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(54) **LARGE SCALE WDM/TDM SENSOR ARRAY EMPLOYING ERBIUM-DOPED FIBER AMPLIFIERS**

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385/24; 385/31; 250/227.14; 250/227.18;
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359/135; 359/137

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(57) **ABSTRACT**

An acoustic array includes amplifiers and sensor subarrays, both of which are placed along rungs that connect a return distribution bus with both a signal distribution bus and a pump distribution bus. By placing the amplifiers along the rungs, separate buses can be used for distributing the optical signal and the pump energy for the amplifiers, thereby facilitating the use of standardized couplers. Time division multiplexed sensor subarrays are advantageously connected to unique combinations of laser signal sources and signal return buses, in which the laser signal sources generate different optical wavelengths that are multiplexed on the signal return buses. Optical sources include intensity modulators on either side of an amplifier to eliminate extraneous noise between optical pulses. In addition, amplified spontaneous emission (ASE) filters may be advantageously used to reduce optical noise at wavelengths other than those of interest.

42 Claims, 27 Drawing Sheets

