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Weiss

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(54) **FLUORESCENT OPTICAL POSITION SENSOR**

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(52) **U.S. Cl.** ..... **385/12**; 250/361 R
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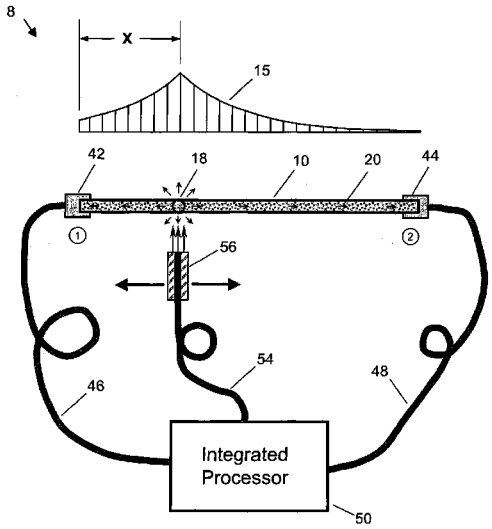
(57) **ABSTRACT**

A fluorescent optical position sensor and method of operation. A small excitation source side-pumps a localized region of fluorescence at an unknown position along a fluorescent waveguide. As the fluorescent light travels down the waveguide, the intensity of fluorescent light decreases due to absorption. By measuring with one (or two) photodetectors the attenuated intensity of fluorescent light emitted from one (or both) ends of the waveguide, the position of the excitation source relative to the waveguide can be determined by comparing the measured light intensity to a calibrated response curve or mathematical model. Alternatively, excitation light can be pumped into an end of the waveguide, which generates an exponentially-decaying continuous source of fluorescent light along the length of the waveguide. The position of a photodetector oriented to view the side of the waveguide can be uniquely determined by measuring the intensity of the fluorescent light emitted radially at that location.

24 Claims, 31 Drawing Sheets