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**Labaziewicz et al.**

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(54) **DIGITAL CAMERA USING MULTIPLE LENSES AND IMAGE SENSORS TO PROVIDE AN EXTENDED ZOOM RANGE**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.**

**G02B 15/14** (2006.01)

**G03B 41/00** (2006.01)

**H04N 5/225** (2006.01)

(52) **U.S. Cl.** ..... **359/676; 396/322; 348/207.99**

(58) **Field of Classification Search** ..... **359/676-692, 359/72, 85, 60, 322, 435, 436; 348/240.99, 348/240.1, 239, 240.3, 262-264, 207.99, 348/34, 369, 360, 361, 344; 396/72, 85, 396/60, 322, 435, 436**

See application file for complete search history.

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*Primary Examiner*—Scott J. Sugarman

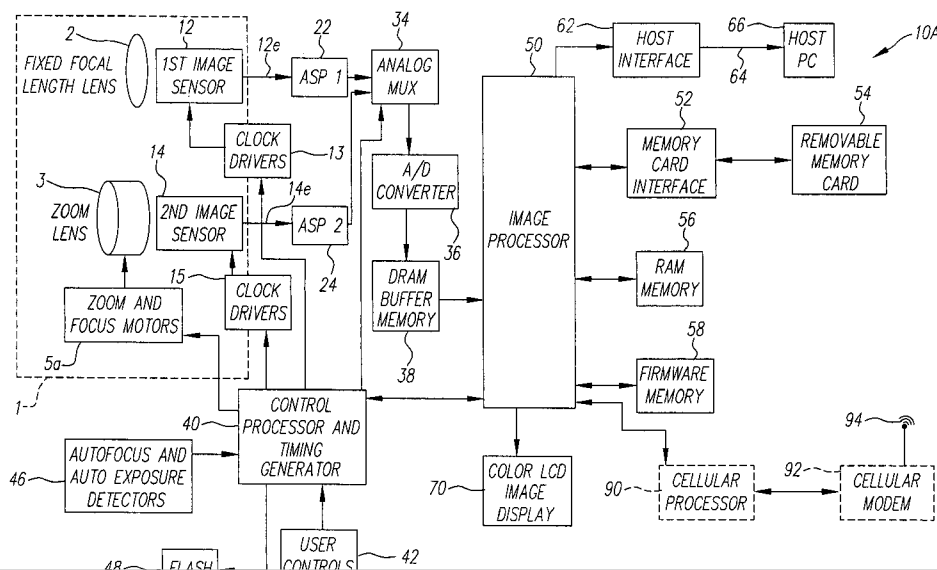
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(57) **ABSTRACT**

A digital camera includes a first image sensor, a first wide angle lens for forming a first image of a scene on the first image sensor; a second image sensor, a zoom lens for forming a second image of the same scene on the second image sensor, a control element for selecting either a first sensor output from the first image sensor or a second sensor output from the second image sensor, and a processing section for producing the output image from the selected sensor output. In one variation of this embodiment, the first lens is also a zoom lens, where the maximum focal length of the first lens is less than or equal to the minimum focal length of the second zoom lens.

