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**Wick**

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(54) **ACTIVE OPTICAL ZOOM SYSTEM**

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(57) **ABSTRACT**

An active optical zoom system changes the magnification (or effective focal length) of an optical imaging system by utilizing two or more active optics in a conventional optical system. The system can create relatively large changes in system magnification with very small changes in the focal lengths of individual active elements by leveraging the optical power of the conventional optical elements (e.g., passive lenses and mirrors) surrounding the active optics. The active optics serve primarily as variable focal-length lenses or mirrors, although adding other aberrations enables increased utility. The active optics can either be LC SLMs, used in a transmissive optical zoom system, or DMs, used in a reflective optical zoom system. By appropriately designing the optical system, the variable focal-length lenses or mirrors can provide the flexibility necessary to change the overall system focal length (i.e., effective focal length), and therefore magnification, that is normally accomplished with mechanical motion in conventional zoom lenses. The active optics can provide additional flexibility by allowing magnification to occur anywhere within the FOV of the system, not just on-axis as in a conventional system.

**19 Claims, 6 Drawing Sheets**

