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(54) **MICROSYSTEM ENABLED PHOTOVOLTAIC MODULES AND SYSTEMS**

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H01L 31/00	(2006.01)
H01L 31/054	(2014.01)
F24J 2/06	(2006.01)

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CPC ***H01L 31/054*** (2014.12); ***F24J 2/06*** (2013.01); *Y02E 10/52* (2013.01)

(58) **Field of Classification Search**
CPC H01L 31/0522; H01L 31/054; F24J 2/06; Y02E 10/52
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See application file for complete search history.

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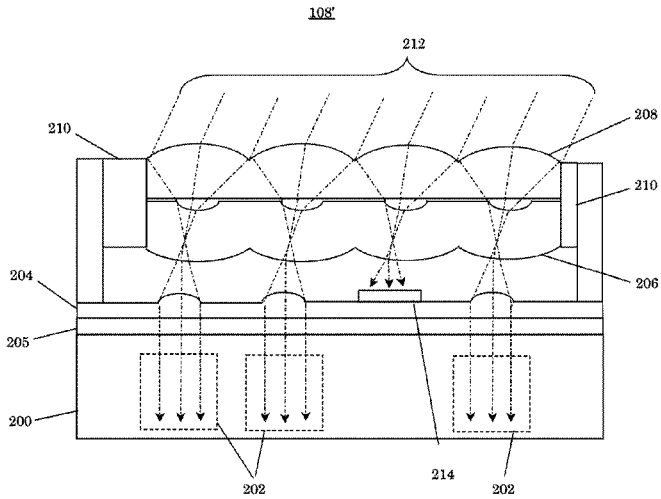
(57) **ABSTRACT**

A microsystem enabled photovoltaic (MEPV) module including: an absorber layer; a fixed optic layer coupled to the absorber layer; a translatable optic layer; a translation stage coupled between the fixed and translatable optic layers; and a motion processor electrically coupled to the translation stage to controls motion of the translatable optic layer relative to the fixed optic layer. The absorber layer includes an array of photovoltaic (PV) elements. The fixed optic layer includes an array of quasi-collimating (QC) micro-optical elements designed and arranged to couple incident radiation from an intermediate image formed by the translatable optic layer into one of the PV elements such that it is quasi-collimated. The translatable optic layer includes an array of focusing micro-optical elements corresponding to the QC micro-optical element array. Each focusing micro-optical element is designed to produce a quasi-telecentric intermediate image from substantially collimated radiation incident within a predetermined field of view.

24 Claims, 8 Drawing Sheets