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(54) **PHYSICAL QUANTITY MEASURING DEVICE OF OPTICAL FREQUENCY RANGE REFLECTION MEASURING TYPE, AND TEMPERATURE AND STRAIN MEASURING METHOD USING THE DEVICE**

(57) A physical quantity measuring apparatus utilizing optical frequency domain reflectometry includes a tunable laser that emits a measuring light; a first polarization maintaining fiber with one end thereof connected with the tunable laser; a polarization maintaining coupler connected with another end of the first polarization maintaining fiber; a second polarization maintaining fiber with one end thereof connected with the polarization maintaining coupler and another end thereof being a referential reflecting end; a third polarization maintaining fiber with one end thereof connected with the polarization maintaining coupler; a sensor consists of a fiber Bragg grating formed in a core of the third polarization maintaining fiber; a fourth polarization maintaining fiber with one end thereof connected with the polarization maintaining coupler; a photodiode connected with the polarization maintaining coupler via the fourth polarization maintaining fiber and detects Bragg reflected light from the sensor and reference light from the referential reflecting end; a controller that detects modulation of an interference intensity between the Bragg reflected light and the reference light based on an intensity change of multiplexed light of the Bragg reflected light and the reference light detected by the photodiode; and an incidence part that inputs the measuring light to both the two orthogonal polarization axes of the second polarization maintaining fiber and the two perpendicular polarization axes of the third polarization maintaining fiber, wherein the incidence part being provided on the first polarization maintaining fiber or on both the second polarization maintaining fiber and the third polarization maintaining fiber.

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FIG. 1