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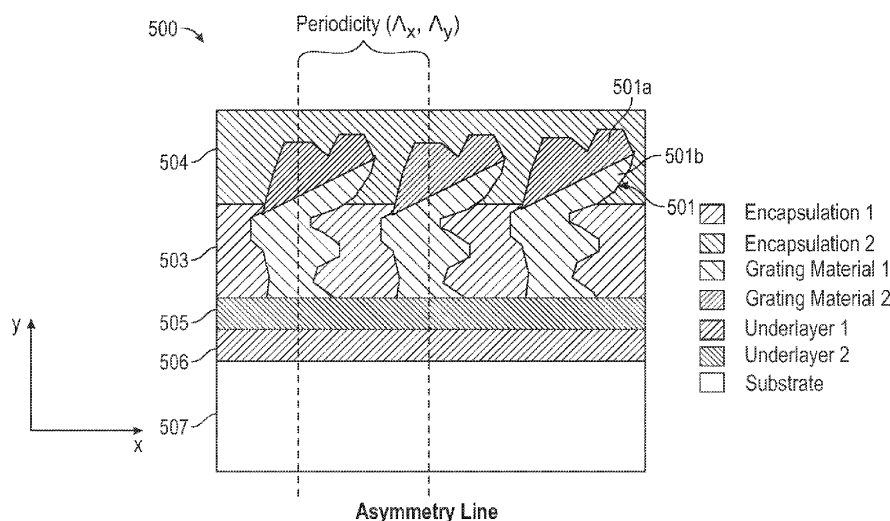


FIG. 5

(57) Abstract: An optical device includes a substrate, an input coupler disposed on a first surface of the substrate and configured to receive input light, a first output coupler disposed on the first surface of the substrate, a second output coupler disposed on a second surface of the substrate, wherein the first output coupler and the second output coupler comprise asymmetric grating structures the first surface of the substrate opposes the second surface of the substrate.

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WO 2025/151798 A1

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