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(54) **POLARIZATION REDUCING APPARATUS, LIGHT SOURCE APPARATUS, OPTICAL AMPLIFYING APPARATUS, AND EXCITATION LIGHT SOURCE APPARATUS FOR RAMAN AMPLIFICATION**

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G02B 6/12	(2006.01)
G02B 6/125	(2006.01)
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(52) **U.S. Cl.**

CPC ***G02B 6/126*** (2013.01); ***G02B 6/12004*** (2013.01); ***G02B 6/125*** (2013.01); ***G02B 6/2786*** (2013.01); ***G02B 6/4213*** (2013.01); ***G02B 27/283*** (2013.01); ***G02B 27/286*** (2013.01); ***H01S 3/06754*** (2013.01); ***H01S 3/10023*** (2013.01); ***H01S 3/302*** (2013.01); *G02B 6/272* (2013.01); *G02B 2006/12116* (2013.01)

(58) **Field of Classification Search**

CPC ... G02B 6/2786; G02B 6/126; G02B 6/12004

See application file for complete search history.

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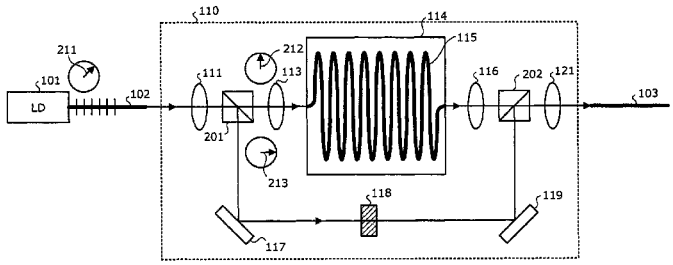
(57) **ABSTRACT**

A polarization reducing apparatus includes a separating unit configured to separate input light into components having polarization directions orthogonal to each other; a winding waveguide of silicon formed on a silicon substrate in a winding manner, the winding waveguide transmitting a first component among the components separated by the separating unit; an optical path configured to have a shorter optical path length than the winding waveguide, the optical path transmitting a second component among the components separated by the separating unit; a combining unit configured to combine the first component and the second component; and an output unit configured to output light consisting of the first component and the second component combined by the combining unit.

11 Claims, 27 Drawing Sheets