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Vasylyev

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(54) **LIGHT TRAPPING OPTICAL STRUCTURES EMPLOYING LIGHT CONVERTING AND LIGHT GUIDING LAYERS**

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Related U.S. Application Data

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(51) **Int. Cl.**

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G01J 1/04 (2006.01)
G01J 5/08 (2006.01)
G02B 5/02 (2006.01)
H01L 31/0232 (2014.01)
H01L 31/0525 (2014.01)
G02B 19/00 (2006.01)

(52) **U.S. Cl.**

CPC **H01L 31/0547** (2014.12); **G01J 1/0407** (2013.01); **G01J 5/0853** (2013.01); **G02B 5/0231** (2013.01); **G02B 5/0294** (2013.01); **G02B 19/0028** (2013.01); **H01L 31/02327** (2013.01); **H01L 31/0525** (2013.01); **H01L 31/0543** (2014.12); **Y02E 10/52** (2013.01)

(58) **Field of Classification Search**

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USPC 250/203.1, 203.3, 203.4, 216; 136/246, 136/256, 259; 385/33, 36
See application file for complete search history.

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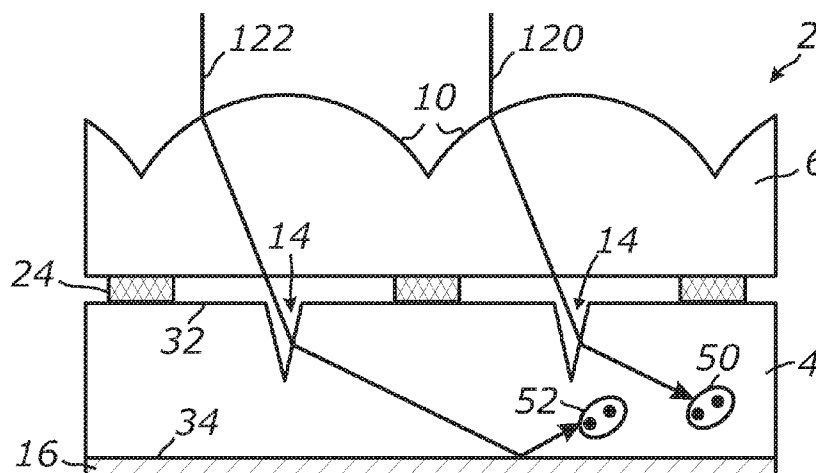
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Primary Examiner — Kevin K Pyo

(57) **ABSTRACT**

A light converting optical system employing a planar light trapping optical structure. The light trapping optical structure includes a monochromatic light source, a light guiding layer, a lenticular lens array incorporating a plurality of linear cylindrical microlenses, a broad-area reflective surface, and a generally planar photoresponsive layer located between the lens array and the reflective surface. The photoresponsive layer is configured at a sufficiently low thickness to transmit at least a portion of incident light without absorption in a single pass. A portion of the unabsorbed light is trapped within the light trapping optical structure and redirected back to the photoresponsive layer.

13 Claims, 7 Drawing Sheets



US 10,269,999 B2

Page 2

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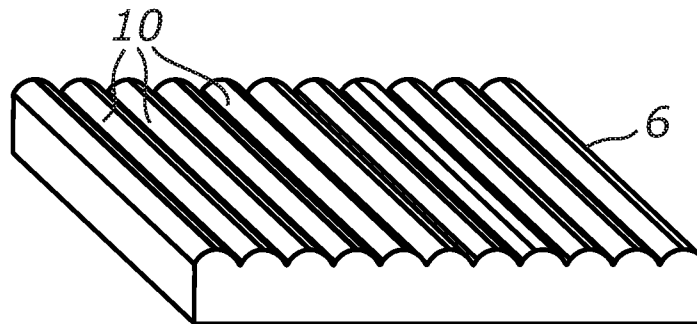


