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Boueitch et al.

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(54) **DOUBLE PASS ARRANGEMENT FOR A LIQUID CRYSTAL DEVICE**

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Related U.S. Application Data

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(60) Provisional application No. 60/183,155, filed on Feb. 17, 2000, now abandoned.

(51) **Int. Cl.**⁷ **G02B 6/26**

(52) **U.S. Cl.** **385/16; 385/24; 385/20; 385/34; 385/36; 359/123; 359/130; 359/246; 359/247; 359/301; 359/302; 349/193; 349/196; 349/197**

(58) **Field of Search** 349/193, 196, 349/197; 359/115, 122, 128, 130, 131, 245, 246, 247, 301, 302; 385/16, 18, 24, 31, 32, 39, 47

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Primary Examiner—John R. Lee

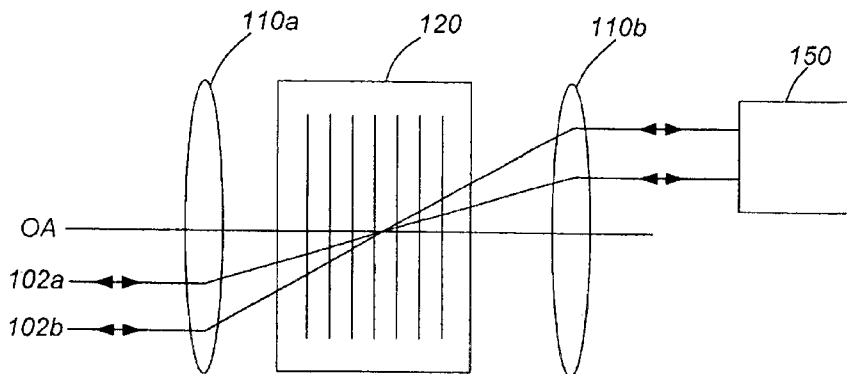
Assistant Examiner—David A. Vanore

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(57) **ABSTRACT**

An optical device for rerouting and modifying an optical signal that uses a double pass through a liquid crystal modulator is disclosed. The optical device includes a first polarizer for providing polarized light, a liquid crystal modulator for selectively modifying the polarized light, a second polarizer for analyzing the light passed through the liquid crystal modulator, and a reflector for reflecting the analyzed light back through the second polarizer, the liquid crystal modulator, and the first polarizer. This arrangement provides a double pass through the liquid crystal modulator, thus significantly improving the attainable extinction ratio.

30 Claims, 17 Drawing Sheets



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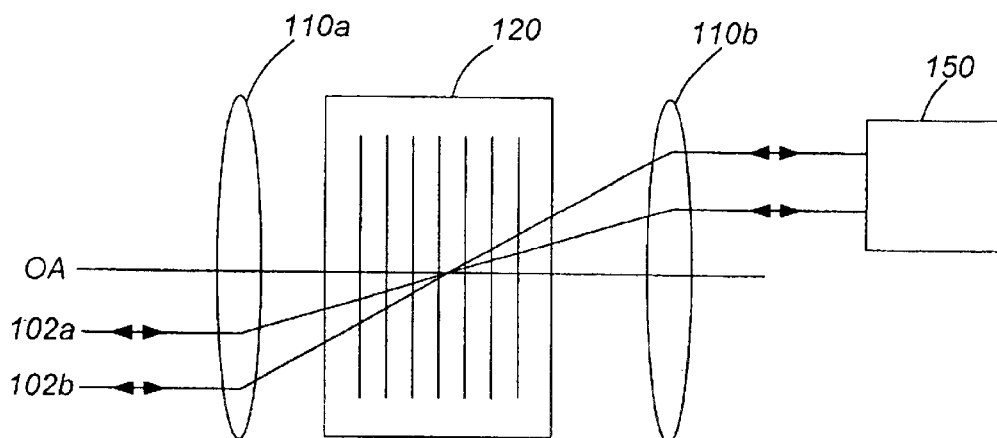


