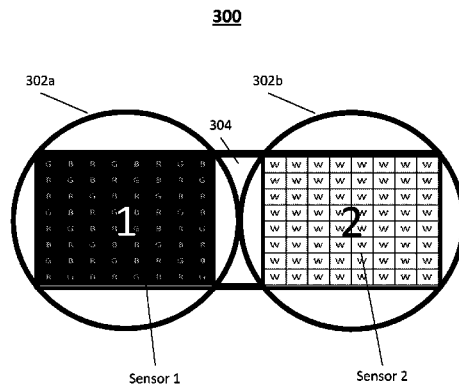
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(57) **ABSTRACT**

Dual-aperture digital cameras with auto-focus (AF) and related methods for obtaining a focused and, optionally optically stabilized color image of an object or scene. A dual-aperture camera includes a first sub-camera having a first optics bloc and a color image sensor for providing a color image, a second sub-camera having a second optics bloc and a clear image sensor for providing a luminance image, the first and second sub-cameras having substantially the same field of view, an AF mechanism coupled mechanically at least to the first optics bloc, and a camera controller coupled to the AF mechanism and to the two image sensors and configured to control the AF mechanism, to calculate a

(Continued)



scaling difference and a sharpness difference between the color and luminance images, the scaling and sharpness differences being due to the AF mechanism, and to process the color and luminance images into a fused color image using the calculated differences.

16 Claims, 10 Drawing Sheets

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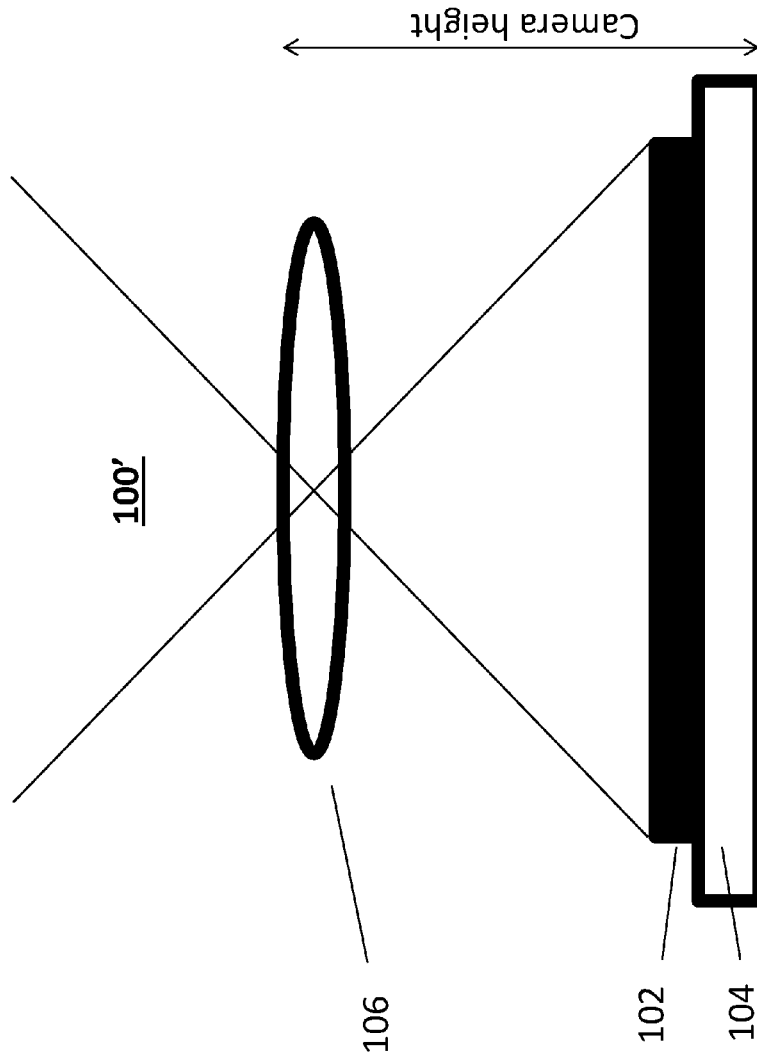