**55 Claims, 22 Drawing Sheets**



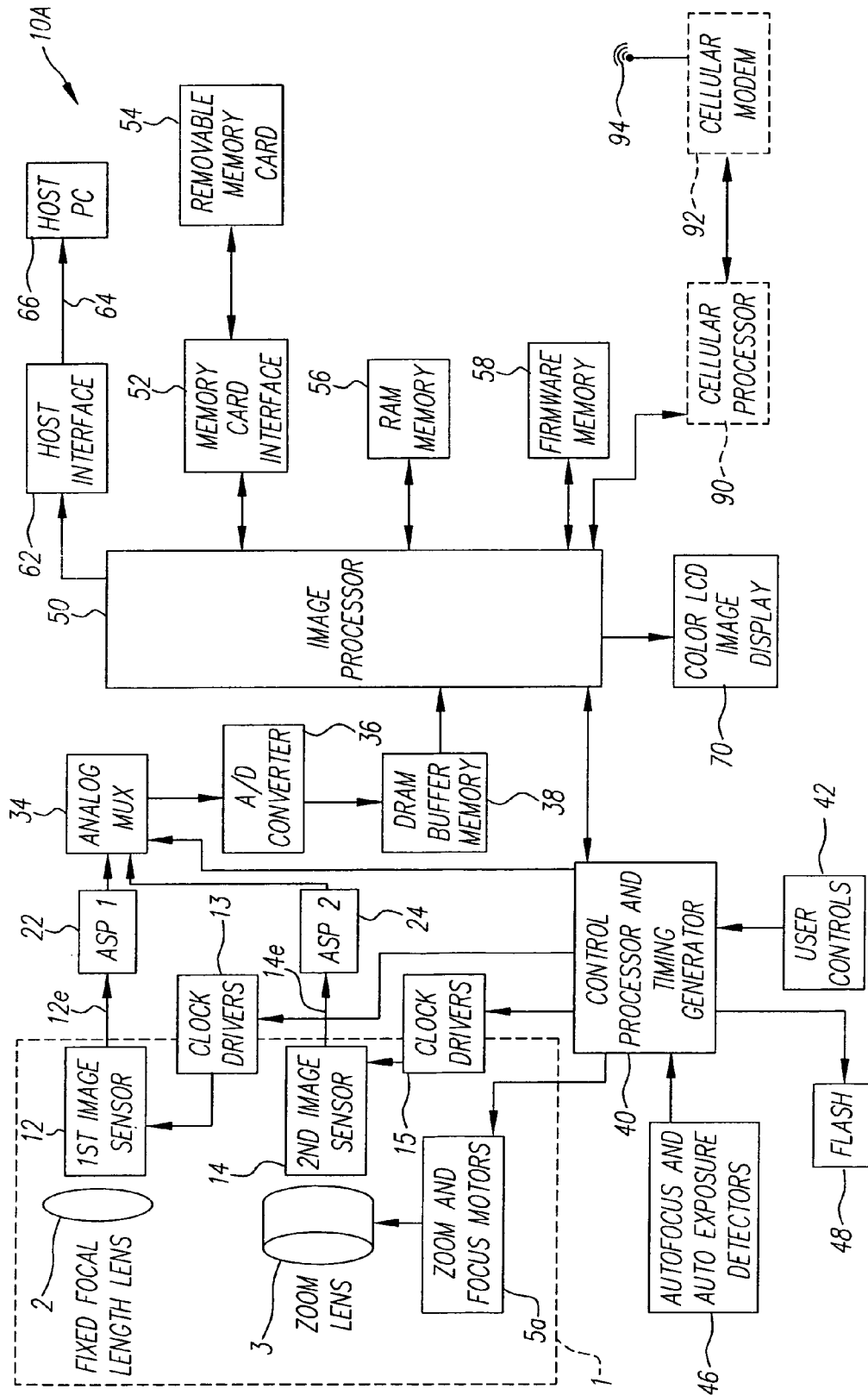


FIG. 1

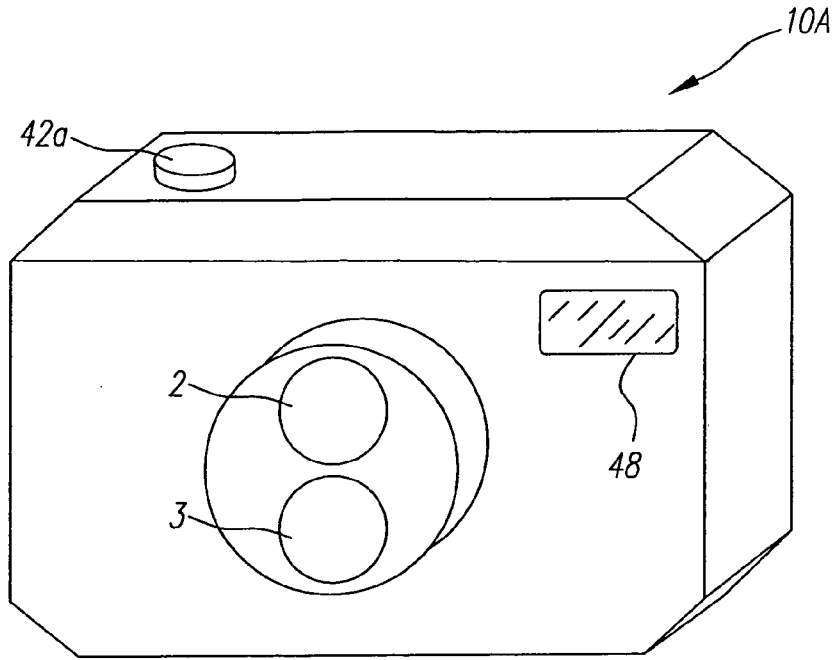