FIG. 1

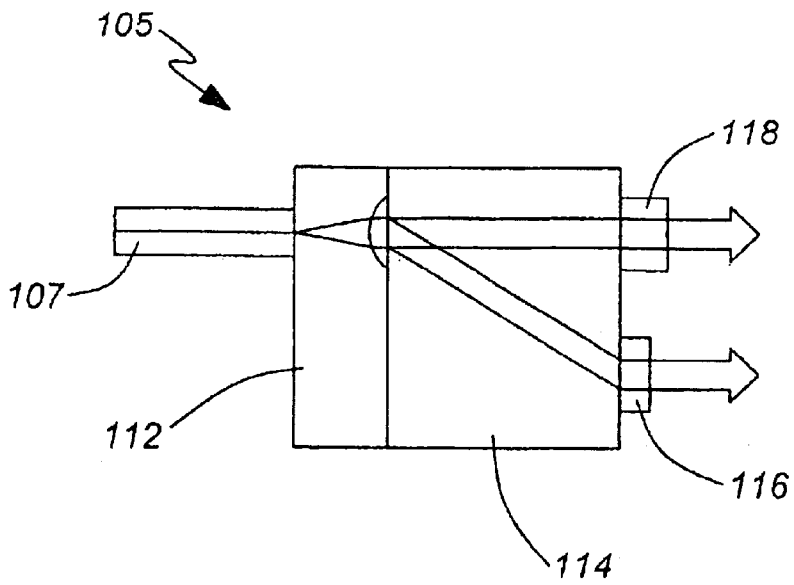


FIG. 2a

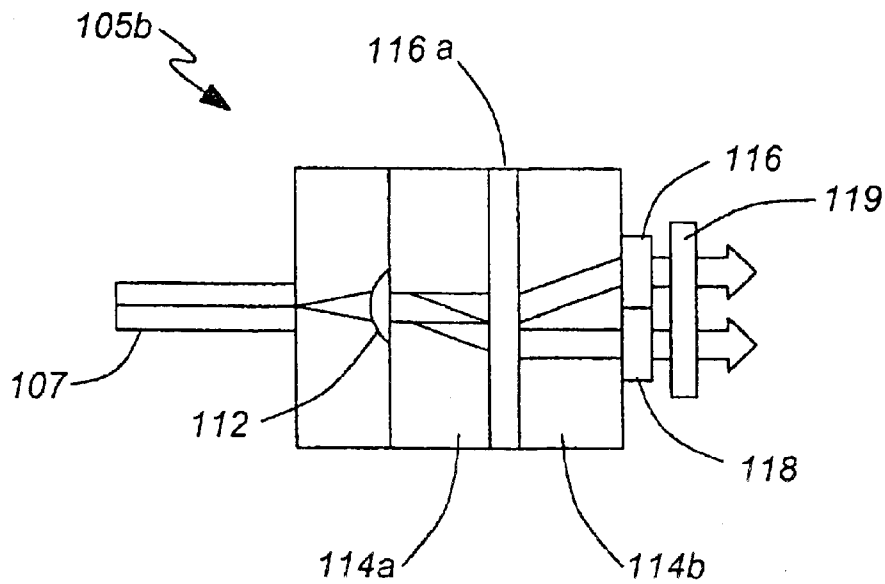


FIG. 2b

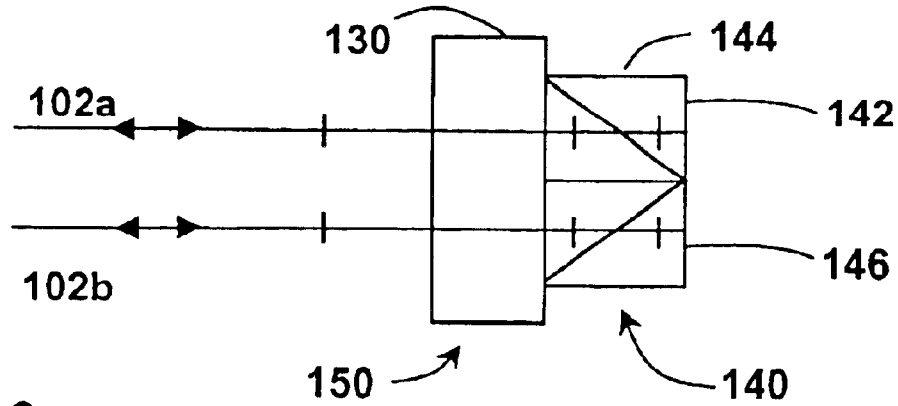


FIG. 3a

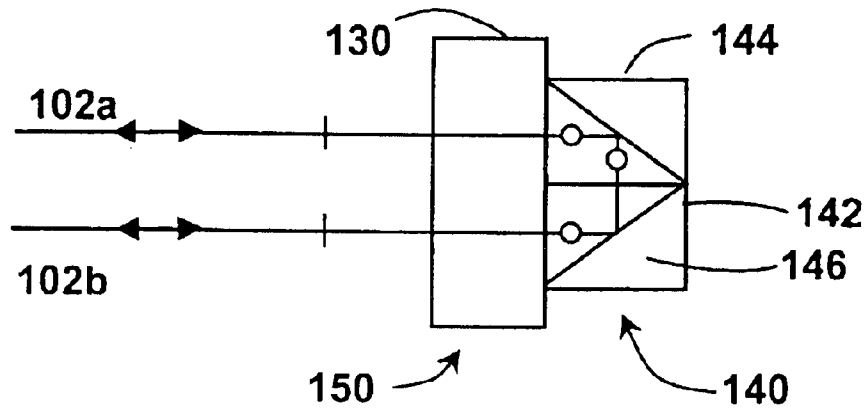


FIG. 3b

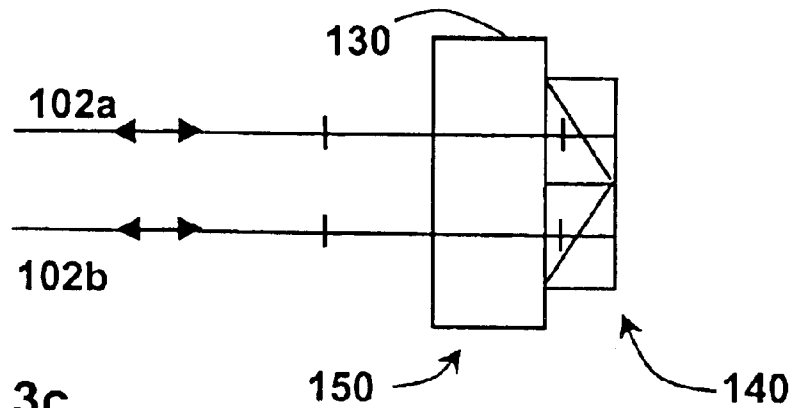


FIG. 3c

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