FIG. 1A

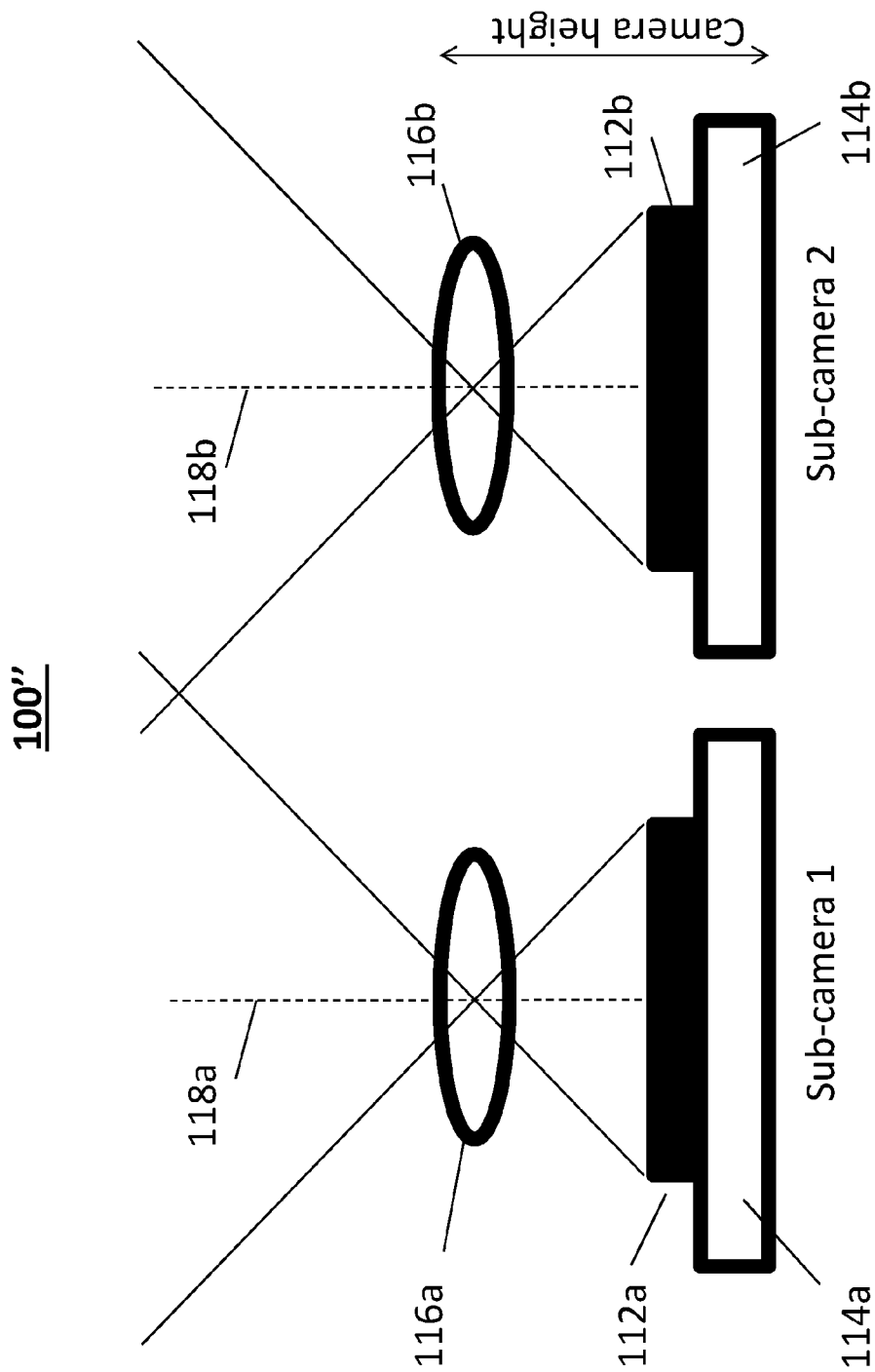


FIG. 1B

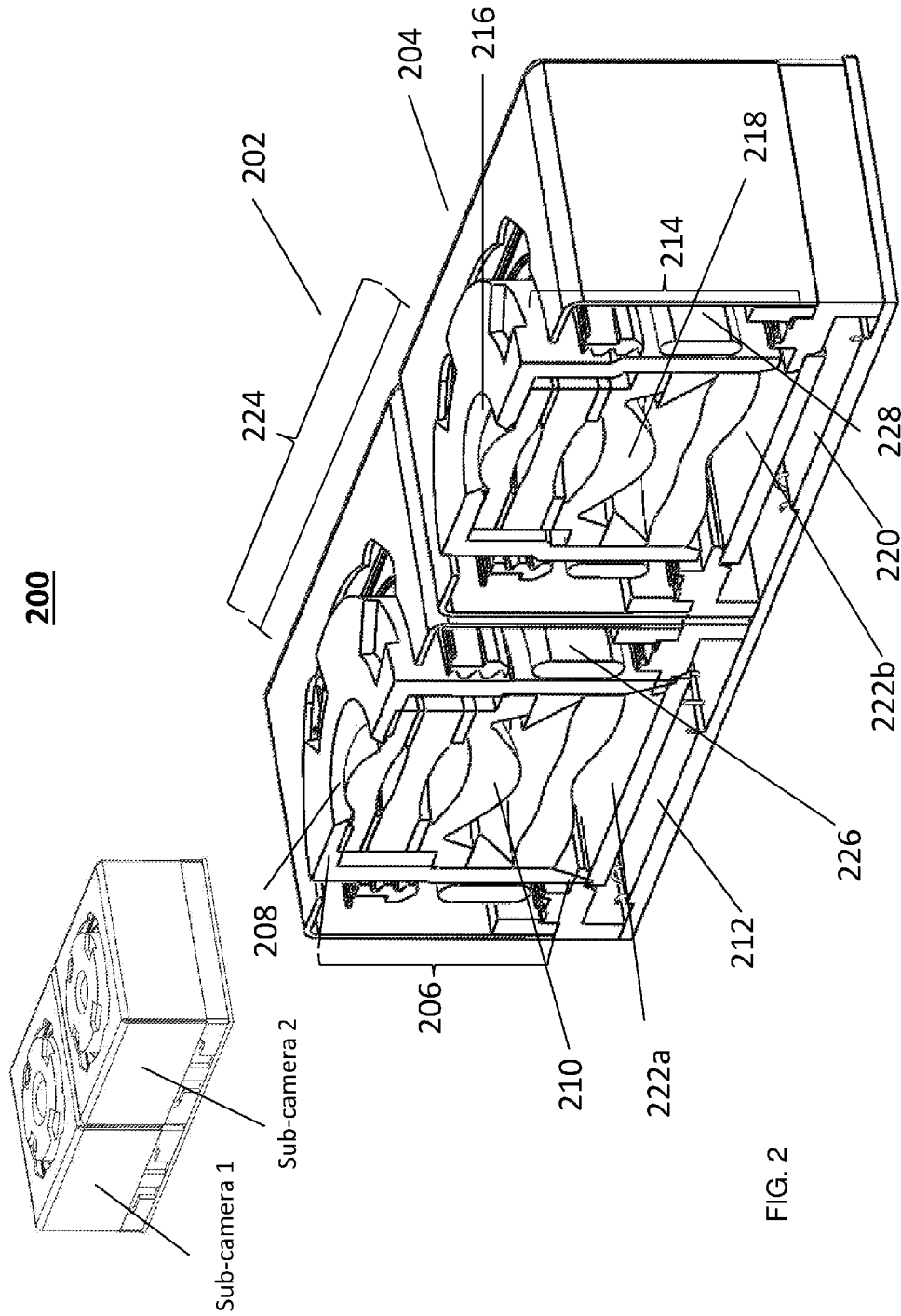


FIG. 2

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