FIG. 2A

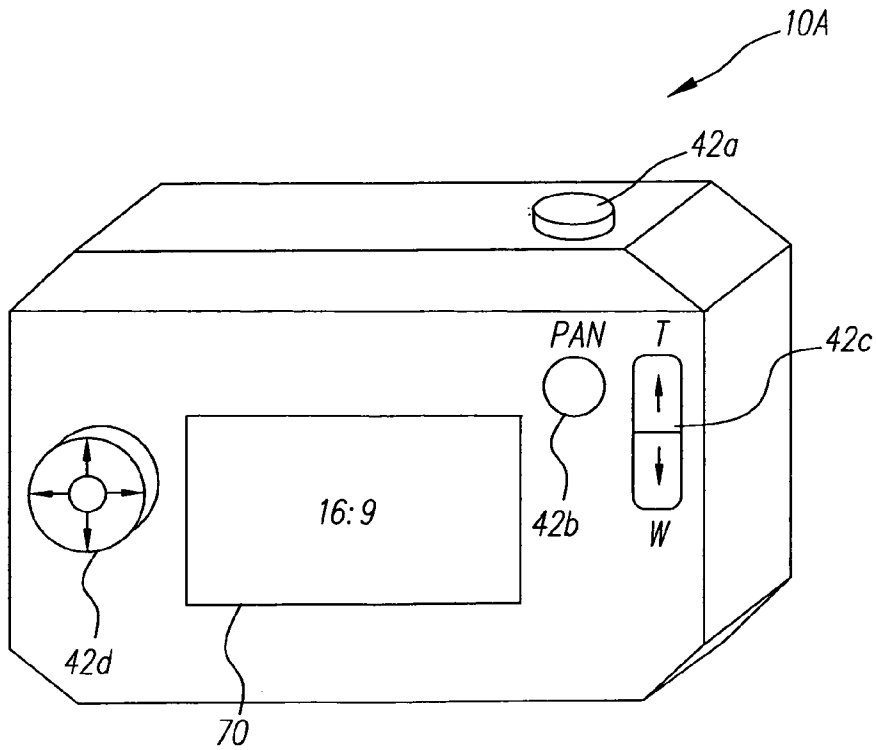


FIG. 2B

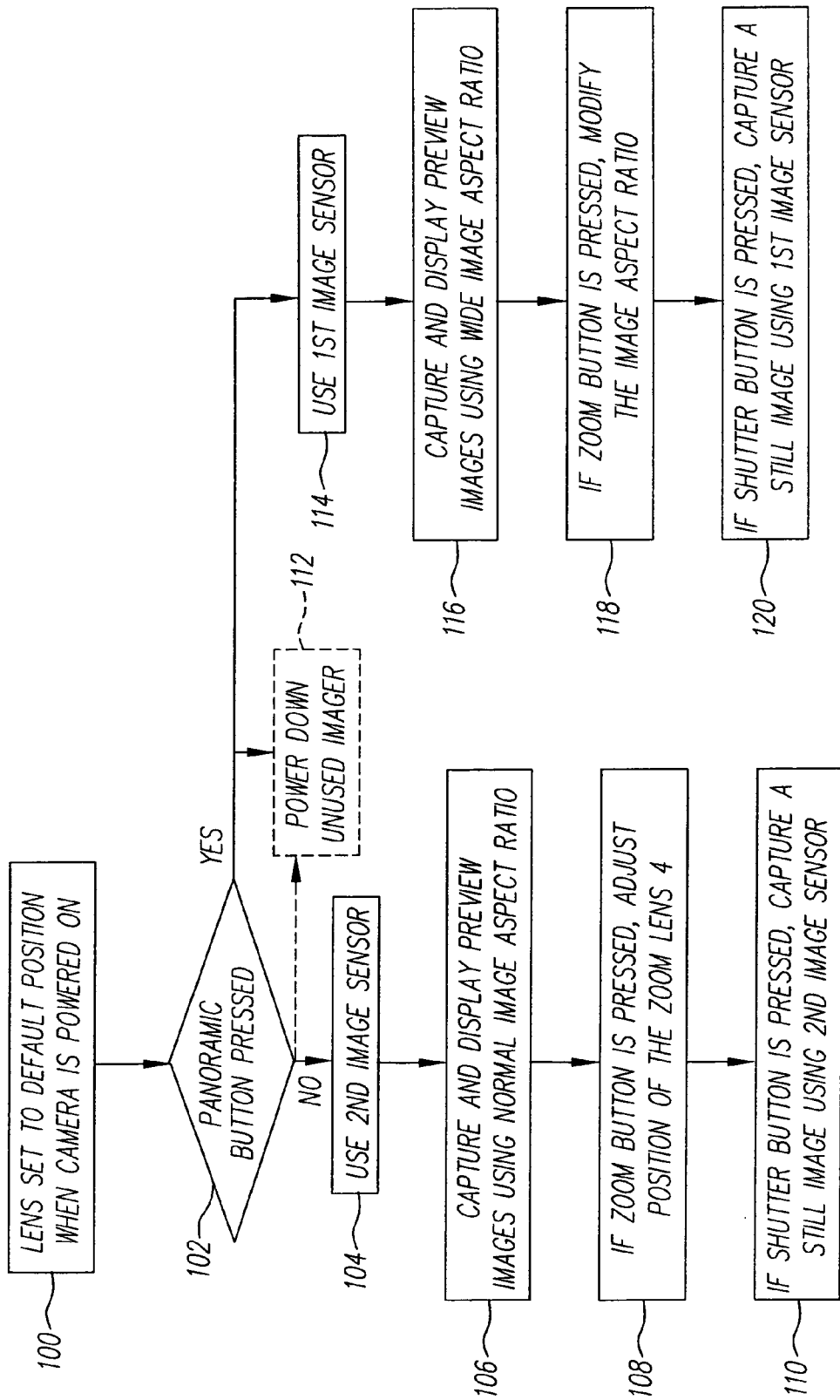


