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(54) Title: CONCATENATED MAGNETO-OPTIC FIELD SENSORS

(57) Abstract

A Faraday effect current sensor uses a plurality of concatenated field sensors, with a single light source and a single detector. At least two Faraday effect sensing elements (single mode sensing fibers) are used, preferably at least three, the sensing elements being interconnected by fusion spliced, polarizing fibers. The sensing fibers may be oriented generally straight, and arranged to form a regular polygon, e.g., an equilateral triangle for a three-element sensor. The locations of the splices between the sensing fibers and the polarizing fibers may further be advantageously arranged such that the sensing fibers form a substantially closed path which may be placed about the current-carrying conductor. The linearity of the sensor response may be improved by selecting an appropriate value of the bias angle of each sensing element, optimally equal to $\arctan[1/\sqrt{(2n-1)}]$ where n is the number of sensing elements. The present invention may also be adapted for use as a differential current sensor wherein each sensing element is housed in a separate package allowing the elements to be placed about different conductors at a Y-branch, or about a single conductor at different locations.