FIG. 4

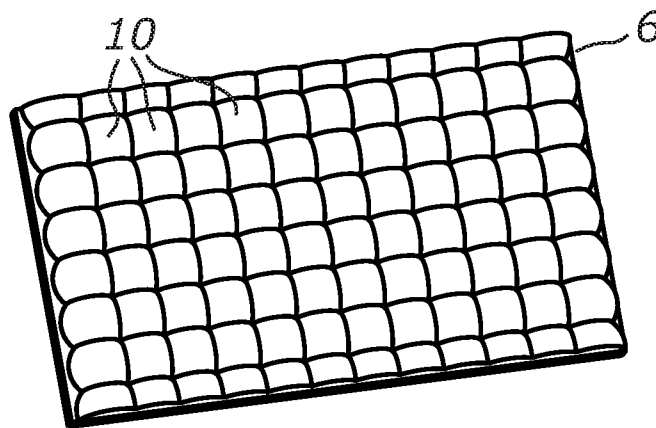


FIG. 5

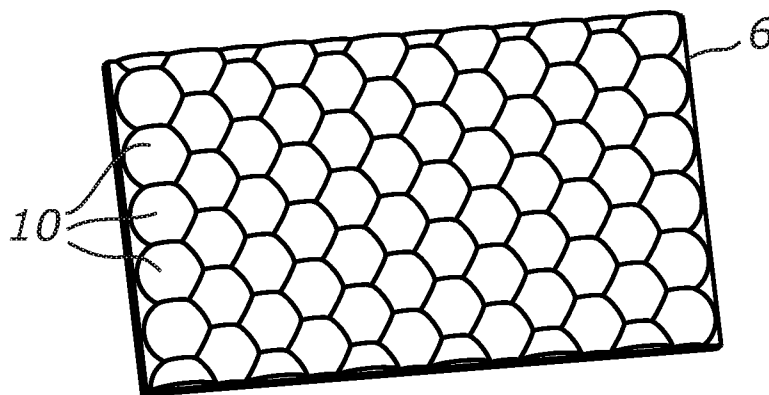
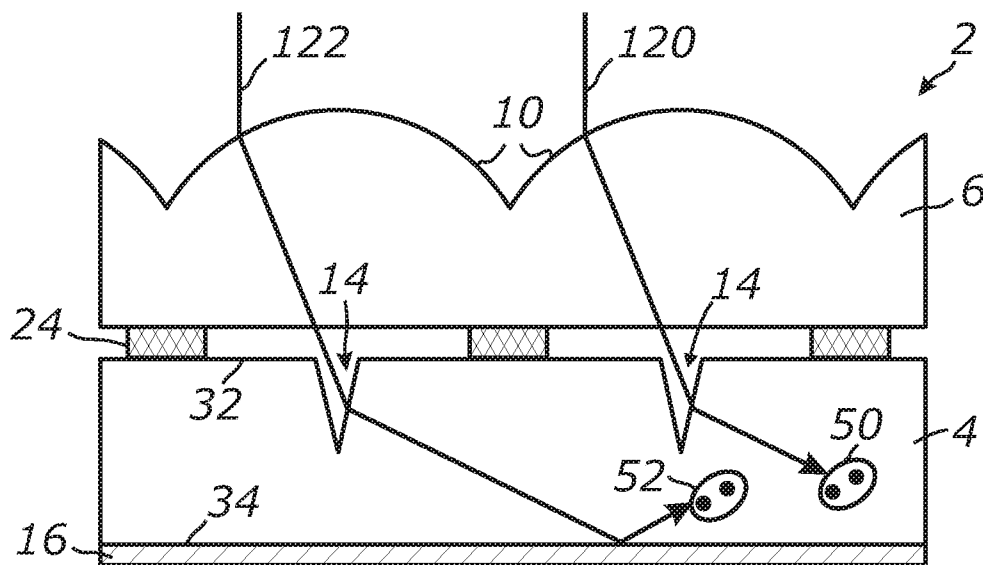
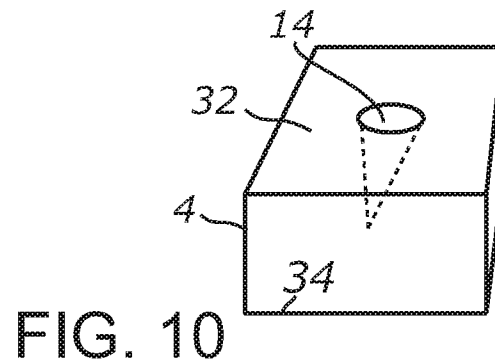
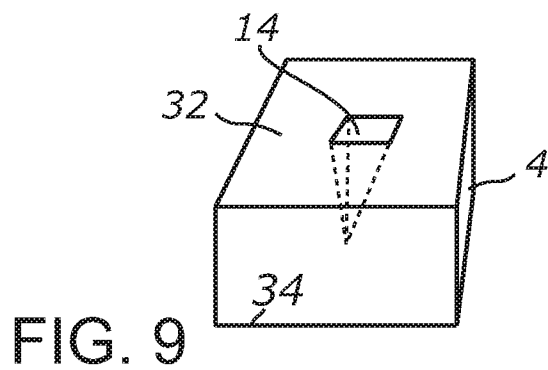
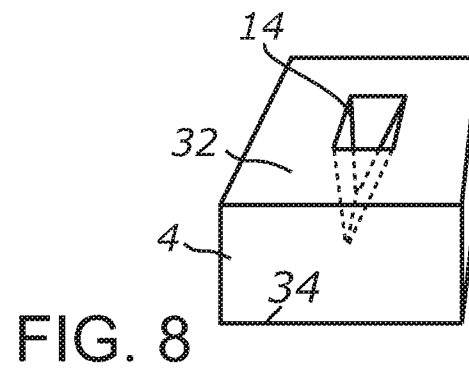
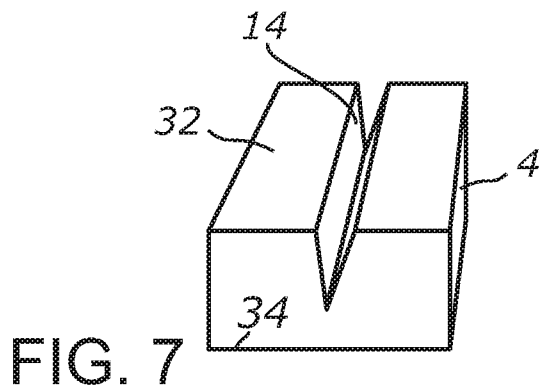


FIG. 6





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