FIG. 3

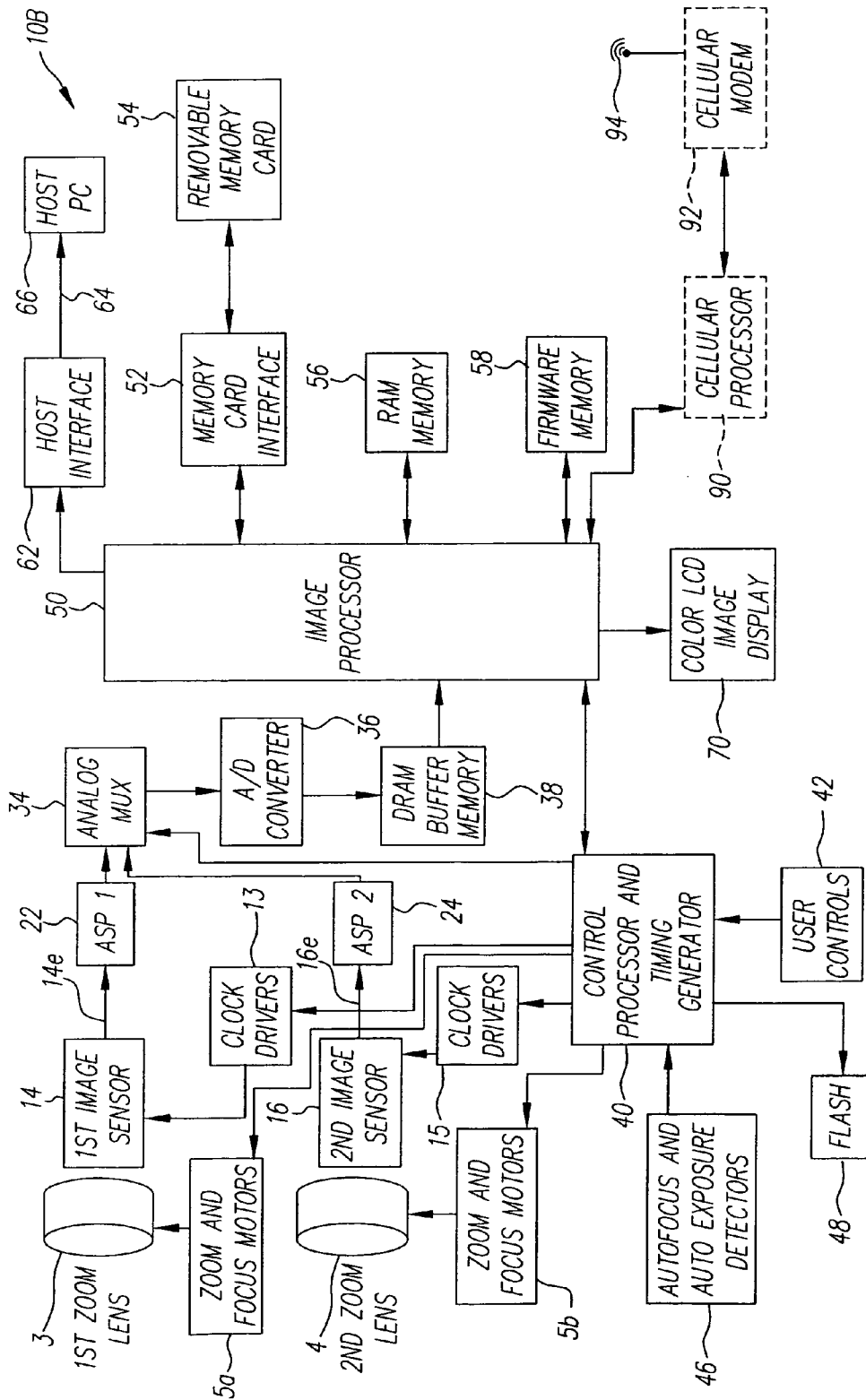


FIG. 4

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